Photon Voice

v2.3

Generated by Doxygen 1.8.10

Fri Jan 25 2019 17:36:35

Contents

Chapter 1

Photon Voice Doxygen Readme

Offline Docs

Manual Generation

To manually generate doxygen offline files:

"doxygen .\Docs\doxygen\voice-doxygen-offline.config"

Automatic Generation

Simply run "Docs\generate_offline.bat". Open the file and edit DOXYGEN_PATH accordingly. Also you need a LaTeX distrubution installed and some packages/dependencies.

This script will also copy the offline files to their respective locations and then clean up.

Files

HTML

It is not possible to disable HTML files generation. So those are just ignored or cleaned up after generation.

CHM

"PhotonVoice-Documentation.chm" should be copied

to "Assets\Photon\PhotonVoice-Documentation.chm"

from "Docs\TempOutputDocs\VOICE_OFFLINE_HTML\PhotonVoice-Documentation.chm".

PDF

"PhotonVoice-Documentation.pdf" should be copied

to "Assets\Photon\PhotonVoice-Documentation.pdf"

from "Docs\TempOutputDocs\latex\refman.pdf".

Online Docs

To manually generate doxygen online files:

"doxygen .\Docs\doxygen\voice-doxygen-online.config"

Chapter 2

Namespace Documentation

2.1 Photon Namespace Reference

Namespaces

- namespace Voice

2.2 Photon.Voice Namespace Reference

Namespaces

- namespace IOS
- namespace PUN
- namespace Unity

Classes

- class AudioDesc
- class AudioInEnumerator
- class AudioStreamPlayer
- class AudioUtil

  Collection of Audio Utility functions and classes.
- class BufferReaderPushAdapter

  Simple BufferReaderPushAdapterBase implementation using a single buffer, using synchronous LocalVoice.PushData
- class BufferReaderPushAdapterAsyncPool

  BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync.
- class BufferReaderPushAdapterAsyncPoolCopy

  BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync and data copy.
- class BufferReaderPushAdapterAsyncPoolFloatToShort

  BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync, converting float samples to short.
- class BufferReaderPushAdapterBase

  Adapter base class to move data by reading from IDataReader.Read and pushing to LocalVoice.
- class FactoryPrimitiveArrayPool

  PrimitiveArrayPool<T> as wrapped in object factory interface.
- class FactoryReusableArray

Array factory returnig the same array instance as long as it requested with the same array length. If length changes, new array instance created.

- class Framer

  Utility class to re-frame audio packets.
- interface IAudioDesc

  Audio Source interface.
- interface IAudioOut
- interface IAudioPusher

  Audio Pusher interface.
- interface IAudioReader

  Audio Reader interface.
- interface IDataReader

  Interface for pulling data, in case this is more appropriate than pushing it.
- interface IDecoder

  Generic media decoder interface.
- interface IDecoderDirect

  Interface for a media decoder that synchronously decodes data.
- interface IDecoderQueued

  Interface for a media decoder that feeds its data output into a separate method or callback asynchronously, or does not produce output at all.
- interface IDecoderQueuedOutputImageNative
- interface IEncoder

  Generic media encoder interface.
- interface IEncoderDataFlow

  Interface for a generic media encoder data flow.
- interface IEncoderDataFlowDirect

  Interface for an encoder data flow that synchronously encodes data.
- interface IEncoderNativeImageDirect
- interface IEncoderQueued

  Interface for an encoder data flow that returns compressed data independently (produces output on its own) or asynchronously (usually from a queue).
- interface ILocalVoiceAudio

  Interface for an outgoing audio stream.
- interface ILogger
- class ImageBufferInfo
- class ImageBufferNative
- class ImageBufferNativeAlloc
- class ImageBufferNativeGCHandleSinglePlane
- class ImageBufferNativePool
- interface IProcessor

  Audio Processor interface.
- interface IServiceable

  Interface for classes that want their Service() function to be called regularly in the context of a LocalVoice.
- interface ISyncAudioOut
- interface IVoiceFrontend
- class LoadBalancingFrontend

  Extends LoadBalancingClient with audio streaming functionality.
- class LocalVoice

  Represents outgoing data stream.
- class LocalVoiceAudio

  Outgoing audio stream.
- class LocalVoiceAudioDummy

Dummy LocalVoiceAudio

- class LocalVoiceAudioFloat

  Specialization of LocalVoiceAudio for float audio
- class LocalVoiceAudioShort

  Specialization of LocalVoiceAudio for short audio
- class LocalVoiceFramed

  Typed re-framing LocalVoice
- class LocalVoiceFramedBase

  Typed re-framing LocalVoice
- interface ObjectFactory

  Uniform interface to ObjectPool<TType, TInfo> and single reusable object.
- class ObjectPool

  Generic Pool to re-use objects of a certain type (TType) that optionally match a certain property or set of properties (TInfo).
- class OpusCodec
- class PrimitiveArrayPool

  Pool of Arrays with components of type T, with ObjectPool info being the array's size.
- class **RemoteVoice**
- class RemoteVoiceInfo

  Information about a remote voice (incoming stream).
- struct RemoteVoiceOptions

  Event Actions and other options for a remote voice (incoming stream).
- class SpeexLib
- class SpeexProcessor
- class UnsupportedCodecException

  Exception thrown if an unsupported codec is encountered.
- class UnsupportedSampleTypeException

  Exception thrown if an unsupported audio sample type is encountered.
- class VoiceClient

  Base class for Voice clients implamantations
- class **VoiceCodec**
- class VoiceEventCode

  PhotonVoice communication uses a single type of event, but differentiates transmission Channels by encoding a channelId into VoiceEventCode.
- struct VoiceInfo

  Describes stream properties.
- class WebRTCAudioLib
- class WebRTCAudioProcessor

Enumerations

- enum **EventSubcode** : byte
- enum **EventParam** : byte
- enum Codec

  Enum for Media Codecs supported by PhotonVoice.
- enum **ImageFormat**
- enum **Rotation**
- enum **Flip**

Functions

- delegate void **OnImageOutputNative** (IntPtr buf, int width, int height, int stride)

2.2.1 Enumeration Type Documentation

2.2.1.1 enum Codec [strong]

Enum for Media Codecs supported by PhotonVoice.

Transmitted in VoiceInfo. Do not change the values of this Enum!

Enumerator

AudioOpus OPUS audio

2.3 Photon.Voice.IOS Namespace Reference

Classes

- struct AudioSessionParameters
- class AudioSessionParametersPresets

Enumerations

- enum **AudioSessionCategory**
- enum **AudioSessionMode**
- enum **AudioSessionCategoryOption**

2.4 Photon.Voice.PUN Namespace Reference

Classes

- class PhotonVoiceNetwork

  This class can be used to automatically sync client states between PUN and Voice. It also sets a custom PUN Speaker factory to find the Speaker component for a character's voice. For this to work attach a PhotonVoiceView next to the PhotonView of your player's prefab.
- class PhotonVoiceView

  Component that should be attached to a networked PUN prefab that has PhotonView. It will bind remote Recorder with local Speaker of the same networked prefab. This component makes automatic voice stream routing easy for players' characters/avatars.

2.5 Photon.Voice.Unity Namespace Reference

Namespaces

- namespace UtilityScripts

Classes

- class AudioClipWrapper
- class AudioOutCapture
- interface ILoggable
- class IOSAudioForceToSpeaker
- class Logger
- class MicWrapper

- class Recorder

  Component representing outgoing audio stream in scene.
- class RemoteVoiceLink
- class Speaker

  Component representing remote audio stream in local scene.
- class UnityAndroidAudioInAEC
- class UnityAudioOut
- class VoiceComponent
- class VoiceConnection

  Component that represents a client voice connection to Photon Servers.
- class VoiceLogger
- class WebRtcAudioDsp

2.6 Photon.Voice.Unity.UtilityScripts Namespace Reference

Classes

- class ConnectAndJoin
- class PhotonVoiceLagSimulationGui
- class TestTone
- class ToneAudioReader

2.7 POpusCodec Namespace Reference

Namespaces

- namespace Enums

Classes

- class OpusDecoder
- class OpusEncoder
- class OpusException
- class **Wrapper**

2.8 POpusCodec.Enums Namespace Reference

Enumerations

- enum Bandwidth : int
- enum Channels : int
- enum **Complexity** : int
- enum Delay

  Using a duration of less than 10 ms will prevent the encoder from using the LPC or hybrid modes.
- enum **ForceChannels** : int
- enum OpusApplicationType : int
- enum **OpusStatusCode** : int
- enum **SamplingRate** : int
- enum SignalHint : int

2.8.1 Enumeration Type Documentation

2.8.1.1 enum Bandwidth : int [strong]

Enumerator

Narrowband Up to 4Khz

Mediumband Up to 6Khz

Wideband Up to 8Khz

SuperWideband Up to 12Khz

Fullband Up to 20Khz (High Definition)

2.8.1.2 enum Channels : int [strong]

Enumerator

Mono 1 Channel

Stereo 2 Channels

2.8.1.3 enum Delay [strong]

Using a duration of less than 10 ms will prevent the encoder from using the LPC or hybrid modes.

Enumerator

Delay2dot5ms 2.5ms

Delay5ms 5ms

Delay10ms 10ms

Delay20ms 20ms

Delay40ms 40ms

Delay60ms 60ms

2.8.1.4 enum OpusApplicationType : int [strong]

Enumerator

Voip Gives best quality at a given bitrate for voice signals. It enhances the input signal by high-pass filtering and emphasizing formants and harmonics. Optionally it includes in-band forward error correction to protect against packet loss. Use this mode for typical VoIP applications. Because of the enhancement, even at high bitrates the output may sound different from the input.

Audio Gives best quality at a given bitrate for most non-voice signals like music. Use this mode for music and mixed (music/voice) content, broadcast, and applications requiring less than 15 ms of coding delay.

RestrictedLowDelay Configures low-delay mode that disables the speech-optimized mode in exchange for slightly reduced delay.

2.8.1.5 enum SignalHint : int [strong]

Enumerator

Auto (default)

Voice Bias thresholds towards choosing LPC or Hybrid modes

Music Bias thresholds towards choosing MDCT modes.

Chapter 3

Class Documentation

3.1 SpeexProcessor.AECLatencyResultType Struct Reference

Public Attributes

- int **LatencyMs**
- int **LatencyDelayedMs**
- bool **PlayDetected**
- bool **PlayDelayedDetected**
- bool **RecDetected**

3.2 AudioClipWrapper Class Reference

Inherits IAudioReader< T >.

Public Member Functions

- **AudioClipWrapper** (AudioClip audioClip)
- bool **Read** (float[ ] buffer)
- void **Dispose** ()

Properties

- bool **Loop** `[get, set]`
- int **SamplingRate** `[get]`
- int **Channels** `[get]`
- string **Error** `[get]`

3.3 AudioDesc Class Reference

Inherits IAudioDesc.

Public Member Functions

- **AudioDesc** (int samplingRate, int channels, string error)
- void **Dispose** ()

Properties

- int **SamplingRate** [get]
- int **Channels** [get]
- string **Error** [get]

3.4 AudioInEnumerator Class Reference

Inherits IDisposable.

Public Member Functions

- **AudioInEnumerator** (Voice.ILogger logger)
- void **Refresh** ()
- string **NameAtIndex** (int i)
- int **IDAtIndex** (int i)
- bool **IDIsValid** (int id)
- void **Dispose** ()

Public Attributes

- readonly bool **IsSupported** = false

Properties

- string **Error** [get]
- int **Count** [get]

3.5 AudioOutCapture Class Reference

Inherits MonoBehaviour.

Events

- Action< float[ ], int > **OnAudioFrame**

3.6 AudioSessionParameters Struct Reference

Public Member Functions

- int **CategotyOptionsToInt** ()
- override string **ToString** ()

Public Attributes

- AudioSessionCategory **Category**
- AudioSessionMode **Mode**
- AudioSessionCategoryOption[ ] **CategoryOptions**

3.7 AudioSessionParametersPresets Class Reference

Static Public Attributes

- static AudioSessionParameters **Game**
- static AudioSessionParameters **VoIP**

3.7.1 Member Data Documentation

3.7.1.1 AudioSessionParameters Game [static]

Initial value:

```
= new AudioSessionParameters()
        {
            Category = AudioSessionCategory.PlayAndRecord,
            Mode = AudioSessionMode.Default,
            CategoryOptions = new AudioSessionCategoryOption[] { AudioSessionCategoryOption.
      DefaultToSpeaker, AudioSessionCategoryOption.AllowBluetooth }
        }
```

3.7.1.2 AudioSessionParameters VoIP [static]

Initial value:

```
= new AudioSessionParameters()
        {
            Category = AudioSessionCategory.PlayAndRecord,
            Mode = AudioSessionMode.VoiceChat,


            CategoryOptions = new AudioSessionCategoryOption[] { AudioSessionCategoryOption.AllowBluetooth
      }
       }
```

3.8 AudioStreamPlayer Class Reference

Inherits IAudioOut.

Public Member Functions

- **AudioStreamPlayer** (Photon.Voice.ILogger logger, Photon.Voice.ISyncAudioOut audioOut, string logPrefix, bool debugInfo)
- void **Start** (int frequency, int channels, int frameSamples, int playDelayMs)
- void **Service** ()
- void **Push** (float[] frame)
- void **Stop** ()

Properties

- int **Lag** [get]
- bool **IsPlaying** [get]

3.9 AudioUtil Class Reference

Collection of Audio Utility functions and classes.

Classes

- interface ILevelMeter

  Audio Level Metering interface.
- interface IVoiceDetector

  Voice Activity Detector interface.
- class LevelMeter

  Audio Level Meter.
- class LevelMeterDummy

  Dummy Audio Level Meter that doesn't actually do anything.
- class LevelMeterFloat

  LevelMeter specialization for float audio.
- class LevelMeterShort

  LevelMeter specialization for short audio.
- class Resampler

  Sample-rate conversion Audio Processor.
- class ToneAudioPusher

  IAudioPusher that provides a constant tone signal.
- class ToneAudioReader

  IAudioReader that provides a constant tone signal.
- class VoiceDetector

  Simple voice activity detector triggered by signal level.
- class VoiceDetectorCalibration

  Calibration Utility for Voice Detector
- class VoiceDetectorDummy

  Dummy VoiceDetector that doesn't actually do anything.
- class VoiceDetectorFloat

  VoiceDetector specialization for float audio.
- class VoiceDetectorShort

  VoiceDetector specialization for float audio.
- class VoiceLevelDetectCalibrate

  Utility Audio Processor Voice Detection Calibration.

Static Public Member Functions

- static void Resample< T > (T[ ] src, T[ ] dst, int dstCount, int channels)

  Resample audio data so that the complete src buffer fits into dstCount samples in the dst buffer.
- static void ResampleAndConvert (short[ ] src, float[ ] dst, int dstCount, int channels)

  Resample audio data so that the complete src buffer fits into dstCount samples in the dst buffer, and convert short to float samples along the way.
- static void ResampleAndConvert (float[ ] src, short[ ] dst, int dstCount, int channels)

  Resample audio data so that the complete src buffer fits into dstCount samples in the dst buffer, and convert float to short samples along the way.
- static void Convert (float[ ] src, short[ ] dst, int dstCount)

  Convert audio buffer from float to short samples.
- static void Convert (short[ ] src, float[ ] dst, int dstCount)

  Convert audio buffer from short to float samples.
- static void ForceToStereo< T > (T[ ] src, T[ ] dst, int srcChannels)

  Convert audio buffer with arbitrary number of channels to stereo.

3.9.1 Detailed Description

Collection of Audio Utility functions and classes.

3.9.2 Member Function Documentation

3.9.2.1 static void Convert (float[ ] *src,* short[ ] *dst,* int *dstCount*) [static]

Convert audio buffer from float to short samples.

Parameters

src	Source buffer.
dst	Destination buffer.
dstCount	Size of destination buffer (in total samples), source buffer must be of same length or longer.

3.9.2.2 static void Convert (short[ ] *src,* float[ ] *dst,* int *dstCount*) [static]

Convert audio buffer from short to float samples.

Parameters

src	Source buffer.
dst	Destination buffer.
dstCount	Size of destination buffer (in total samples), source buffer must be of same length or longer.

3.9.2.3 static void ForceToStereo< T > (T[ ] *src,* T[ ] *dst,* int *srcChannels*) [static]

Convert audio buffer with arbitrary number of channels to stereo.

For mono sources (srcChannels==1), the signal will be copied to both Left and Right stereo channels. For all others, the first two available channels will be used, any other channels will be discarded.

Parameters

src	Source buffer.
dst	Destination buffer.
srcChannels	Number of (interleaved) channels in src.

3.9.2.4 static void Resample< T > (T[ ] *src,* T[ ] *dst,* int *dstCount,* int *channels*) [static]

Resample audio data so that the complete src buffer fits into dstCount samples in the dst buffer.

This implements a primitive nearest-neighbor resampling algorithm for an arbitrary number of channels.

Parameters

src	Source buffer.
dst	Destination buffer.
dstCount	Target size of destination buffer (in samples per channel).
channels	Number of channels in the signal (1=mono, 2=stereo). Must be > 0.

3.9.2.5 static void ResampleAndConvert (short[ ] *src,* float[ ] *dst,* int *dstCount,* int *channels*) [static]

Resample audio data so that the complete src buffer fits into dstCount samples in the dst buffer, and convert short to float samples along the way.

This implements a primitive nearest-neighbor resampling algorithm for an arbitrary number of channels.

Parameters

src	Source buffer.
dst	Destination buffer.
dstCount	Target size of destination buffer (in samples per channel).
channels	Number of channels in the signal (1=mono, 2=stereo). Must be > 0.

3.9.2.6 static void ResampleAndConvert (float[ ] *src,* short[ ] *dst,* int *dstCount,* int *channels*) [static]

Resample audio data so that the complete src buffer fits into dstCount samples in the dst buffer, and convert float to short samples along the way.

This implements a primitive nearest-neighbor resampling algorithm for an arbitrary number of channels.

Parameters

src	Source buffer.
dst	Destination buffer.
dstCount	Target size of destination buffer (in samples per channel).
channels	Number of channels in the signal (1=mono, 2=stereo). Must be > 0.

3.10 BufferReaderPushAdapter< T > Class Template Reference

Simple BufferReaderPushAdapterBase implementation using a single buffer, using synchronous LocalVoice.Push↩ Data

Inherits BufferReaderPushAdapterBase< T >.

Public Member Functions

- BufferReaderPushAdapter (LocalVoice localVoice, IDataReader< T > reader)

  Create a new BufferReaderPushAdapter instance
- override void Service (LocalVoice localVoice)

  Do the actual data read/push.

Protected Attributes

- T[ ] **buffer**

3.10.1 Detailed Description

Simple BufferReaderPushAdapterBase implementation using a single buffer, using synchronous LocalVoice.Push↩ Data

3.10.2 Constructor & Destructor Documentation

3.10.2.1 BufferReaderPushAdapter (LocalVoice *localVoice,* IDataReader< T > *reader*)

Create a new BufferReaderPushAdapter instance

Parameters

localVoice	LocalVoice instance to push data to.
reader	DataReader to read from.

3.10.3 Member Function Documentation

3.10.3.1 override void Service (LocalVoice *localVoice*) [virtual]

Do the actual data read/push.

Parameters

localVoice	LocalVoice instance to push data to.

Implements BufferReaderPushAdapterBase< T >.

3.11 BufferReaderPushAdapterAsyncPool< T > Class Template Reference

BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync.

Inherits BufferReaderPushAdapterBase< T >.

Public Member Functions

- BufferReaderPushAdapterAsyncPool (LocalVoice localVoice, IDataReader< T > reader)

  Create a new BufferReaderPushAdapter instance
- override void Service (LocalVoice localVoice)

  Do the actual data read/push.

Additional Inherited Members

3.11.1 Detailed Description

BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync.

Acquires a buffer from pool before each Read, releases buffer after last Read (brings Acquire/Release overhead).

Expects localVoice to be a LocalVoiceFramed<T> of same T.

3.11.2 Constructor & Destructor Documentation

3.11.2.1 BufferReaderPushAdapterAsyncPool (LocalVoice *localVoice,* IDataReader< T > *reader*)

Create a new BufferReaderPushAdapter instance

Parameters

localVoice	LocalVoice instance to push data to.
reader	DataReader to read from.

3.11.3 Member Function Documentation

3.11.3.1 override void Service (LocalVoice *localVoice*) [virtual]

Do the actual data read/push.

Parameters

localVoice	LocalVoice instance to push data to. Must be a LocalVoiceFramed<T> of same T.

Implements BufferReaderPushAdapterBase< T >.

3.12 BufferReaderPushAdapterAsyncPoolCopy< T > Class Template Reference

BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync and data copy.

Inherits BufferReaderPushAdapterBase< T >.

Public Member Functions

- BufferReaderPushAdapterAsyncPoolCopy (LocalVoice localVoice, IDataReader< T > reader)

  Create a new BufferReaderPushAdapter instance
- override void Service (LocalVoice localVoice)

  Do the actual data read/push.

Protected Attributes

- T[ ] **buffer**

3.12.1 Detailed Description

BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync and data copy.

Reads data to preallocated buffer, copies it to buffer from pool before pushing. Compared with , this avoids one pool Acquire/Release cycle at the cost of a buffer copy. Expects localVoice to be a LocalVoiceFramed<T> of same T.

3.12.2 Constructor & Destructor Documentation

3.12.2.1 BufferReaderPushAdapterAsyncPoolCopy (LocalVoice *localVoice,* IDataReader< T > *reader*)

Create a new BufferReaderPushAdapter instance

Parameters

localVoice	LocalVoice instance to push data to.
reader	DataReader to read from.

3.12.3 Member Function Documentation

3.12.3.1 override void Service (LocalVoice *localVoice*) [virtual]

Do the actual data read/push.

Parameters

localVoice	LocalVoice instance to push data to. Must be a LocalVoiceFramed<T> of same T.

Implements BufferReaderPushAdapterBase< T >.

3.13 BufferReaderPushAdapterAsyncPoolFloatToShort Class Reference

BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync, converting float samples to short.

Inherits BufferReaderPushAdapterBase< T >.

Public Member Functions

- BufferReaderPushAdapterAsyncPoolFloatToShort (Voice.LocalVoice localVoice, Voice.IDataReader< float > reader)

  Create a new BufferReaderPushAdapter instance
- override void Service (Voice.LocalVoice localVoice)

  Do the actual data read/push.

Additional Inherited Members

3.13.1 Detailed Description

BufferReaderPushAdapter implementation using asynchronous LocalVoice.PushDataAsync, converting float samples to short.

This adapter works exactly like BufferReaderPushAdapterAsyncPool, but it converts float samples to short. Acquires a buffer from pool before each Read, releases buffer after last Read.

Expects localVoice to be a LocalVoiceFramed<T> of same T.

3.13.2 Constructor & Destructor Documentation

3.13.2.1 BufferReaderPushAdapterAsyncPoolFloatToShort (Voice.LocalVoice *localVoice,* Voice.IDataReader< float > *reader*)

Create a new BufferReaderPushAdapter instance

Parameters

localVoice	LocalVoice instance to push data to.
reader	DataReader to read from.

3.13.3 Member Function Documentation

3.13.3.1 override void Service (Voice.LocalVoice *localVoice*)

Do the actual data read/push.

Parameters

localVoice	LocalVoice instance to push data to. Must be a LocalVoiceFramed<T> of same T.

3.14 BufferReaderPushAdapterBase< T > Class Template Reference

Adapter base class to move data by reading from IDataReader.Read and pushing to LocalVoice.

Inherits IServiceable.

Inherited by BufferReaderPushAdapter< T >, BufferReaderPushAdapterAsyncPool< T >, BufferReaderPushAdapterAsyncPoolCopy< T >, and BufferReaderPushAdapterAsyncPoolFloatToShort.

Public Member Functions

- abstract void Service (LocalVoice localVoice)

  Do the actual data read/push.
- BufferReaderPushAdapterBase (IDataReader< T > reader)

  Create a new BufferReaderPushAdapterBase instance
- void Dispose ()

  Release resources associated with this instance.

Protected Attributes

- IDataReader< T > **reader**

3.14.1 Detailed Description

Adapter base class to move data by reading from IDataReader.Read and pushing to LocalVoice.

Use this with a LocalVoice of same T type.

3.14.2 Constructor & Destructor Documentation

3.14.2.1 BufferReaderPushAdapterBase (IDataReader< T > *reader*)

Create a new BufferReaderPushAdapterBase instance

Parameters

reader	DataReader to read from.

3.14.3 Member Function Documentation

3.14.3.1 void Dispose ( )

Release resources associated with this instance.

3.14.3.2 abstract void Service (LocalVoice *localVoice*) [pure virtual]

Do the actual data read/push.

Parameters

localVoice	LocalVoice instance to push data to.

Implements IServiceable.

Implemented in BufferReaderPushAdapterAsyncPoolCopy< T >, BufferReaderPushAdapterAsyncPool< T >, and BufferReaderPushAdapter< T >.

3.15 WebRTCAudioLib.ConfigParam Struct Reference

Public Attributes

- const int **AEC_DELAY_AGNOSTIC** = 12
- const int **AEC_EXTENDED_FILTER** = 13
- const int **AGC_EXPERIMENTAL** = 53
- const int **AGC_EXPERIMENTAL_STARTUP_MIN_VOLUME** = 54
- const int **AGC_EXPERIMENTAL_CLIP_LEVEL_MIN** = 55

3.16 ConnectAndJoin Class Reference

Inherits MonoBehaviour, IConnectionCallbacks, and IMatchmakingCallbacks.

Public Member Functions

- void **ConnectNow** ()
- void **OnCreatedRoom** ()
- void **OnCreateRoomFailed** (short returnCode, string message)
- void **OnFriendListUpdate** (List< FriendInfo > friendList)
- void **OnJoinedRoom** ()
- void **OnJoinRandomFailed** (short returnCode, string message)
- void **OnJoinRoomFailed** (short returnCode, string message)
- void **OnLeftRoom** ()
- void **OnConnected** ()
- void **OnConnectedToMaster** ()
- void **OnDisconnected** (DisconnectCause cause)
- void **OnRegionListReceived** (RegionHandler regionHandler)
- void **OnCustomAuthenticationResponse** (Dictionary< string, object > data)
- void **OnCustomAuthenticationFailed** (string debugMessage)

Public Attributes

- bool **RandomRoom** = true
- string **RoomName**

Properties

- bool **IsConnected** `[get]`

3.17 OpusCodec.Decoder Class Reference

Inherits IDecoderDirect.

Public Member Functions

- **Decoder** (ILogger logger)
- void Open (VoiceInfo i)

  Open (initialize) the decoder.
- byte[ ] DecodeToByte (byte[ ] buf)

  Decode the given raw data buffer.
- float[ ] DecodeToFloat (byte[ ] buf)

  Decode the given raw data buffer to floating point audio.
- short[ ] DecodeToShort (byte[ ] buf)

  Decode the given raw data buffer to 'short' (16-bit) audio.
- void **Dispose** ()

Properties

- string **Error** `[get]`

3.17.1 Member Function Documentation

3.17.1.1 byte [ ] DecodeToByte (byte[ ] *buf*)

Decode the given raw data buffer.

Parameters

buf	Buffer of encoded (compressed) data.

Returns

Buffer of decoded (uncompressed) data.

Implements IDecoderDirect.

3.17.1.2 float [ ] DecodeToFloat (byte[ ] *buf*)

Decode the given raw data buffer to floating point audio.

Only sensible for audio data.

Parameters

buf	Buffer of encoded (compressed) data.

Returns

Buffer of decoded (uncompressed) data.

Implements IDecoderDirect.

3.17.1.3 short [ ] DecodeToShort (byte[ ] *buf*)

Decode the given raw data buffer to 'short' (16-bit) audio.

Only sensible for audio data.

Parameters

buf	Buffer of encoded (compressed) data.

Returns

Buffer of decoded (uncompressed) data.

Implements IDecoderDirect.

3.17.1.4 void Open (VoiceInfo *info*)

Open (initialize) the decoder.

Parameters

info	Properties of the data stream to decode.

Implements IDecoder.

3.18 OpusCodec.Encoder< T > Class Template Reference

Inherits IEncoderDataFlowDirect< T >.

Inherited by OpusCodec.EncoderFloat, and OpusCodec.EncoderShort.

Public Member Functions

- void **Dispose** ()
- abstract ArraySegment< byte > EncodeAndGetOutput (T[ ] buf)

  Encode the given uncompressed media data.

Protected Member Functions

- **Encoder** (VoiceInfo i, ILogger logger)

Protected Attributes

- OpusEncoder **encoder**
- bool **disposed**

Properties

- string **Error** `[get]`

3.18.1 Member Function Documentation

3.18.1.1 abstract ArraySegment<byte> EncodeAndGetOutput (T[ ] *buf*) `[pure virtual]`

Encode the given uncompressed media data.

Parameters

buf	Array containing raw (uncompressed) data (e.g. audio samples).

Returns

Encoded (compressed) data.

Implements IEncoderDataFlowDirect< T >.

3.19 OpusCodec.EncoderFactory Class Reference

Static Public Member Functions

- static IEncoder **Create** (VoiceInfo i, LocalVoice v)

3.20 OpusCodec.EncoderFloat Class Reference

Inherits OpusCodec.Encoder< T >.

Public Member Functions

- override ArraySegment< byte > **EncodeAndGetOutput** (float[ ] buf)

Additional Inherited Members

3.21 OpusCodec.EncoderShort Class Reference

Inherits OpusCodec.Encoder< T >.

Public Member Functions

- override ArraySegment< byte > **EncodeAndGetOutput** (short[ ] buf)

Additional Inherited Members

3.22 FactoryPrimitiveArrayPool< T > Class Template Reference

PrimitiveArrayPool<T> as wrapped in object factory interface.

Inherits ObjectFactory< TType, TInfo >.

Public Member Functions

- **FactoryPrimitiveArrayPool** (int capacity, string name)
- **FactoryPrimitiveArrayPool** (int capacity, string name, int info)
- T[ ] **New** ()
- T[ ] **New** (int size)
- void **Free** (T[ ] obj)
- void **Free** (T[ ] obj, int info)
- void **Dispose** ()

Properties

- int **Info** [get]

3.22.1 Detailed Description

PrimitiveArrayPool<T> as wrapped in object factory interface.

Template Parameters

T	Array element type.

3.23 FactoryReusableArray< T > Class Template Reference

Array factory returnig the same array instance as long as it requested with the same array length. If length changes, new array instance created.

Inherits ObjectFactory< TType, TInfo >.

Public Member Functions

- **FactoryReusableArray** (int size)
- T[ ] **New** ()
- T[ ] **New** (int size)
- void **Free** (T[ ] obj)
- void **Free** (T[ ] obj, int info)
- void **Dispose** ()

Properties

- int **Info** [get]

3.23.1 Detailed Description

Array factory returnig the same array instance as long as it requested with the same array length. If length changes, new array instance created.

Template Parameters

T	Array element type.

3.24 Framer< T > Class Template Reference

Utility class to re-frame audio packets.

Public Member Functions

- Framer (int frameSize)

  Create new Framer instance.
- int Count (int bufLen)

  Get the number of frames available after adding bufLen samples.

- IEnumerable< T[] > Frame (T[] buf)
  Append arbitrary-sized buffer and return available full frames.

3.24.1 Detailed Description

Utility class to re-frame audio packets.

3.24.2 Constructor & Destructor Documentation

3.24.2.1 Framer (int *frameSize*)

Create new Framer instance.

3.24.3 Member Function Documentation

3.24.3.1 int Count (int *bufLen*)

Get the number of frames available after adding bufLen samples.

Parameters

bufLen	Number of samples that would be added.

Returns

Number of full frames available when adding bufLen samples.

3.24.3.2 IEnumerable<T[]> Frame (T[] *buf*)

Append arbitrary-sized buffer and return available full frames.

Parameters

buf	Array of samples to add.

Returns

Enumerator of full frames (might be none).

3.25 IAudioDesc Interface Reference

Audio Source interface.

Inherits IDisposable.

Inherited by AudioDesc, IAudioPusher< T >, and IAudioReader< T >.

Properties

- int SamplingRate [get]
  Sampling rate of the audio signal (in Hz).
- int Channels [get]
  Number of channels in the audio signal.
- string Error [get]
  If not null, audio object is in invalid state.

3.25.1 Detailed Description

Audio Source interface.

3.25.2 Property Documentation

3.25.2.1 int Channels [get]

Number of channels in the audio signal.

3.25.2.2 string Error [get]

If not null, audio object is in invalid state.

3.25.2.3 int SamplingRate [get]

Sampling rate of the audio signal (in Hz).

3.26 IAudioOut Interface Reference

Inherited by AudioStreamPlayer, and ISyncAudioOut.

Public Member Functions

- void **Start** (int frequency, int channels, int frameSamplesPerChannel, int playDelayMs)
- void **Stop** ()
- void **Push** (float[ ] frame)
- void **Service** ()

Properties

- bool **IsPlaying** [get]
- int **Lag** [get]

3.27 IAudioPusher< T > Interface Template Reference

Audio Pusher interface.

Inherits IAudioDesc.

Inherited by AudioUtil.ToneAudioPusher< T >, and UnityAndroidAudioInAEC.

Public Member Functions

- void SetCallback (Action< T[ ]> callback, ObjectFactory< T[ ], int > bufferFactory)

  Set the callback function used for pushing data.

Additional Inherited Members

3.27.1 Detailed Description

Audio Pusher interface.

Opposed to an IAudioReader (which will deliver audio data when it is "pulled"), an IAudioPusher will push its audio data whenever it is ready,

3.27.2 Member Function Documentation

3.27.2.1 void SetCallback (Action< T[ ]> *callback,* ObjectFactory< T[ ], int > *bufferFactory*)

Set the callback function used for pushing data.

Parameters

callback	Callback function to use.
localVoice	Outgoing audio stream, for context.

Implemented in AudioUtil.ToneAudioPusher< T >.

3.28 IAudioReader< T > Interface Template Reference

Audio Reader interface.

Inherits IDataReader< T >, and IAudioDesc.

Inherited by AudioUtil.ToneAudioReader< T >, AudioClipWrapper, MicWrapper, and ToneAudioReader.

Additional Inherited Members

3.28.1 Detailed Description

Audio Reader interface.

Opposed to an IAudioPusher (which will push its audio data whenever it is ready), an IAudioReader will deliver audio data when it is "pulled" (it's Read function is called).

3.29 IDataReader< T > Interface Template Reference

Interface for pulling data, in case this is more appropriate than pushing it.

Inherits IDisposable.

Inherited by IAudioReader< T >.

Public Member Functions

- bool Read (T[ ] buffer)

  Fill full given frame buffer with source uncompressed data or return false if not enough such data.

3.29.1 Detailed Description

Interface for pulling data, in case this is more appropriate than pushing it.

3.29.2 Member Function Documentation

3.29.2.1 bool Read (T[] *buffer*)

Fill full given frame buffer with source uncompressed data or return false if not enough such data.

Parameters

buffer	Buffer to fill.

Returns

True if buffer was filled successfully, false otherwise.

Implemented in AudioUtil.ToneAudioReader< T >.

3.30 IDecoder Interface Reference

Generic media decoder interface.

Inherits IDisposable.

Inherited by IDecoderDirect, and IDecoderQueued.

Public Member Functions

- void Open (VoiceInfo info)
  Open (initialize) the decoder.

Properties

- string Error `[get]`
  If not null, the object is in invalid state.

3.30.1 Detailed Description

Generic media decoder interface.

3.30.2 Member Function Documentation

3.30.2.1 void Open (VoiceInfo *info*)

Open (initialize) the decoder.

Parameters

info	Properties of the data stream to decode.

Implemented in OpusCodec.Decoder.

3.30.3 Property Documentation

3.30.3.1 string Error `[get]`

If not null, the object is in invalid state.

3.31 IDecoderDirect Interface Reference

Interface for a media decoder that synchronously decodes data.

Inherits IDecoder.

Inherited by OpusCodec.Decoder.

Public Member Functions

- byte[ ] DecodeToByte (byte[ ] buf)

  Decode the given raw data buffer.
- float[ ] DecodeToFloat (byte[ ] buf)

  Decode the given raw data buffer to floating point audio.
- short[ ] DecodeToShort (byte[ ] buf)

  Decode the given raw data buffer to 'short' (16-bit) audio.

Additional Inherited Members

3.31.1 Detailed Description

Interface for a media decoder that synchronously decodes data.

3.31.2 Member Function Documentation

3.31.2.1 byte [ ] DecodeToByte (byte[ ] *buf*)

Decode the given raw data buffer.

Parameters

buf	Buffer of encoded (compressed) data.

Returns

Buffer of decoded (uncompressed) data.

Implemented in OpusCodec.Decoder.

3.31.2.2 float [ ] DecodeToFloat (byte[ ] *buf*)

Decode the given raw data buffer to floating point audio.

Only sensible for audio data.

Parameters

buf	Buffer of encoded (compressed) data.

Returns

Buffer of decoded (uncompressed) data.

Implemented in OpusCodec.Decoder.

3.31.2.3 short [ ] DecodeToShort (byte[ ] *buf*)

Decode the given raw data buffer to 'short' (16-bit) audio.

Only sensible for audio data.

Parameters

buf	Buffer of encoded (compressed) data.

Returns

Buffer of decoded (uncompressed) data.

Implemented in OpusCodec.Decoder.

3.32 IDecoderQueued Interface Reference

Interface for a media decoder that feeds its data output into a separate method or callback asynchronously, or does not produce output at all.

Inherits IDecoder.

Inherited by IDecoderQueuedOutputImageNative.

Public Member Functions

- void Decode (byte[ ] buf)

  Decode the given raw data buffer.

Additional Inherited Members

3.32.1 Detailed Description

Interface for a media decoder that feeds its data output into a separate method or callback asynchronously, or does not produce output at all.

3.32.2 Member Function Documentation

3.32.2.1 void Decode (byte[ ] *buf*)

Decode the given raw data buffer.

This function will be called also for every missing frame, with buf = null.

Parameters

buf	Buffer of encoded (compressed) data.

3.33 IDecoderQueuedOutputImageNative Interface Reference

Inherits IDecoderQueued.

Properties

- ImageFormat **OutputImageFormat** `[get, set]`
- Flip **OutputImageFlip** `[get, set]`
- Func< int, int, IntPtr > **OutputImageBufferGetter** `[get, set]`
- OnImageOutputNative **OnOutputImage** `[get, set]`

Additional Inherited Members

3.34 IEncoder Interface Reference

Generic media encoder interface.

Inherits IDisposable.

Inherited by IEncoderDataFlow< T >, IEncoderNativeImageDirect, and IEncoderQueued.

Properties

- string Error `[get]`
  If not null, the object is in invalid state.

3.34.1 Detailed Description

Generic media encoder interface.

3.34.2 Property Documentation

3.34.2.1 string Error `[get]`

If not null, the object is in invalid state.

3.35 IEncoderDataFlow< T > Interface Template Reference

Interface for a generic media encoder data flow.

Inherits IEncoder.

Inherited by IEncoderDataFlowDirect< T >.

Additional Inherited Members

3.35.1 Detailed Description

Interface for a generic media encoder data flow.

3.36 IEncoderDataFlowDirect< T > Interface Template Reference

Interface for an encoder data flow that synchronously encodes data.

Inherits IEncoderDataFlow< T >.

Inherited by OpusCodec.Encoder< T >.

Public Member Functions

- ArraySegment< byte > EncodeAndGetOutput (T[ ] buf)

  Encode the given uncompressed media data.

Additional Inherited Members

3.36.1 Detailed Description

Interface for an encoder data flow that synchronously encodes data.

3.36.2 Member Function Documentation

3.36.2.1 ArraySegment<byte> EncodeAndGetOutput (T[ ] *buf*)

Encode the given uncompressed media data.

Parameters

buf	Array containing raw (uncompressed) data (e.g. audio samples).

Returns

Encoded (compressed) data.

Implemented in OpusCodec.Encoder< T >.

3.37 IEncoderNativeImageDirect Interface Reference

Inherits IEncoder.

Public Member Functions

- IEnumerable< ArraySegment< byte > > **EncodeAndGetOutput** (IntPtr[ ] buf, int width, int height, int[ ] stride, ImageFormat imageFormat, Rotation rotation, Flip flip)

Additional Inherited Members

3.38 IEncoderQueued Interface Reference

Interface for an encoder data flow that returns compressed data independently (produces output on its own) or asynchronously (usually from a queue).

Inherits IEncoder.

Public Member Functions

- IEnumerable< ArraySegment< byte > > GetOutput ()

  Get an Enumerable of buffers containing encoded (compressed) data.

Additional Inherited Members

3.38.1 Detailed Description

Interface for an encoder data flow that returns compressed data independently (produces output on its own) or asynchronously (usually from a queue).

3.38.2 Member Function Documentation

3.38.2.1 IEnumerable<ArraySegment<byte> > GetOutput ( )

Get an Enumerable of buffers containing encoded (compressed) data.

Returns

Encoded (compressed) data.

3.39 AudioUtil.ILevelMeter Interface Reference

Audio Level Metering interface.

Inherited by AudioUtil.LevelMeter< T >, and AudioUtil.LevelMeterDummy.

Public Member Functions

- void ResetAccumAvgPeakAmp ()

  Reset AccumAvgPeakAmp.

Properties

- float CurrentAvgAmp `[get]`

  Average amplitude value over last half second.
- float CurrentPeakAmp `[get]`

  Maximum amplitude value over last half second sec.
- float AccumAvgPeakAmp `[get]`

  Average of CurrentPeakAmps since last reset.

3.39.1 Detailed Description

Audio Level Metering interface.

3.39.2 Member Function Documentation

3.39.2.1 void ResetAccumAvgPeakAmp ( )

Reset AccumAvgPeakAmp.

Implemented in AudioUtil.LevelMeter< T >, and AudioUtil.LevelMeterDummy.

3.39.3 Property Documentation

3.39.3.1 float AccumAvgPeakAmp [get]

Average of CurrentPeakAmps since last reset.

3.39.3.2 float CurrentAvgAmp [get]

Average amplitude value over last half second.

3.39.3.3 float CurrentPeakAmp [get]

Maximum amplitude value over last half second sec.

3.40 ILocalVoiceAudio Interface Reference

Interface for an outgoing audio stream.

Inherited by LocalVoiceAudio< T >, and LocalVoiceAudioDummy.

Public Member Functions

- void VoiceDetectorCalibrate (int durationMs)
  Trigger voice detector calibration process.

Properties

- AudioUtil.IVoiceDetector VoiceDetector [get]
  The VoiceDetector in use.
- AudioUtil.ILevelMeter LevelMeter [get]
  The LevelMeter utility in use.
- bool VoiceDetectorCalibrating [get]
  If true, voice detector calibration is in progress.

3.40.1 Detailed Description

Interface for an outgoing audio stream.

A LocalVoice always brings a LevelMeter and a VoiceDetector, which you can access using this interface.

3.40.2 Member Function Documentation

3.40.2.1 void VoiceDetectorCalibrate (int *durationMs*)

Trigger voice detector calibration process.

While calibrating, keep silence. Voice detector sets threshold based on measured backgroud noise level.

Parameters

durationMs	Duration of calibration (in milliseconds).

Implemented in LocalVoiceAudioDummy, and LocalVoiceAudio< T >.

3.40.3 Property Documentation

3.40.3.1 AudioUtil.ILevelMeter LevelMeter [get]

The LevelMeter utility in use.

3.40.3.2 AudioUtil.IVoiceDetector VoiceDetector [get]

The VoiceDetector in use.

Use it to enable or disable voice detector and set its parameters.

3.40.3.3 bool VoiceDetectorCalibrating [get]

If true, voice detector calibration is in progress.

3.41 ILoggable Interface Reference

Inherited by VoiceComponent, and VoiceConnection.

Properties

- DebugLevel **LogLevel** [get, set]
- VoiceLogger **Logger** [get]

3.42 ILogger Interface Reference

Inherited by IVoiceFrontend, Logger, and VoiceLogger.

Public Member Functions

- void **LogError** (string fmt, params object[ ] args)
- void **LogWarning** (string fmt, params object[ ] args)
- void **LogInfo** (string fmt, params object[ ] args)
- void **LogDebug** (string fmt, params object[ ] args)

3.43 ImageBufferInfo Class Reference

Public Member Functions

- **ImageBufferInfo** (int width, int height, int[ ] stride, ImageFormat format)

Properties

- int **Width** `[get]`
- int **Height** `[get]`
- int[ ] **Stride** `[get]`
- ImageFormat **Format** `[get]`
- Rotation **Rotation** `[get, set]`
- Flip **Flip** `[get, set]`

3.44 ImageBufferNative Class Reference

Inherited by ImageBufferNativeAlloc, and ImageBufferNativeGCHandleSinglePlane.

Public Member Functions

- **ImageBufferNative** (ImageBufferInfo info)
- virtual void **Release** ()
- virtual void **Dispose** ()

Properties

- ImageBufferInfo **Info** `[get, protected set]`
- IntPtr[ ] **Planes** `[get, protected set]`

3.45 ImageBufferNativeAlloc Class Reference

Inherits ImageBufferNative, and IDisposable.

Public Member Functions

- **ImageBufferNativeAlloc** (ImageBufferNativePool< ImageBufferNativeAlloc > pool, ImageBufferInfo info)
- override void **Release** ()
- override void **Dispose** ()

Additional Inherited Members

3.46 ImageBufferNativeGCHandleSinglePlane Class Reference

Inherits ImageBufferNative, and IDisposable.

Public Member Functions

- **ImageBufferNativeGCHandleSinglePlane** (ImageBufferNativePool< ImageBufferNativeGCHandleSingle↩ Plane > pool, ImageBufferInfo info)
- void **PinPlane** (byte[ ] plane)
- override void **Release** ()
- override void **Dispose** ()

Additional Inherited Members

3.47 ImageBufferNativePool< T > Class Template Reference

Inherits ObjectPool< TType, TInfo >.

Public Member Functions

- delegate T **Factory** (ImageBufferNativePool< T > pool, ImageBufferInfo info)
- **ImageBufferNativePool** (int capacity, Factory factory, string name)
- **ImageBufferNativePool** (int capacity, Factory factory, string name, ImageBufferInfo info)

Protected Member Functions

- override T **createObject** (ImageBufferInfo info)
- override void **destroyObject** (T obj)
- override bool **infosMatch** (ImageBufferInfo i0, ImageBufferInfo i1)

Additional Inherited Members

3.48 IOSAudioForceToSpeaker Class Reference

Inherits MonoBehaviour.

3.49 IProcessor< T > Interface Template Reference

Audio Processor interface.

Inherits IDisposable.

Inherited by AudioUtil.LevelMeter< T >, AudioUtil.Resampler< T >, AudioUtil.VoiceDetector< T >, AudioUtil.VoiceDetectorCalibration< T >, AudioUtil.VoiceLevelDetectCalibrate< T >, SpeexProcessor, and WebRTCAudioProcessor.

Public Member Functions

- T[ ] Process (T[ ] buf)

  Process a frame of audio data.

3.49.1 Detailed Description

Audio Processor interface.

3.49.2 Member Function Documentation

3.49.2.1 T [ ] Process (T[ ] *buf*)

Process a frame of audio data.

Parameters

buf	Buffer containing input audio data

Returns

Buffer containing output audio data

Implemented in AudioUtil.VoiceLevelDetectCalibrate< T >, AudioUtil.VoiceDetector< T >, AudioUtil.VoiceDetectorCalibration< T >, AudioUtil.LevelMeter< T >, and AudioUtil.Resampler< T >.

3.50 IServiceable Interface Reference

Interface for classes that want their Service() function to be called regularly in the context of a LocalVoice.

Inherited by BufferReaderPushAdapterBase< T >.

Public Member Functions

- void Service (LocalVoice localVoice)

  Service function that should be called regularly.

3.50.1 Detailed Description

Interface for classes that want their Service() function to be called regularly in the context of a LocalVoice.

3.50.2 Member Function Documentation

3.50.2.1 void Service (LocalVoice *localVoice*)

Service function that should be called regularly.

Implemented in BufferReaderPushAdapterAsyncPoolCopy< T >, BufferReaderPushAdapterAsyncPool< T >, BufferReaderPushAdapter< T >, and BufferReaderPushAdapterBase< T >.

3.51 ISyncAudioOut Interface Reference

Inherits IAudioOut.

Inherited by UnityAudioOut.

Public Member Functions

- void **Pause** ()
- void **UnPause** ()

Properties

- int **PlaySamplePos** `[get, set]`

3.52 AudioUtil.IVoiceDetector Interface Reference

Voice Activity Detector interface.

Inherited by AudioUtil.VoiceDetector< T >, and AudioUtil.VoiceDetectorDummy.

Properties

- bool On `[get, set]`

  If true, voice detection enabled.
- float Threshold `[get, set]`

  Voice detected as soon as signal level exceeds threshold.
- bool Detected `[get]`

  If true, voice detected.
- DateTime DetectedTime `[get]`

  Last time when switched to detected state.
- int ActivityDelayMs `[get, set]`

  Keep detected state during this time after signal level dropped below threshold.

Events

- Action OnDetected

  Called when switched to detected state.

3.52.1 Detailed Description

Voice Activity Detector interface.

3.52.2 Property Documentation

3.52.2.1 int ActivityDelayMs `[get]`, `[set]`

Keep detected state during this time after signal level dropped below threshold.

3.52.2.2 bool Detected `[get]`

If true, voice detected.

3.52.2.3 DateTime DetectedTime `[get]`

Last time when switched to detected state.

3.52.2.4 bool On `[get]`, `[set]`

If true, voice detection enabled.

3.52.2.5 float Threshold `[get]`, `[set]`

Voice detected as soon as signal level exceeds threshold.

3.52.3 Event Documentation

3.52.3.1 Action OnDetected

Called when switched to detected state.

3.53 IVoiceFrontend Interface Reference

Inherits ILogger.

Inherited by LoadBalancingFrontend.

Public Member Functions

- int **AssignChannel** (VoiceInfo v)
- bool **IsChannelJoined** (int channelId)
- void **SendVoicesInfo** (IEnumerable< LocalVoice > voices, int channelId, int targetPlayerId)
- void **SendVoiceRemove** (LocalVoice voice, int channelId, int targetPlayerId)
- void **SendFrame** (ArraySegment< byte > data, byte evNumber, byte voiceId, int channelId, LocalVoice localVoice)
- string **ChannelIdStr** (int channelId)
- string **PlayerIdStr** (int playerId)
- void **SetDebugEchoMode** (LocalVoice v)

3.54 AudioUtil.LevelMeter< T > Class Template Reference

Audio Level Meter.

Inherits IProcessor< T >, and AudioUtil.ILevelMeter.

Inherited by AudioUtil.LevelMeterFloat, and AudioUtil.LevelMeterShort.

Public Member Functions

- void ResetAccumAvgPeakAmp ()

  Reset AccumAvgPeakAmp.
- abstract T[ ] Process (T[ ] buf)

  Process a frame of audio data.
- void **Dispose** ()

Protected Attributes

- float **ampSum**
- float **ampPeak**
- int **bufferSize**
- float[ ] **buffer**
- int **prevValuesPtr**
- float **accumAvgPeakAmpSum**
- int **accumAvgPeakAmpCount**

Properties

- float **CurrentAvgAmp** `[get]`
- float **CurrentPeakAmp** `[get, protected set]`
- float **AccumAvgPeakAmp** `[get]`

3.54.1 Detailed Description

Audio Level Meter.

3.54.2 Member Function Documentation

3.54.2.1 abstract T [ ] Process (T[ ] *buf*) `[pure virtual]`

Process a frame of audio data.

Parameters

buf	Buffer containing input audio data

Returns

Buffer containing output audio data

Implements IProcessor< T >.

3.54.2.2 void ResetAccumAvgPeakAmp ( )

Reset AccumAvgPeakAmp.

Implements AudioUtil.ILevelMeter.

3.55 AudioUtil.LevelMeterDummy Class Reference

Dummy Audio Level Meter that doesn't actually do anything.

Inherits AudioUtil.ILevelMeter.

Public Member Functions

- void ResetAccumAvgPeakAmp ()

  Reset AccumAvgPeakAmp.

Properties

- float **CurrentAvgAmp** `[get]`
- float **CurrentPeakAmp** `[get]`
- float **AccumAvgPeakAmp** `[get]`

3.55.1 Detailed Description

Dummy Audio Level Meter that doesn't actually do anything.

3.55.2 Member Function Documentation

3.55.2.1 void ResetAccumAvgPeakAmp ( )

Reset AccumAvgPeakAmp.

Implements AudioUtil.ILevelMeter.

3.56 AudioUtil.LevelMeterFloat Class Reference

LevelMeter specialization for float audio.

Inherits AudioUtil.LevelMeter< T >.

Public Member Functions

- LevelMeterFloat (int samplingRate, int numChannels)

  Create new LevelMeterFloat instance.
- override float[ ] **Process** (float[ ] buf)

Additional Inherited Members

3.56.1 Detailed Description

LevelMeter specialization for float audio.

3.56.2 Constructor & Destructor Documentation

3.56.2.1 LevelMeterFloat (int *samplingRate,* int *numChannels*)

Create new LevelMeterFloat instance.

Parameters

samplingRate	Sampling rate of the audio signal (in Hz).
numChannels	Number of channels in the audio signal.

3.57 AudioUtil.LevelMeterShort Class Reference

LevelMeter specialization for short audio.

Inherits AudioUtil.LevelMeter< T >.

Public Member Functions

- LevelMeterShort (int samplingRate, int numChannels)

  Create new LevelMeterShort instance.
- override short[ ] **Process** (short[ ] buf)

Additional Inherited Members

3.57.1 Detailed Description

LevelMeter specialization for short audio.

3.57.2 Constructor & Destructor Documentation

3.57.2.1 LevelMeterShort (int *samplingRate,* int *numChannels*)

Create new LevelMeterShort instance.

Parameters

samplingRate	Sampling rate of the audio signal (in Hz).
numChannels	Number of channels in the audio signal.

3.58 LoadBalancingFrontend Class Reference

Extends LoadBalancingClient with audio streaming functionality.

Inherits LoadBalancingClient, IVoiceFrontend, and IDisposable.

Public Member Functions

- void **LogError** (string fmt, params object[ ] args)
- void **LogWarning** (string fmt, params object[ ] args)
- void **LogInfo** (string fmt, params object[ ] args)
- void **LogDebug** (string fmt, params object[ ] args)
- int **AssignChannel** (VoiceInfo v)
- bool **IsChannelJoined** (int channelId)
- void **SetDebugEchoMode** (LocalVoice v)
- LoadBalancingFrontend (ConnectionProtocol connectionProtocol=ConnectionProtocol.Udp)

  Initializes a new LoadBalancingFrontend.
- new void Service ()

  This method dispatches all available incoming commands and then sends this client's outgoing commands. Call this method regularly (2 to 20 times a second).
- virtual bool ChangeAudioGroups (byte[ ] groupsToRemove, byte[ ] groupsToAdd)

  Change audio groups listended by client. Works only while joined to a voice room.
- void **SendVoicesInfo** (IEnumerable< LocalVoice > voices, int channelId, int targetPlayerId)
- void SendDebugEchoVoicesInfo (int channelId)

  Send VoicesInfo events to the local player for all voices that have DebugEcho enabled.
- void **SendVoiceRemove** (LocalVoice voice, int channelId, int targetPlayerId)
- void **SendFrame** (ArraySegment< byte > data, byte evNumber, byte voiceId, int channelId, LocalVoice localVoice)
- string **ChannelIdStr** (int channelId)
- string **PlayerIdStr** (int playerId)
- void Dispose ()

  Releases all resources used by the LoadBalancingFrontend instance.

Protected Attributes

- VoiceClient **voiceClient**

Properties

- VoiceClient VoiceClient `[get]`

  The VoiceClient implementation associated with this LoadBalancingFrontend.

- byte GlobalAudioGroup `[get, set]`

  Set global audio group for this client. This call sets AudioGroup for existing local voices and for created later to given value. Client set as listening to this group only until ChangeAudioGroups called. This method can be called any time.

3.58.1 Detailed Description

Extends LoadBalancingClient with audio streaming functionality.

Use your normal LoadBalancing workflow to join a Voice room. All standard LoadBalancing features are available.

To work with audio:

- Create outgoing audio streams with Client.CreateLocalVoice.
- Handle new incoming audio streams info with OnRemoteVoiceInfoAction .
- Handle incoming audio streams data with OnAudioFrameAction .
- Handle closing of incoming audio streams with .

3.58.2 Constructor & Destructor Documentation

3.58.2.1 LoadBalancingFrontend (ConnectionProtocol *connectionProtocol* = `ConnectionProtocol.Udp`)

Initializes a new LoadBalancingFrontend.

Parameters

connection↩ Protocol	Connection protocol (UDP or TCP). ConnectionProtocol

3.58.3 Member Function Documentation

3.58.3.1 virtual bool ChangeAudioGroups (byte[ ] *groupsToRemove*, byte[ ] *groupsToAdd*) `[virtual]`

Change audio groups listended by client. Works only while joined to a voice room.

LocalVoice.Group SetGlobalAudioGroup(byte)

Note the difference between passing null and byte[0]: null won't add/remove any groups. byte[0] will add/remove all (existing) groups. First, removing groups is executed. This way, you could leave all groups and join only the ones provided.

Parameters

groupsTo↩ Remove	Groups to remove from listened. Null will not leave any. A byte[0] will remove all.
groupsToAdd	Groups to add to listened. Null will not add any. A byte[0] will add all current.

Returns

If request could be enqueued for sending

3.58.3.2 void Dispose ( )

Releases all resources used by the LoadBalancingFrontend instance.

3.58.3.3 void SendDebugEchoVoicesInfo (int *channelId*)

Send VoicesInfo events to the local player for all voices that have DebugEcho enabled.

This function will call SendVoicesInfo for all local voices of our VoiceClient that have DebugEchoMode set to true, with the given channel ID, and the local Player's ActorNumber as target.

Parameters

channelId	Transport Channel ID

3.58.3.4 new void Service ( )

This method dispatches all available incoming commands and then sends this client's outgoing commands. Call this method regularly (2 to 20 times a second).

3.58.4 Property Documentation

3.58.4.1 byte GlobalAudioGroup [get], [set]

Set global audio group for this client. This call sets AudioGroup for existing local voices and for created later to given value. Client set as listening to this group only until ChangeAudioGroups called. This method can be called any time.

LocalVoice.Group ChangeAudioGroups(byte[ ], byte[ ])

3.58.4.2 VoiceClient VoiceClient [get]

The VoiceClient implementation associated with this LoadBalancingFrontend.

3.59 LocalVoice Class Reference

Represents outgoing data stream.

Inherits IDisposable.

Inherited by LocalVoiceAudioDummy, and LocalVoiceFramedBase.

Public Member Functions

- void RemoveSelf ()

  Remove this voice from it's VoiceClient (using VoiceClient.RemoveLocalVoice
- virtual void **Dispose** ()

Public Attributes

- const int **DATA_POOL_CAPACITY** = 50

Protected Member Functions

- void **resetNoTransmitCnt** ()

Protected Attributes

- IEncoder **encoder**
- VoiceClient **voiceClient**
- volatile bool **disposed**
- object **disposeLock** = new object()

Properties

- byte Group `[get, set]`

  If AudioGroup != 0, voice's data is sent only to clients listening to this group.
- VoiceInfo Info `[get]`

  Returns Info structure assigned on local voice cration.
- bool TransmitEnabled `[get, set]`

  If true, stream data broadcasted.
- bool IsCurrentlyTransmitting `[get, protected set]`

  Returns true if stream broadcasts.
- int FramesSent `[get]`

  Sent frames counter.
- int FramesSentBytes `[get]`

  Sent frames bytes counter.
- bool Reliable `[get, set]`

  Send data reliable.
- bool Encrypt `[get, set]`

  Send data encrypted.
- IServiceable LocalUserServiceable `[get, set]`

  Optional user object attached to LocalVoice. its Service() will be called at each VoiceClient.Service() call.
- bool DebugEchoMode `[get, set]`

  If true, outgoing stream routed back to client via server same way as for remote client's streams. Can be swithed any time. OnRemoteVoiceInfoAction and OnRemoteVoiceRemoveAction are triggered if required. This functionality availability depends on frontend.

3.59.1 Detailed Description

Represents outgoing data stream.

3.59.2 Member Function Documentation

3.59.2.1 void RemoveSelf ( )

Remove this voice from it's VoiceClient (using VoiceClient.RemoveLocalVoice

.

3.59.3 Property Documentation

3.59.3.1 bool DebugEchoMode [get], [set]

If true, outgoing stream routed back to client via server same way as for remote client's streams. Can be swithed any time. OnRemoteVoiceInfoAction and OnRemoteVoiceRemoveAction are triggered if required. This functionality availability depends on frontend.

3.59.3.2 bool Encrypt [get], [set]

Send data encrypted.

3.59.3.3 int FramesSent [get]

Sent frames counter.

3.59.3.4 int FramesSentBytes [get]

Sent frames bytes counter.

3.59.3.5 byte Group [get], [set]

If AudioGroup != 0, voice's data is sent only to clients listening to this group.

LoadBalancingFrontend.ChangeAudioGroups(byte[], byte[])

3.59.3.6 VoiceInfo Info [get]

Returns Info structure assigned on local voice cration.

3.59.3.7 bool IsCurrentlyTransmitting [get], [protected set]

Returns true if stream broadcasts.

3.59.3.8 IServiceable LocalUserServiceable [get], [set]

Optional user object attached to LocalVoice. its Service() will be called at each VoiceClient.Service() call.

3.59.3.9 bool Reliable [get], [set]

Send data reliable.

3.59.3.10 bool TransmitEnabled [get], [set]

If true, stream data broadcasted.

3.60 LocalVoiceAudio< T > Class Template Reference

Outgoing audio stream.

Inherits LocalVoiceFramed< T >, and ILocalVoiceAudio.

Inherited by LocalVoiceAudioFloat, and LocalVoiceAudioShort.

Public Member Functions

- void VoiceDetectorCalibrate (int durationMs)

  Trigger voice detector calibration process.

Static Public Member Functions

- static LocalVoiceAudio< T > Create (VoiceClient voiceClient, byte voiceId, IEncoder encoder, VoiceInfo voiceInfo, int channelId)

  Create a new LocalVoiceAudio<T> instance.

Protected Member Functions

- void **initBuiltinProcessors** ()

Protected Attributes

- AudioUtil.VoiceDetector< T > **voiceDetector**
- AudioUtil.VoiceDetectorCalibration< T > **voiceDetectorCalibration**
- AudioUtil.LevelMeter< T > **levelMeter**
- int **channels**
- int **sourceSamplingRateHz**
- bool **resampleSource**

Properties

- virtual AudioUtil.IVoiceDetector **VoiceDetector** `[get]`
- virtual AudioUtil.ILevelMeter **LevelMeter** `[get]`
- bool VoiceDetectorCalibrating `[get]`

  True if the VoiceDetector is currently calibrating.

Additional Inherited Members

3.60.1 Detailed Description

Outgoing audio stream.

3.60.2 Member Function Documentation

3.60.2.1 static LocalVoiceAudio<T> Create (VoiceClient *voiceClient,* byte *voiceId,* IEncoder *encoder,* VoiceInfo *voiceInfo,* int *channelId*) `[static]`

Create a new LocalVoiceAudio<T> instance.

Parameters

voiceClient	The VoiceClient to use for this outgoing stream.
voiceId	Numeric ID for this voice.
encoder	Encoder to use for this voice.
channelId	Voice transport channel ID to use for this voice.

Returns

The new LocalVoiceAudio<T> instance.

3.60.2.2 void VoiceDetectorCalibrate (int *durationMs*)

Trigger voice detector calibration process.

While calibrating, keep silence. Voice detector sets threshold basing on measured backgroud noise level.

Parameters

durationMs	Duration of calibration in milliseconds.

Implements ILocalVoiceAudio.

3.60.3 Property Documentation

3.60.3.1 bool VoiceDetectorCalibrating [get]

True if the VoiceDetector is currently calibrating.

3.61 LocalVoiceAudioDummy Class Reference

Dummy LocalVoiceAudio

Inherits LocalVoice, and ILocalVoiceAudio.

Public Member Functions

- void VoiceDetectorCalibrate (int durationMs)

  Trigger voice detector calibration process.

Static Public Attributes

- static LocalVoiceAudioDummy Dummy = new LocalVoiceAudioDummy()

  A Dummy LocalVoiceAudio instance.

Properties

- AudioUtil.IVoiceDetector **VoiceDetector** [get]
- AudioUtil.ILevelMeter **LevelMeter** [get]
- bool **VoiceDetectorCalibrating** [get]

Additional Inherited Members

3.61.1 Detailed Description

Dummy LocalVoiceAudio

For testing, this LocalVoiceAudio implementation features a AudioUtil.VoiceDetectorDummy and a AudioUtil.Level↩ MeterDummy

3.61.2 Member Function Documentation

3.61.2.1 void VoiceDetectorCalibrate (int *durationMs*)

Trigger voice detector calibration process.

While calibrating, keep silence. Voice detector sets threshold based on measured backgroud noise level.

Parameters

durationMs	Duration of calibration (in milliseconds).

Implements ILocalVoiceAudio.

3.61.3 Member Data Documentation

3.61.3.1 LocalVoiceAudioDummy Dummy = new LocalVoiceAudioDummy() [static]

A Dummy LocalVoiceAudio instance.

3.62 LocalVoiceAudioFloat Class Reference

Specialization of LocalVoiceAudio for float audio

Inherits LocalVoiceAudio< T >.

Additional Inherited Members

3.62.1 Detailed Description

Specialization of LocalVoiceAudio for float audio

3.63 LocalVoiceAudioShort Class Reference

Specialization of LocalVoiceAudio for short audio

Inherits LocalVoiceAudio< T >.

Additional Inherited Members

3.63.1 Detailed Description

Specialization of LocalVoiceAudio for short audio

3.64 LocalVoiceFramed< T > Class Template Reference

Typed re-framing LocalVoice

Inherits LocalVoiceFramedBase.

Inherited by LocalVoiceAudio< T >.

Public Member Functions

- void AddPostProcessor (params IProcessor< T >[ ] processors)

  Adds processors after any built-in processors and everything added with AddPreProcessor.
- void AddPreProcessor (params IProcessor< T >[ ] processors)

  Adds processors before built-in processors and everything added with AddPostProcessor.
- void ClearProcessors ()

  Clears all processors in pipeline including built-in resampling. User should add at least resampler processor after call.
- void PushDataAsync (T[ ] buf)

  Asynchronously push data into this stream.
- void PushData (T[ ] buf)

  Synchronously push data into this stream.
- override void Dispose ()

  Releases resources used by the VoiceFramed instance. Buffers used for asynchronous push will be disposed in encoder thread's 'finally'.

Properties

- FactoryPrimitiveArrayPool< T > **BufferFactory** `[get]`
- bool PushDataAsyncReady `[get]`

  Wether this LocalVoiceFramed has capacity for more data buffers to be pushed asynchronously.

Additional Inherited Members

3.64.1 Detailed Description

Typed re-framing LocalVoice

Consumes data in array buffers of arbitrary length. Repacks them in frames of constant length for further processing and encoding.

Parameters

voiceInfo	Outgoing stream parameters. Set applicable fields to read them by encoder and by receiving client when voice created.
channelId	Transport channel specific to frontend. Set to VoiceClient.ChannelAuto to let frontend automatically assign channel.
encoder	Encoder producing the stream.

Returns

Outgoing stream handler.

3.64.2 Member Function Documentation

3.64.2.1 void AddPostProcessor (params IProcessor< T >[ ] *processors*)

Adds processors after any built-in processors and everything added with AddPreProcessor.

Parameters

processors	

3.64.2.2 void AddPreProcessor (params IProcessor< T >[ ] *processors*)

Adds processors before built-in processors and everything added with AddPostProcessor.

Parameters

processors	

3.64.2.3 void ClearProcessors ( )

Clears all processors in pipeline including built-in resampling. User should add at least resampler processor after call.

3.64.2.4 override void Dispose ( ) [virtual]

Releases resources used by the VoiceFramed instance. Buffers used for asynchronous push will be disposed in encoder thread's 'finally'.

Reimplemented from LocalVoice.

3.64.2.5 void PushData (T[ ] *buf*)

Synchronously push data into this stream.

3.64.2.6 void PushDataAsync (T[ ] *buf*)

Asynchronously push data into this stream.

3.64.3 Property Documentation

3.64.3.1 bool PushDataAsyncReady [get]

Wether this LocalVoiceFramed has capacity for more data buffers to be pushed asynchronously.

3.65 LocalVoiceFramedBase Class Reference

Typed re-framing LocalVoice

Inherits LocalVoice.

Inherited by LocalVoiceFramed< T >.

Properties

- int FrameSize [get]

  Data flow will be repacked to frames of this size. May differ from input voiceInfo.FrameSize. Processors should resample in this case.

Additional Inherited Members

3.65.1 Detailed Description

Typed re-framing LocalVoice

Base class for typed re-framing LocalVoice implementation (LocalVoiceFramedBase<T>)

3.65.2 Property Documentation

3.65.2.1 int FrameSize [get]

Data flow will be repacked to frames of this size. May differ from input voiceInfo.FrameSize. Processors should resample in this case.

3.66 Logger Class Reference

Inherits ILogger.

Public Member Functions

- void **LogError** (string fmt, params object[ ] args)
- void **LogWarning** (string fmt, params object[ ] args)
- void **LogInfo** (string fmt, params object[ ] args)
- void **LogDebug** (string fmt, params object[ ] args)

3.67 MicWrapper Class Reference

Inherits IAudioReader< T >.

Public Member Functions

- **MicWrapper** (string device, int suggestedFrequency, Voice.ILogger logger)
- void **Dispose** ()
- bool **Read** (float[ ] buffer)

Properties

- int **SamplingRate** [get]
- int **Channels** [get]
- string **Error** [get]

3.68 ObjectFactory< TType, TInfo > Interface Template Reference

Uniform interface to ObjectPool<TType, TInfo> and single reusable object.

Inherits IDisposable.

Inherited by FactoryPrimitiveArrayPool< T >, and FactoryReusableArray< T >.

Public Member Functions

- TType **New** ()
- TType **New** (TInfo info)
- void **Free** (TType obj)
- void **Free** (TType obj, TInfo info)

Properties

- TInfo **Info** `[get]`

3.68.1 Detailed Description

Uniform interface to ObjectPool<TType, TInfo> and single reusable object.

Template Parameters

TType	Object type.
TInfo	Type of property used to check 2 objects identity (like integral length of array).

3.69 ObjectPool< TType, TInfo > Class Template Reference

Generic Pool to re-use objects of a certain type (TType) that optionally match a certain property or set of properties (TInfo).

Inherits IDisposable.

Inherited by ImageBufferNativePool< T >, and PrimitiveArrayPool< T >.

Public Member Functions

- ObjectPool (int capacity, string name)

  Create a new ObjectPool instance. Does not call Init().
- ObjectPool (int capacity, string name, TInfo info)

  Create a new ObjectPool instance with the given info structure. Calls Init().
- void Init (TInfo info)

  (Re-)Initializes this ObjectPool.
- TType AcquireOrCreate ()

  Acquire an existing object, or create a new one if none are available.
- TType AcquireOrCreate (TInfo info)

  Acquire an existing object (if info matches), or create a new one from the passed info.
- virtual bool Release (TType obj, TInfo objInfo)

  Returns object to pool.
- virtual bool Release (TType obj)

  Returns object to pool, or destroys it if the pool is full.
- void Dispose ()

  Free resources assoicated with this ObjectPool

Protected Member Functions

- abstract TType **createObject** (TInfo info)
- abstract void **destroyObject** (TType obj)
- abstract bool **infosMatch** (TInfo i0, TInfo i1)

Protected Attributes

- int **capacity**
- TInfo **info**
- int **pos**
- string **name**

Properties

- TInfo Info `[get]`

  The property (info) that objects in this Pool must match.

3.69.1 Detailed Description

Generic Pool to re-use objects of a certain type (TType) that optionally match a certain property or set of properties (TInfo).

Template Parameters

TType	Object type.
TInfo	Type of parameter used to check 2 objects identity (like integral length of array).

3.69.2 Constructor & Destructor Documentation

3.69.2.1 ObjectPool (int *capacity*, string *name*)

Create a new ObjectPool instance. Does not call Init().

Parameters

capacity	Capacity (size) of the object pool.
name	Name of the object pool.

3.69.2.2 ObjectPool (int *capacity*, string *name*, TInfo *info*)

Create a new ObjectPool instance with the given info structure. Calls Init().

Parameters

capacity	Capacity (size) of the object pool.
name	Name of the object pool.
info	Info about this Pool's objects.

3.69.3 Member Function Documentation

3.69.3.1 TType AcquireOrCreate ( )

Acquire an existing object, or create a new one if none are available.

If it fails to get one from the pool, this will create from the info given in this pool's constructor.

3.69.3.2 TType AcquireOrCreate (TInfo *info*)

Acquire an existing object (if info matches), or create a new one from the passed info.

Parameters

info	Info structure to match, or create a new object with.

3.69.3.3 void Dispose ( )

Free resources assoicated with this ObjectPool

3.69.3.4 void Init (TInfo *info*)

(Re-)Initializes this ObjectPool.

If there are objects available in this Pool, they will be destroyed. Allocates (Capacity) new Objects.

Parameters

info	Info about this Pool's objects.

3.69.3.5 virtual bool Release (TType *obj*, TInfo *objInfo*) [virtual]

Returns object to pool.

Parameters

obj	The object to return to the pool.
objInfo	The info structure about obj.

obj is returned to the pool only if objInfo matches this pool's info. Else, it is destroyed.

3.69.3.6 virtual bool Release (TType *obj*) [virtual]

Returns object to pool, or destroys it if the pool is full.

Parameters

obj	The object to return to the pool.

3.69.4 Property Documentation

3.69.4.1 TInfo Info [get]

The property (info) that objects in this Pool must match.

3.70 OpusCodec Class Reference

Classes

- class Decoder
- class Encoder
- class EncoderFactory
- class EncoderFloat
- class EncoderShort
- class Util

Public Types

- enum **FrameDuration**

3.71 OpusDecoder Class Reference

Inherits IDisposable.

Public Member Functions

- **OpusDecoder** (SamplingRate outputSamplingRateHz, Channels numChannels)
- float[ ] **DecodePacketFloat** (byte[ ] packetData)
- short[ ] **DecodePacketShort** (byte[ ] packetData)
- void **Dispose** ()

Properties

- string **Version** `[get]`
- Bandwidth **PreviousPacketBandwidth** `[get]`

3.72 OpusEncoder Class Reference

Inherits IDisposable.

Public Member Functions

- **OpusEncoder** (SamplingRate inputSamplingRateHz, Channels numChannels, int bitrate, OpusApplication↩ Type applicationType, Delay encoderDelay)
- ArraySegment< byte > **Encode** (float[ ] pcmSamples)
- ArraySegment< byte > **Encode** (short[ ] pcmSamples)
- void **Dispose** ()

Public Attributes

- const int **BitrateMax** = -1

Properties

- SamplingRate **InputSamplingRate** `[get]`
- Channels **InputChannels** `[get]`
- string **Version** `[get]`
- Delay EncoderDelay `[get, set]`

  Using a duration of less than 10 ms will prevent the encoder from using the LPC or hybrid modes.
- int **FrameSizePerChannel** `[get]`
- int **Bitrate** `[get, set]`
- Bandwidth **MaxBandwidth** `[get, set]`
- Complexity **Complexity** `[get, set]`
- int **ExpectedPacketLossPercentage** `[get, set]`
- SignalHint **SignalHint** `[get, set]`

- ForceChannels **ForceChannels** `[get, set]`
- bool **UseInbandFEC** `[get, set]`
- bool **UseUnconstrainedVBR** `[get, set]`
- bool **DtxEnabled** `[get, set]`

3.72.1 Property Documentation

3.72.1.1 Delay EncoderDelay `[get],[set]`

Using a duration of less than 10 ms will prevent the encoder from using the LPC or hybrid modes.

3.73 OpusException Class Reference

Inherits Exception.

Public Member Functions

- **OpusException** (OpusStatusCode statusCode, string message)

Properties

- OpusStatusCode **StatusCode** `[get]`

3.74 WebRTCAudioLib.Param Struct Reference

Public Attributes

- const int **REVERSE_STREAM_DELAY_MS** = 1
- const int **AEC** = 10
- const int **AEC_SUPPRESSION_LEVEL** = 11
- const int **AECM** = 20
- const int **AECM_ROUTING_MODE** = 21
- const int **AECM_COMFORT_NOISE** = 22
- const int **HIGH_PASS_FILTER** = 31
- const int **NS** = 41
- const int **NS_LEVEL** = 42
- const int **AGC** = 51
- const int **AGC_MODE** = 52
- const int **AGC_COMPRESSION_GAIN** = 56
- const int **AGC_LIMITER** = 57
- const int **VAD** = 61
- const int **VAD_FRAME_SIZE_MS** = 62
- const int **VAD_LIKEHOOD** = 63

3.75 Recorder.PhotonVoiceCreatedParams Class Reference

Properties

- LocalVoice **Voice** `[get, set]`
- IAudioDesc **AudioDesc** `[get, set]`

3.76 PhotonVoiceLagSimulationGui Class Reference

Inherits MonoBehaviour.

Public Member Functions

- void **Start** ()
- void **OnGUI** ()

Public Attributes

- Rect WindowRect = new Rect(0, 100, 120, 100)

  Positioning rect for window.
- int WindowId = 101

  Unity GUI Window ID (must be unique or will cause issues).
- bool Visible = true

  Shows or hides GUI (does not affect settings).

Properties

- PhotonPeer Peer `[get, set]`

  The peer currently in use (to set the network simulation).

3.76.1 Member Data Documentation

3.76.1.1 bool Visible = true

Shows or hides GUI (does not affect settings).

3.76.1.2 int WindowId = 101

Unity GUI Window ID (must be unique or will cause issues).

3.76.1.3 Rect WindowRect = new Rect(0, 100, 120, 100)

Positioning rect for window.

3.76.2 Property Documentation

3.76.2.1 PhotonPeer Peer `[get],[set]`

The peer currently in use (to set the network simulation).

3.77 PhotonVoiceNetwork Class Reference

This class can be used to automatically sync client states between PUN and Voice. It also sets a custom PUN Speaker factory to find the Speaker component for a character's voice. For this to work attach a PhotonVoiceView next to the PhotonView of your player's prefab.

Inherits VoiceConnection.

Public Member Functions

- bool ConnectAndJoinRoom ()

  Connect voice client to Photon servers and join a Voice room
- void Disconnect ()

  Disconnect voice client from all Photon servers

Public Attributes

- const string VoiceRoomNameSuffix = "_voice_"

  Suffix for voice room names appended to PUN room names.
- bool AutoConnectAndJoin = true

  Auto connect voice client and join a voice room when PUN client is joined to a PUN room
- bool AutoLeaveAndDisconnect = true

  Auto disconnect voice client when PUN client is not joined to a PUN room
- bool AutoCreateSpeakerIfNotFound = true

  Auto instantiate a GameObject and attach a Speaker component to link to a remote audio stream if no candidate could be found

Protected Member Functions

- override void **Awake** ()
- override void **OnApplicationQuit** ()
- override void **OnDestroy** ()
- override void **OnVoiceStateChanged** (ClientState fromState, ClientState toState)

Properties

- static PhotonVoiceNetwork Instance `[get, set]`

  Singleton instance for PhotonVoiceNetwork

Additional Inherited Members

3.77.1 Detailed Description

This class can be used to automatically sync client states between PUN and Voice. It also sets a custom PUN Speaker factory to find the Speaker component for a character's voice. For this to work attach a PhotonVoiceView next to the PhotonView of your player's prefab.

3.77.2 Member Function Documentation

3.77.2.1 bool ConnectAndJoinRoom ( )

Connect voice client to Photon servers and join a Voice room

Returns

If true, connection command send from client

3.77.2.2 void Disconnect ( )

Disconnect voice client from all Photon servers

3.77.3 Member Data Documentation

3.77.3.1 bool AutoConnectAndJoin = true

Auto connect voice client and join a voice room when PUN client is joined to a PUN room

3.77.3.2 bool AutoCreateSpeakerIfNotFound = true

Auto instantiate a GameObject and attach a Speaker component to link to a remote audio stream if no candidate could be found

3.77.3.3 bool AutoLeaveAndDisconnect = true

Auto disconnect voice client when PUN client is not joined to a PUN room

3.77.3.4 const string VoiceRoomNameSuffix = "_voice_"

Suffix for voice room names appended to PUN room names.

3.77.4 Property Documentation

3.77.4.1 PhotonVoiceNetwork Instance [static],[get],[set]

Singleton instance for PhotonVoiceNetwork

3.78 PhotonVoiceView Class Reference

Component that should be attached to a networked PUN prefab that has PhotonView. It will bind remote Recorder with local Speaker of the same networked prefab. This component makes automatic voice stream routing easy for players' characters/avatars.

Inherits VoiceComponent.

Public Attributes

- bool AutoCreateRecorderIfNotFound

  If true, a Recorder component will be added to the same GameObject if not found already.
- bool UsePrimaryRecorder

  If true, PhotonVoiceNetwork.PrimaryRecorder will be used by this PhotonVoiceView
- bool SetupDebugSpeaker

  If true, a Speaker component will be setup to be used for the DebugEcho mode

Protected Member Functions

- override void **Awake** ()

Properties

- Recorder RecorderInUse `[get, set]`

  The Recorder component currently used by this PhotonVoiceView
- Speaker SpeakerInUse `[get, set]`

  The Speaker component currently used by this PhotonVoiceView
- bool IsSetup `[get, protected set]`

  If true, this PhotonVoiceView is setup and ready to be used
- bool IsSpeaker `[get, protected set]`

  If true, this PhotonVoiceView has a Speaker setup for playback of received audio frames from remote audio source
- bool IsSpeaking `[get]`

  If true, this PhotonVoiceView has a Speaker that is currently playing received audio frames from remote audio source
- bool IsRecorder `[get, protected set]`

  If true, this PhotonVoiceView has a Recorder setup for transmission of audio stream from local audio source
- bool IsRecording `[get]`

  If true, this PhotonVoiceView has a Recorder that is currently transmitting audio stream from local audio source

Additional Inherited Members

3.78.1 Detailed Description

Component that should be attached to a networked PUN prefab that has PhotonView. It will bind remote Recorder with local Speaker of the same networked prefab. This component makes automatic voice stream routing easy for players' characters/avatars.

3.78.2 Member Data Documentation

3.78.2.1 bool AutoCreateRecorderIfNotFound

If true, a Recorder component will be added to the same GameObject if not found already.

3.78.2.2 bool SetupDebugSpeaker

If true, a Speaker component will be setup to be used for the DebugEcho mode

3.78.2.3 bool UsePrimaryRecorder

If true, PhotonVoiceNetwork.PrimaryRecorder will be used by this PhotonVoiceView

3.78.3 Property Documentation

3.78.3.1 bool IsRecorder `[get],[protected set]`

If true, this PhotonVoiceView has a Recorder setup for transmission of audio stream from local audio source

3.78.3.2 bool IsRecording `[get]`

If true, this PhotonVoiceView has a Recorder that is currently transmitting audio stream from local audio source

3.78.3.3 bool IsSetup [get], [protected set]

If true, this PhotonVoiceView is setup and ready to be used

3.78.3.4 bool IsSpeaker [get], [protected set]

If true, this PhotonVoiceView has a Speaker setup for playback of received audio frames from remote audio source

3.78.3.5 bool IsSpeaking [get]

If true, this PhotonVoiceView has a Speaker that is currently playing received audio frames from remote audio source

3.78.3.6 Recorder RecorderInUse [get], [set]

The Recorder component currently used by this PhotonVoiceView

3.78.3.7 Speaker SpeakerInUse [get], [set]

The Speaker component currently used by this PhotonVoiceView

3.79 PrimitiveArrayPool< T > Class Template Reference

Pool of Arrays with components of type T, with ObjectPool info being the array's size.

Inherits ObjectPool< TType, TInfo >.

Public Member Functions

- **PrimitiveArrayPool** (int capacity, string name)
- **PrimitiveArrayPool** (int capacity, string name, int info)

Protected Member Functions

- override T[ ] **createObject** (int info)
- override void **destroyObject** (T[ ] obj)
- override bool **infosMatch** (int i0, int i1)

Additional Inherited Members

3.79.1 Detailed Description

Pool of Arrays with components of type T, with ObjectPool info being the array's size.

Template Parameters

T	Array element type.

3.80 Recorder Class Reference

Component representing outgoing audio stream in scene.

Inherits VoiceComponent.

Classes

- class PhotonVoiceCreatedParams

Public Types

- enum **InputSourceType**
- enum **MicType**
- enum **SampleTypeConv**

Public Member Functions

- void Init (VoiceClient voiceClient, object customObj=null)

  Initializes the Recorder component to be able to transmit audio.
- void ReInit ()

  Reinitializes the Recorder if something has changed that requires this.
- void VoiceDetectorCalibrate (int durationMs)

  Trigger voice detector calibration process. While calibrating, keep silence. Voice detector sets threshold basing on measured backgroud noise level.

Protected Member Functions

- virtual void **SendPhotonVoiceCreatedMessage** ()

Properties

- static AudioInEnumerator PhotonMicrophoneEnumerator `[get]`

  Enumerator for the available microphone devices gathered by the Photon plugin.
- bool IsInitialized `[get]`

  If true, this Recorder has been initialized and is ready to transmit to remote clients.
- bool RequiresInit `[get]`

  Returns true if something has changed in the Recorder after initialization that won't take effect unless re initialized.
- bool TransmitEnabled `[get, set]`

  If true, audio transmission is enabled.
- bool Encrypt `[get, set]`

  If true, voice stream is sent encrypted.
- bool DebugEchoMode `[get, set]`

  If true, outgoing stream routed back to client via server same way as for remote client's streams.
- bool ReliableMode `[get, set]`

  If true, stream data sent in reliable mode.
- bool VoiceDetection `[get, set]`

  If true, voice detection enabled.
- float VoiceDetectionThreshold `[get, set]`

  Voice detection threshold (0..1, where 1 is full amplitude).
- int VoiceDetectionDelayMs `[get, set]`

Keep detected state during this time after signal level dropped below threshold. Default is 500ms

- object UserData `[get, set]`

  Custom user object to be sent in the voice stream info event.

- Func< IAudioDesc > InputFactory `[get, set]`

  Set the method returning new Voice.IAudioDesc instance to be assigned to a new voice created with Source set to Factory

- AudioUtil.IVoiceDetector VoiceDetector `[get]`

  Returns voice activity detector for recorder's audio stream.

- string UnityMicrophoneDevice `[get, set]`

  Set or get Unity microphone device used for streaming.

- int PhotonMicrophoneDeviceId `[get, set]`

  Set or get photon microphone device used for streaming.

- byte AudioGroup `[get, set]`

  Target interest group that will receive transmitted audio.

- bool IsCurrentlyTransmitting `[get]`

  Returns true if audio stream broadcasts.

- AudioUtil.ILevelMeter LevelMeter `[get]`

  Level meter utility.

- bool VoiceDetectorCalibrating `[get]`

  If true, voice detector calibration is in progress.

- ILocalVoiceAudio **voiceAudio** `[get]`
- InputSourceType SourceType `[get, set]`

  Audio data source.

- MicType MicrophoneType `[get, set]`

  Which microphone API to use when the Source is set to Microphone.

- SampleTypeConv TypeConvert `[get, set]`

  Force creation of 'short' pipeline and convert audio data to short for 'float' audio sources.

- AudioClip AudioClip `[get, set]`

  Source audio clip.

- bool LoopAudioClip `[get, set]`

  Loop playback for audio clip sources.

- POpusCodec.Enums.SamplingRate SamplingRate `[get, set]`

  Outgoing audio stream sampling rate.

- OpusCodec.FrameDuration FrameDuration `[get, set]`

  Outgoing audio stream encoder delay.

- int Bitrate `[get, set]`

  Outgoing audio stream bitrate.

Additional Inherited Members

3.80.1 Detailed Description

Component representing outgoing audio stream in scene.

3.80.2 Member Function Documentation

3.80.2.1 void Init (VoiceClient *voiceClient*, object *customObj* = `null`)

Initializes the Recorder component to be able to transmit audio.

Parameters

voiceClient	The VoiceClient to be used with this Recorder.
customObj	Optional user data object to be transmitted with the voice stream info

3.80.2.2 void ReInit ( )

Reinitializes the Recorder if something has changed that requires this.

3.80.2.3 void VoiceDetectorCalibrate (int *durationMs*)

Trigger voice detector calibration process. While calibrating, keep silence. Voice detector sets threshold basing on measured backgroud noise level.

Parameters

durationMs	Duration of calibration in milliseconds.

3.80.3 Property Documentation

3.80.3.1 AudioClip AudioClip [get], [set]

Source audio clip.

3.80.3.2 byte AudioGroup [get], [set]

Target interest group that will receive transmitted audio.

If AudioGroup != 0, recorders's audio data is sent only to clients listening to this group.

3.80.3.3 int Bitrate [get], [set]

Outgoing audio stream bitrate.

3.80.3.4 bool DebugEchoMode [get], [set]

If true, outgoing stream routed back to client via server same way as for remote client's streams.

3.80.3.5 bool Encrypt [get], [set]

If true, voice stream is sent encrypted.

3.80.3.6 OpusCodec.FrameDuration FrameDuration [get], [set]

Outgoing audio stream encoder delay.

3.80.3.7 Func<IAudioDesc> InputFactory [get], [set]

Set the method returning new Voice.IAudioDesc instance to be assigned to a new voice created with Source set to Factory

3.80.3.8 bool IsCurrentlyTransmitting [get]

Returns true if audio stream broadcasts.

3.80.3.9 bool IsInitialized [get]

If true, this Recorder has been initialized and is ready to transmit to remote clients.

3.80.3.10 AudioUtil.ILevelMeter LevelMeter [get]

Level meter utility.

3.80.3.11 bool LoopAudioClip [get], [set]

Loop playback for audio clip sources.

3.80.3.12 MicType MicrophoneType [get], [set]

Which microphone API to use when the Source is set to Microphone.

3.80.3.13 int PhotonMicrophoneDeviceId [get], [set]

Set or get photon microphone device used for streaming.

3.80.3.14 AudioInEnumerator PhotonMicrophoneEnumerator [static], [get]

Enumerator for the available microphone devices gathered by the Photon plugin.

3.80.3.15 bool ReliableMode [get], [set]

If true, stream data sent in reliable mode.

3.80.3.16 bool RequiresInit [get]

Returns true if something has changed in the Recorder after initialization that won't take effect unless re initialized.

3.80.3.17 POpusCodec.Enums.SamplingRate SamplingRate [get], [set]

Outgoing audio stream sampling rate.

3.80.3.18 InputSourceType SourceType [get], [set]

Audio data source.

3.80.3.19 bool TransmitEnabled [get], [set]

If true, audio transmission is enabled.

3.80.3.20 SampleTypeConv TypeConvert [get], [set]

Force creation of 'short' pipeline and convert audio data to short for 'float' audio sources.

3.80.3.21 string UnityMicrophoneDevice [get], [set]

Set or get Unity microphone device used for streaming.

3.80.3.22 object UserData [get], [set]

Custom user object to be sent in the voice stream info event.

3.80.3.23 bool VoiceDetection [get], [set]

If true, voice detection enabled.

3.80.3.24 int VoiceDetectionDelayMs [get], [set]

Keep detected state during this time after signal level dropped below threshold. Default is 500ms

3.80.3.25 float VoiceDetectionThreshold [get], [set]

Voice detection threshold (0..1, where 1 is full amplitude).

3.80.3.26 AudioUtil.IVoiceDetector VoiceDetector [get]

Returns voice activity detector for recorder's audio stream.

3.80.3.27 bool VoiceDetectorCalibrating [get]

If true, voice detector calibration is in progress.

3.81 RemoteVoiceInfo Class Reference

Information about a remote voice (incoming stream).

Properties

- VoiceInfo Info [get]

  Remote voice info.
- int ChannelId [get]

  ID of channel used for transmission.
- int PlayerId [get]

  Player ID of voice owner.
- byte VoiceId [get]

  Voice ID (unique in the room).

3.81.1 Detailed Description

Information about a remote voice (incoming stream).

3.81.2 Property Documentation

3.81.2.1 int ChannelId [get]

ID of channel used for transmission.

3.81.2.2 VoiceInfo Info [get]

Remote voice info.

3.81.2.3 int PlayerId [get]

Player ID of voice owner.

3.81.2.4 byte VoiceId [get]

Voice ID (unique in the room).

3.82 RemoteVoiceLink Class Reference

Public Member Functions

- **RemoteVoiceLink** (VoiceInfo info, int playerId, int voiceId, int channelId, ref RemoteVoiceOptions options)

Properties

- VoiceInfo **Info** [get]
- int **PlayerId** [get]
- int **VoiceId** [get]
- int **ChannelId** [get]

Events

- Action< float[ ]> **FloatFrameDecoded**
- Action **RemoteVoiceRemoved**

3.83 RemoteVoiceOptions Struct Reference

Event Actions and other options for a remote voice (incoming stream).

Properties

- Action< byte[ ]> OnDecodedFrameByteAction [get, set]

  Register a method to be called when new data frame received. Use it to get uncompressed data as byte[].
- Action< float[ ]> OnDecodedFrameFloatAction [get, set]

  Register a method to be called when new data frame received. Use it to get uncompressed data as float[].
- Action< short[ ]> OnDecodedFrameShortAction [get, set]

  Register a method to be called when new data frame received. Use it to get uncompressed data as short[].
- Action OnRemoteVoiceRemoveAction [get, set]

  Register a method to be called when the remote voice is removed.
- object LocalUserObject [get, set]

  User object (e.g. audio player) attached to remote voice instance for easy access.
- IDecoder Decoder [get, set]

  Remote voice data decoder. Use to set decoder options or override it with user decoder.

3.83.1 Detailed Description

Event Actions and other options for a remote voice (incoming stream).

3.83.2 Property Documentation

3.83.2.1 IDecoder Decoder [get], [set]

Remote voice data decoder. Use to set decoder options or override it with user decoder.

3.83.2.2 object LocalUserObject [get], [set]

User object (e.g. audio player) attached to remote voice instance for easy access.

3.83.2.3 Action<byte[ ]> OnDecodedFrameByteAction [get], [set]

Register a method to be called when new data frame received. Use it to get uncompressed data as byte[].

3.83.2.4 Action<float[ ]> OnDecodedFrameFloatAction [get], [set]

Register a method to be called when new data frame received. Use it to get uncompressed data as float[].

3.83.2.5 Action<short[ ]> OnDecodedFrameShortAction [get], [set]

Register a method to be called when new data frame received. Use it to get uncompressed data as short[].

3.83.2.6 Action OnRemoteVoiceRemoveAction [get], [set]

Register a method to be called when the remote voice is removed.

3.84 AudioUtil.Resampler< T > Class Template Reference

Sample-rate conversion Audio Processor.

Inherits IProcessor< T >.

Public Member Functions

- Resampler (int dstSize, int channels)

  Create a new Resampler instance.
- T[ ] Process (T[ ] buf)

  Process a frame of audio data.
- void **Dispose** ()

Protected Attributes

- T[ ] **frameResampled**

3.84.1 Detailed Description

Sample-rate conversion Audio Processor.

This processor converts the sample-rate of the source stream. Internally, it uses AudioUtil.Resample.

3.84.2 Constructor & Destructor Documentation

3.84.2.1 Resampler (int *dstSize,* int *channels*)

Create a new Resampler instance.

Parameters

dstSize	Frame size of a destination frame. Determins output rate.
channels	Number of audio channels expected in both in- and output.

3.84.3 Member Function Documentation

3.84.3.1 T [ ] Process (T[ ] *buf*)

Process a frame of audio data.

Parameters

buf	Buffer containing input audio data

Returns

Buffer containing output audio data

Implements IProcessor< T >.

3.85 Speaker Class Reference

Component representing remote audio stream in local scene.

Inherits VoiceComponent.

Public Attributes

- int **PlayDelayMs** = 200

Protected Member Functions

- override void **Awake** ()

Properties

- bool IsPlaying `[get]`

  Is the speaker playing right now.
- int Lag `[get]`

  Smoothed difference between (jittering) stream and (clock-driven) audioOutput.
- Action< Speaker > OnRemoteVoiceRemoveAction `[get, set]`

  Register a method to be called when remote voice removed.
- Realtime.Player Actor `[get, set]`

  Per room, the connected users/players are represented with a Realtime.Player, also known as Actor.
- bool IsLinked `[get]`

  Whether or not this Speaker has been linked to a remote voice stream.

Additional Inherited Members

3.85.1 Detailed Description

Component representing remote audio stream in local scene.

3.85.2 Property Documentation

3.85.2.1 Realtime.Player Actor `[get],[set]`

Per room, the connected users/players are represented with a Realtime.Player, also known as Actor.

Photon Voice calls this Actor, to avoid a name-clash with the Player class in Voice.

3.85.2.2 bool IsLinked `[get]`

Whether or not this Speaker has been linked to a remote voice stream.

3.85.2.3 bool IsPlaying `[get]`

Is the speaker playing right now.

3.85.2.4 int Lag `[get]`

Smoothed difference between (jittering) stream and (clock-driven) audioOutput.

3.85.2.5 Action<Speaker> OnRemoteVoiceRemoveAction `[get],[set]`

Register a method to be called when remote voice removed.

3.86 SpeexLib Class Reference

Inherited by SpeexProcessor.

Public Member Functions

- static IntPtr **speex_preprocess_state_init** (int frame_size, int sampling_rate)
- static void **speex_preprocess_state_destroy** (IntPtr st)
- static int **speex_preprocess_run** (IntPtr st, short[ ] x)
- static int **speex_preprocess_ctl** (IntPtr st, int request, IntPtr ptr)
- static IntPtr **speex_echo_state_init** (int frame_size, int filter_length)
- static IntPtr **speex_echo_state_init_mc** (int frame_size, int filter_length, int nb_mic, int nb_speakers)
- static void **speex_echo_state_destroy** (IntPtr st)
- static void **speex_echo_cancellation** (IntPtr st, short[ ] rec, short[ ] play, short[ ] outBuf)
- static void **speex_echo_capture** (IntPtr st, short[ ] rec, short[ ] outBuf)
- static void **speex_echo_playback** (IntPtr st, short[ ] play)
- static void **speex_echo_state_reset** (IntPtr st)
- static int **speex_echo_ctl** (IntPtr st, int request, IntPtr ptr)

Static Public Member Functions

- static int **speex_preprocess_ctl** (IntPtr st, int request, ref int value)
- static int **speex_preprocess_ctl** (IntPtr st, int request, ref float value)
- static int **speex_echo_ctl** (IntPtr st, int request, ref int value)
- static int **speex_echo_ctl** (IntPtr st, int request, ref float value)

Public Attributes

- const int SPEEX_PREPROCESS_SET_DENOISE = 0
- const int SPEEX_PREPROCESS_GET_DENOISE = 1
- const int SPEEX_PREPROCESS_SET_AGC = 2
- const int SPEEX_PREPROCESS_GET_AGC = 3
- const int SPEEX_PREPROCESS_SET_VAD = 4
- const int SPEEX_PREPROCESS_GET_VAD = 5
- const int SPEEX_PREPROCESS_SET_AGC_LEVEL = 6
- const int SPEEX_PREPROCESS_GET_AGC_LEVEL = 7
- const int SPEEX_PREPROCESS_SET_DEREVERB = 8
- const int SPEEX_PREPROCESS_GET_DEREVERB = 9
- const int SPEEX_PREPROCESS_SET_DEREVERB_LEVEL = 10
- const int SPEEX_PREPROCESS_GET_DEREVERB_LEVEL = 11
- const int SPEEX_PREPROCESS_SET_DEREVERB_DECAY = 12
- const int SPEEX_PREPROCESS_GET_DEREVERB_DECAY = 13
- const int SPEEX_PREPROCESS_SET_PROB_START = 14
- const int SPEEX_PREPROCESS_GET_PROB_START = 15
- const int SPEEX_PREPROCESS_SET_PROB_CONTINUE = 16
- const int SPEEX_PREPROCESS_GET_PROB_CONTINUE = 17
- const int SPEEX_PREPROCESS_SET_NOISE_SUPPRESS = 18
- const int SPEEX_PREPROCESS_GET_NOISE_SUPPRESS = 19
- const int SPEEX_PREPROCESS_SET_ECHO_SUPPRESS = 20
- const int SPEEX_PREPROCESS_GET_ECHO_SUPPRESS = 21
- const int SPEEX_PREPROCESS_SET_ECHO_SUPPRESS_ACTIVE = 22
- const int SPEEX_PREPROCESS_GET_ECHO_SUPPRESS_ACTIVE = 23
- const int SPEEX_PREPROCESS_SET_ECHO_STATE = 24
- const int SPEEX_PREPROCESS_GET_ECHO_STATE = 25
- const int SPEEX_PREPROCESS_SET_AGC_INCREMENT = 26
- const int SPEEX_PREPROCESS_GET_AGC_INCREMENT = 27
- const int SPEEX_PREPROCESS_SET_AGC_DECREMENT = 28
- const int SPEEX_PREPROCESS_GET_AGC_DECREMENT = 29

- const int SPEEX_PREPROCESS_SET_AGC_MAX_GAIN = 30
- const int SPEEX_PREPROCESS_GET_AGC_MAX_GAIN = 31
- const int SPEEX_PREPROCESS_GET_AGC_LOUDNESS = 33
- const int SPEEX_PREPROCESS_GET_AGC_GAIN = 35
- const int SPEEX_PREPROCESS_GET_PSD_SIZE = 37
- const int SPEEX_PREPROCESS_GET_PSD = 39
- const int SPEEX_PREPROCESS_GET_NOISE_PSD_SIZE = 41
- const int SPEEX_PREPROCESS_GET_NOISE_PSD = 43
- const int SPEEX_PREPROCESS_GET_PROB = 45
- const int SPEEX_PREPROCESS_SET_AGC_TARGET = 46
- const int SPEEX_PREPROCESS_GET_AGC_TARGET = 47
- const int SPEEX_ECHO_GET_FRAME_SIZE = 3
- const int SPEEX_ECHO_SET_SAMPLING_RATE = 24
- const int SPEEX_ECHO_GET_SAMPLING_RATE = 25
- const int SPEEX_ECHO_GET_IMPULSE_RESPONSE_SIZE = 27
- const int SPEEX_ECHO_GET_IMPULSE_RESPONSE = 29

3.86.1 Member Data Documentation

3.86.1.1 const int SPEEX_ECHO_GET_FRAME_SIZE = 3

Obtain frame size used by the AEC

3.86.1.2 const int SPEEX_ECHO_GET_IMPULSE_RESPONSE = 29

Get impulse response (int32[])

3.86.1.3 const int SPEEX_ECHO_GET_IMPULSE_RESPONSE_SIZE = 27

Get size of impulse response (int32)

3.86.1.4 const int SPEEX_ECHO_GET_SAMPLING_RATE = 25

Get sampling rate

3.86.1.5 const int SPEEX_ECHO_SET_SAMPLING_RATE = 24

Set sampling rate

3.86.1.6 const int SPEEX_PREPROCESS_GET_AGC = 3

Get preprocessor Automatic Gain Control state

3.86.1.7 const int SPEEX_PREPROCESS_GET_AGC_DECREMENT = 29

Get maximal gain decrease in dB/second (int32)

3.86.1.8 const int SPEEX_PREPROCESS_GET_AGC_GAIN = 35

Get current gain (int32 percent)

3.86.1.9 const int SPEEX_PREPROCESS_GET_AGC_INCREMENT = 27

Get maximal gain increase in dB/second (int32)

3.86.1.10 const int SPEEX_PREPROCESS_GET_AGC_LEVEL = 7

Get preprocessor Automatic Gain Control level (float)

3.86.1.11 const int SPEEX_PREPROCESS_GET_AGC_LOUDNESS = 33

Get loudness

3.86.1.12 const int SPEEX_PREPROCESS_GET_AGC_MAX_GAIN = 31

Get maximal gain in dB (int32)

3.86.1.13 const int SPEEX_PREPROCESS_GET_AGC_TARGET = 47

Get preprocessor Automatic Gain Control level (int32)

3.86.1.14 const int SPEEX_PREPROCESS_GET_DENOISE = 1

Get preprocessor denoiser state

3.86.1.15 const int SPEEX_PREPROCESS_GET_DEREVERB = 9

Get preprocessor dereverb state

3.86.1.16 const int SPEEX_PREPROCESS_GET_DEREVERB_DECAY = 13

Get preprocessor dereverb decay

3.86.1.17 const int SPEEX_PREPROCESS_GET_DEREVERB_LEVEL = 11

Get preprocessor dereverb level

3.86.1.18 const int SPEEX_PREPROCESS_GET_ECHO_STATE = 25

Get the corresponding echo canceller state

3.86.1.19 const int SPEEX_PREPROCESS_GET_ECHO_SUPPRESS = 21

Get maximum attenuation of the residual echo in dB (negative number)

3.86.1.20 const int SPEEX_PREPROCESS_GET_ECHO_SUPPRESS_ACTIVE = 23

Get maximum attenuation of the residual echo in dB when near end is active (negative number)

3.86.1.21 const int SPEEX_PREPROCESS_GET_NOISE_PSD = 43

Get noise estimate (int32[] of squared values)

3.86.1.22 const int SPEEX_PREPROCESS_GET_NOISE_PSD_SIZE = 41

Get spectrum size for noise estimate (int32)

3.86.1.23 const int SPEEX_PREPROCESS_GET_NOISE_SUPPRESS = 19

Get maximum attenuation of the noise in dB (negative number)

3.86.1.24 const int SPEEX_PREPROCESS_GET_PROB = 45

Get speech probability in last frame (int32).

3.86.1.25 const int SPEEX_PREPROCESS_GET_PROB_CONTINUE = 17

Get probability required for the VAD to stay in the voice state (integer percent)

3.86.1.26 const int SPEEX_PREPROCESS_GET_PROB_START = 15

Get probability required for the VAD to go from silence to voice

3.86.1.27 const int SPEEX_PREPROCESS_GET_PSD = 39

Get power spectrum (int32[] of squared values)

3.86.1.28 const int SPEEX_PREPROCESS_GET_PSD_SIZE = 37

Get spectrum size for power spectrum (int32)

3.86.1.29 const int SPEEX_PREPROCESS_GET_VAD = 5

Get preprocessor Voice Activity Detection state

3.86.1.30 const int SPEEX_PREPROCESS_SET_AGC = 2

Set preprocessor Automatic Gain Control state

3.86.1.31 const int SPEEX_PREPROCESS_SET_AGC_DECREMENT = 28

Set maximal gain decrease in dB/second (int32)

3.86.1.32 const int SPEEX_PREPROCESS_SET_AGC_INCREMENT = 26

Set maximal gain increase in dB/second (int32)

3.86.1.33 const int SPEEX_PREPROCESS_SET_AGC_LEVEL = 6

Set preprocessor Automatic Gain Control level (float)

3.86.1.34 const int SPEEX_PREPROCESS_SET_AGC_MAX_GAIN = 30

Set maximal gain in dB (int32)

3.86.1.35 const int SPEEX_PREPROCESS_SET_AGC_TARGET = 46

Set preprocessor Automatic Gain Control level (int32)

3.86.1.36 const int SPEEX_PREPROCESS_SET_DENOISE = 0

Set preprocessor denoiser state

3.86.1.37 const int SPEEX_PREPROCESS_SET_DEREVERB = 8

Set preprocessor dereverb state

3.86.1.38 const int SPEEX_PREPROCESS_SET_DEREVERB_DECAY = 12

Set preprocessor dereverb decay

3.86.1.39 const int SPEEX_PREPROCESS_SET_DEREVERB_LEVEL = 10

Set preprocessor dereverb level

3.86.1.40 const int SPEEX_PREPROCESS_SET_ECHO_STATE = 24

Set the corresponding echo canceller state so that residual echo suppression can be performed (NULL for no residual echo suppression)

3.86.1.41 const int SPEEX_PREPROCESS_SET_ECHO_SUPPRESS = 20

Set maximum attenuation of the residual echo in dB (negative number)

3.86.1.42 const int SPEEX_PREPROCESS_SET_ECHO_SUPPRESS_ACTIVE = 22

Set maximum attenuation of the residual echo in dB when near end is active (negative number)

3.86.1.43 const int SPEEX_PREPROCESS_SET_NOISE_SUPPRESS = 18

Set maximum attenuation of the noise in dB (negative number)

3.86.1.44 const int SPEEX_PREPROCESS_SET_PROB_CONTINUE = 16

Set probability required for the VAD to stay in the voice state (integer percent)

3.86.1.45 const int SPEEX_PREPROCESS_SET_PROB_START = 14

Set probability required for the VAD to go from silence to voice

3.86.1.46 const int SPEEX_PREPROCESS_SET_VAD = 4

Set preprocessor Voice Activity Detection state

3.87 SpeexProcessor Class Reference

Inherits SpeexLib, and IProcessor< T >.

Classes

- struct AECLatencyResultType

Public Member Functions

- void **ResetAEC** ()
- void **AECLatecnyDetectCaliberate** ()
- **SpeexProcessor** (ILogger logger, Func< long > clockMs, int frameSize, int samplingRate, int channels, int playSamplingRate, int playChannels, int playBufSize)
- void **InitAEC** ()
- short[ ] **Process** (short[ ] buf)
- void **OnAudioOutFrame** (float[ ] data, int outChannels)
- void **PrintInfo** ()
- void **Dispose** ()

Properties

- bool **AEC** `[get, set]`
- int **AECFilterLengthMs** `[get, set]`
- int **AECPlaybackDelayMs** `[get, set]`
- int **AECurrentPlayDelayFrames** `[get]`
- bool **AECLatencyDetect** `[get, set]`
- AECLatencyResultType **AECLatencyResult** `[get]`
- bool **Denoise** `[get, set]`
- bool **AGC** `[get, set]`
- float **AGCLevel** `[get, set]`

Additional Inherited Members

3.88 TestTone Class Reference

Inherits MonoBehaviour.

3.89 AudioUtil.ToneAudioPusher< T > Class Template Reference

IAudioPusher that provides a constant tone signal.

Inherits IAudioPusher< T >.

Public Member Functions

- ToneAudioPusher (int frequency=440, int bufSizeMs=100, int samplingRate=441000, int channels=2)

  Create a new ToneAudioReader instance
- void SetCallback (Action< T[]> callback, ObjectFactory< T[], int > bufferFactory)

  Set the callback function used for pushing data
- void **Dispose** ()

Properties

- int **Channels** `[get]`
- int **SamplingRate** `[get]`
- string **Error** `[get]`

3.89.1 Detailed Description

IAudioPusher that provides a constant tone signal.

3.89.2 Constructor & Destructor Documentation

3.89.2.1 ToneAudioPusher (int *frequency* = 440, int *bufSizeMs* = 100, int *samplingRate* = 441000, int *channels* = 2)

Create a new ToneAudioReader instance

Parameters

frequency	Frequency of the generated tone (in Hz).
bufSizeMs	Size of buffers to push (in milliseconds).
samplingRate	Sampling rate of the audio signal (in Hz).
channels	Number of channels in the audio signal.

3.89.3 Member Function Documentation

3.89.3.1 void SetCallback (Action< T[]> *callback*, ObjectFactory< T[], int > *bufferFactory*)

Set the callback function used for pushing data

Parameters

callback	Callback function to use
localVoice	Outgoing audio stream, for context

Implements IAudioPusher< T >.

3.90 AudioUtil.ToneAudioReader< T > Class Template Reference

IAudioReader that provides a constant tone signal.

Inherits IAudioReader< T >.

Public Member Functions

- ToneAudioReader (Func< double > clockSec=null, double frequency=440, int samplingRate=441000, int channels=2)

Create a new ToneAudioReader instance

- void **Dispose** ()
- bool Read (T[] buf)

  Fill full given frame buffer with source uncompressed data or return false if not enough such data.

Properties

- int Channels `[get]`

  Number of channels in the audio signal.
- int SamplingRate `[get]`

  Sampling rate of the audio signal (in Hz).
- string Error `[get]`

  If not null, audio object is in invalid state.

3.90.1 Detailed Description

IAudioReader that provides a constant tone signal.

See also MicWrapper and AudioClipWrapper Because of current resampling algorithm, the tone is distorted if SamplingRate does not equal encoder sampling rate.

3.90.2 Constructor & Destructor Documentation

3.90.2.1 ToneAudioReader (Func< double > *clockSec* = `null`, double *frequency* = `440`, int *samplingRate* = `441000`, int *channels* = `2`)

Create a new ToneAudioReader instance

Parameters

clockSec	Function to get current time in seconds. In Unity, pass in '() => AudioSettings.dspTime' for better results.
frequency	Frequency of the generated tone (in Hz).
samplingRate	Sampling rate of the audio signal (in Hz).
channels	Number of channels in the audio signal.

3.90.3 Member Function Documentation

3.90.3.1 bool Read (T[] *buffer*)

Fill full given frame buffer with source uncompressed data or return false if not enough such data.

Parameters

buffer	Buffer to fill.

Returns

True if buffer was filled successfully, false otherwise.

Implements IDataReader< T >.

3.90.4 Property Documentation

3.90.4.1 int Channels [get]

Number of channels in the audio signal.

3.90.4.2 string Error [get]

If not null, audio object is in invalid state.

3.90.4.3 int SamplingRate [get]

Sampling rate of the audio signal (in Hz).

3.91 ToneAudioReader Class Reference

Inherits IAudioReader< T >.

Public Member Functions

- void **Dispose** ()
- bool **Read** (float[ ] buf)

Properties

- int **Channels** [get]
- int **SamplingRate** [get]
- string **Error** [get]

3.92 UnityAndroidAudioInAEC Class Reference

Inherits IAudioPusher< T >.

Public Member Functions

- **UnityAndroidAudioInAEC** (Voice.ILogger logger)
- void **SetCallback** (Action< short[ ]> callback, ObjectFactory< short[ ], int > bufferFactory)
- void **Dispose** ()

Properties

- int **Channels** [get]
- int **SamplingRate** [get]
- string **Error** [get]

3.93 UnityAudioOut Class Reference

Inherits ISyncAudioOut.

Public Member Functions

- **UnityAudioOut** (AudioSource audioSource)
- void **Start** (int frequency, int channels, int frameSamples, int playDelayMs)
- void **Service** ()
- void **Push** (float[ ] frame)
- void **Stop** ()
- void **Pause** ()
- void **UnPause** ()

Public Attributes

- const int **FRAME_POOL_CAPACITY** = 50

Properties

- int **Lag** `[get]`
- int **PlaySamplePos** `[get, set]`
- bool **IsPlaying** `[get]`

3.94 UnsupportedCodecException Class Reference

Exception thrown if an unsupported codec is encountered.

Inherits Exception.

Public Member Functions

- UnsupportedCodecException (Codec codec, LocalVoice voice)
  Create a new UnsupportedCodecException.

3.94.1 Detailed Description

Exception thrown if an unsupported codec is encountered.

PhotonVoice currently only supports one Codec, Codec.AudioOpus.

3.94.2 Constructor & Destructor Documentation

3.94.2.1 UnsupportedCodecException (Codec *codec,* LocalVoice *voice*)

Create a new UnsupportedCodecException.

Parameters

codec	The codec actually encountered.
voice	The LocalVoice (outgoing stream) involved.

3.95 UnsupportedSampleTypeException Class Reference

Exception thrown if an unsupported audio sample type is encountered.

Inherits Exception.

Public Member Functions

- UnsupportedSampleTypeException (Type t)

  Create a new UnsupportedSampleTypeException.

3.95.1 Detailed Description

Exception thrown if an unsupported audio sample type is encountered.

PhotonVoice generally supports 32-bit floating point ("float") or 16-bit signed integer ("short") audio, but it usually won't be converted automatically due to the high CPU overhead (and potential loss of precision) involved.

3.95.2 Constructor & Destructor Documentation

3.95.2.1 UnsupportedSampleTypeException (Type *t*)

Create a new UnsupportedSampleTypeException.

Parameters

t	The sample type actually encountered.

3.96 OpusCodec.Util Class Reference

3.97 VoiceClient Class Reference

Base class for Voice clients implamantations

Inherits IDisposable.

Public Member Functions

- delegate void RemoteVoiceInfoDelegate (int channelId, int playerId, byte voiceId, VoiceInfo voiceInfo, ref RemoteVoiceOptions options)

  Remote voice info event delegate.
- IEnumerable< LocalVoice > LocalVoicesInChannel (int channelId)

  Iterates through copy of all local voices list of given channel.
- void Service ()

  This method dispatches all available incoming commands and then sends this client's outgoing commands. Call this method regularly (2..20 times a second).
- LocalVoice CreateLocalVoice (VoiceInfo voiceInfo, int channelId=ChannelAuto, IEncoder encoder=null)

  Creates basic outgoing stream w/o data processing support. Provided encoder should generate output data stream.
- LocalVoiceFramed< T > CreateLocalVoiceFramed< T > (VoiceInfo voiceInfo, int frameSize, int channelId=ChannelAuto, IEncoderDataFlow< T > encoder=null)

  Creates outgoing stream consuming sequence of values passed in array buffers of arbitrary length which repacked in frames of constant length for further processing and encoding.
- LocalVoiceAudio< T > CreateLocalVoiceAudio< T > (VoiceInfo voiceInfo, int channelId=ChannelAuto, IEncoder encoder=null)

  Creates outgoing audio stream. Adds audio specific features (e.g. resampling, level meter) to processing pipeline and to returning stream handler.
- Voice.LocalVoice CreateLocalVoiceAudioFromSource (Voice.VoiceInfo voiceInfo, Voice.IAudioDesc source, bool forceShort=false, int channelId=ChannelAuto, IEncoder encoder=null)

Creates outgoing audio stream of type automatically assigned and adds procedures (callback or serviceable) for consuming given audio source data. Adds audio specific features (e.g. resampling, level meter) to processing pipeline and to returning stream handler.

- void RemoveLocalVoice (LocalVoice voice)

  Removes local voice (outgoing data stream).
  Parameters

voice	*Handler of outgoing stream to be removed.*

- void **Dispose** ()

Public Attributes

- const int **ChannelAuto** = -1

Properties

- int FramesLost `[get, set]`

  Lost frames counter.
- int FramesReceived `[get]`

  Received frames counter.
- int FramesSent `[get]`

  Sent frames counter.
- int FramesSentBytes `[get]`

  Sent frames bytes counter.
- int RoundTripTime `[get]`

  Average time required voice packet to return to sender.
- int RoundTripTimeVariance `[get]`

  Average round trip time variation.
- bool SuppressInfoDuplicateWarning `[get, set]`

  Do not log warning when duplicate info received.
- RemoteVoiceInfoDelegate OnRemoteVoiceInfoAction `[get, set]`

  Register a method to be called when remote voice info arrived (after join or new new remote voice creation). Metod parameters: (int channelId, int playerId, byte voiceId, VoiceInfo voiceInfo, ref RemoteVoiceOptions options);
- int DebugLostPercent `[get, set]`

  Lost frames simulation ratio.
- IEnumerable< LocalVoice > LocalVoices `[get]`

  Iterates through copy of all local voices list.
- IEnumerable< RemoteVoiceInfo > RemoteVoiceInfos `[get]`

  Iterates through all remote voices infos.
- IEnumerable< object > RemoteVoiceLocalUserObjects `[get]`

  Iterates through all local objects set by user in remote voices.

3.97.1 Detailed Description

Base class for Voice clients implamantations

3.97.2 Member Function Documentation

3.97.2.1 LocalVoice CreateLocalVoice (VoiceInfo *voiceInfo*, int *channelId* = `ChannelAuto`, IEncoder *encoder* = `null`)

Creates basic outgoing stream w/o data processing support. Provided encoder should generate output data stream.

Parameters

voiceInfo	Outgoing stream parameters. Set applicable fields to read them by encoder and by receiving client when voice created.
channelId	Transport channel specific to frontend. Set to VoiceClient.ChannelAuto to let frontend automatically assign channel.
encoder	Encoder producing the stream.

Returns

Outgoing stream handler.

3.97.2.2 LocalVoiceAudio<T> CreateLocalVoiceAudio< T > (VoiceInfo *voiceInfo*, int *channelId* = `ChannelAuto`, IEncoder *encoder* = `null`)

Creates outgoing audio stream. Adds audio specific features (e.g. resampling, level meter) to processing pipeline and to returning stream handler.

Template Parameters

T	Element type of audio array buffers.

Parameters

voiceInfo	Outgoing audio stream parameters. Set applicable fields to read them by encoder and by receiving client when voice created.
channelId	Transport channel specific to frontend. Set to VoiceClient.ChannelAuto to let frontend automatically assign channel.
encoder	Audio encoder. Set to null to use default Opus encoder.

Returns

Outgoing stream handler.

voiceInfo.sourceSamplingRate and voiceInfo.SamplingRate may do not match. Automatic resampling will occur in this case.

3.97.2.3 Voice.LocalVoice CreateLocalVoiceAudioFromSource (Voice.VoiceInfo *voiceInfo*, Voice.IAudioDesc *source*, bool *forceShort* = `false`, int *channelId* = `ChannelAuto`, IEncoder *encoder* = `null`)

Creates outgoing audio stream of type automatically assigned and adds procedures (callback or serviceable) for consuming given audio source data. Adds audio specific features (e.g. resampling, level meter) to processing pipeline and to returning stream handler.

Parameters

voiceInfo	Outgoing audio stream parameters. Set applicable fields to read them by encoder and by receiving client when voice created.
source	Streaming audio source.
forceShort	For audio sources producing buffers of 'float' type, creates stream of 'short' type and adds converter.
channelId	Transport channel specific to frontend. Set to VoiceClient.ChannelAuto to let frontend automatically assign channel.

encoder	Audio encoder. Set to null to use default Opus encoder.

Returns

Outgoing stream handler.

voiceInfo.sourceSamplingRate and voiceInfo.SamplingRate may do not match. Automatic resampling will occur in this case.

3.97.2.4 LocalVoiceFramed<T> CreateLocalVoiceFramed< T > (VoiceInfo *voiceInfo,* int *frameSize,* int *channelId =* `ChannelAuto`, IEncoderDataFlow< T > *encoder =* `null`)

Creates outgoing stream consuming sequence of values passed in array buffers of arbitrary length which repacked in frames of constant length for further processing and encoding.

Template Parameters

T	Type of data consumed by outgoing stream (element type of array buffers).

Parameters

voiceInfo	Outgoing stream parameters. Set applicable fields to read them by encoder and by receiving client when voice created.
channelId	Transport channel specific to frontend. Set to VoiceClient.ChannelAuto to let frontend automatically assign channel.
encoder	Encoder compressing data stream in pipeline.

Returns

Outgoing stream handler.

3.97.2.5 IEnumerable<LocalVoice> LocalVoicesInChannel (int *channelId*)

Iterates through copy of all local voices list of given channel.

3.97.2.6 delegate void RemoteVoiceInfoDelegate (int *channelId,* int *playerId,* byte *voiceId,* VoiceInfo *voiceInfo,* ref RemoteVoiceOptions *options*)

Remote voice info event delegate.

3.97.2.7 void RemoveLocalVoice (LocalVoice *voice*)

Removes local voice (outgoing data stream).

Parameters

voice	Handler of outgoing stream to be removed.

3.97.2.8 void Service ( )

This method dispatches all available incoming commands and then sends this client's outgoing commands. Call this method regularly (2..20 times a second).

3.97.3 Property Documentation

3.97.3.1 int DebugLostPercent [get], [set]

Lost frames simulation ratio.

3.97.3.2 int FramesLost [get], [set]

Lost frames counter.

3.97.3.3 int FramesReceived [get]

Received frames counter.

3.97.3.4 int FramesSent [get]

Sent frames counter.

3.97.3.5 int FramesSentBytes [get]

Sent frames bytes counter.

3.97.3.6 IEnumerable<LocalVoice> LocalVoices [get]

Iterates through copy of all local voices list.

3.97.3.7 RemoteVoiceInfoDelegate OnRemoteVoiceInfoAction [get], [set]

Register a method to be called when remote voice info arrived (after join or new new remote voice creation). Metod parameters: (int channelId, int playerId, byte voiceId, VoiceInfo voiceInfo, ref RemoteVoiceOptions options);

3.97.3.8 IEnumerable<RemoteVoiceInfo> RemoteVoiceInfos [get]

Iterates through all remote voices infos.

3.97.3.9 IEnumerable<object> RemoteVoiceLocalUserObjects [get]

Iterates through all local objects set by user in remote voices.

3.97.3.10 int RoundTripTime [get]

Average time required voice packet to return to sender.

3.97.3.11 int RoundTripTimeVariance [get]

Average round trip time variation.

3.97.3.12 bool SuppressInfoDuplicateWarning [get], [set]

Do not log warning when duplicate info received.

3.98 VoiceComponent Class Reference

Inherits MonoBehaviour, and ILoggable.

Inherited by PhotonVoiceView, Recorder, Speaker, and WebRtcAudioDsp.

Protected Member Functions

- virtual void **Awake** ()

Protected Attributes

- DebugLevel **logLevel** = DebugLevel.ERROR

Properties

- VoiceLogger **Logger** `[get, protected set]`
- DebugLevel **LogLevel** `[get, set]`

3.99 VoiceConnection Class Reference

Component that represents a client voice connection to Photon Servers.

Inherits ConnectionHandler, and ILoggable.

Inherited by PhotonVoiceNetwork.

Public Member Functions

- bool ConnectUsingSettings (AppSettings overwriteSettings=null)

  Connect to Photon server using Settings

Public Attributes

- AppSettings Settings

  Settings to be used by this voice connection
- Recorder PrimaryRecorder

  Main Recorder to be used for transmission by default
- Func< int, byte, object, Speaker > SpeakerFactory

  Special factory to link Speaker components with incoming remote audio streams

Protected Member Functions

- override void **Awake** ()
- virtual void **Update** ()
- override void **OnDestroy** ()
- virtual void **OnVoiceStateChanged** (ClientState fromState, ClientState toState)
- override void **OnApplicationQuit** ()
- void **CalcStatistics** ()
- void **LinkSpeaker** (Speaker speaker, RemoteVoiceLink remoteVoice)

Protected Attributes

- List< RemoteVoiceLink > **cachedRemoteVoices** = new List<RemoteVoiceLink>()

Properties

- VoiceLogger Logger `[get, protected set]`

  Logger used by this component
- DebugLevel LogLevel `[get, set]`

  Log level for this component
- new LoadBalancingFrontend Client `[get]`

  Returns underlying Photon LoadBalancing client.
- VoiceClient VoiceClient `[get]`

  Returns underlying Photon Voice client.
- ClientState ClientState `[get]`

  Returns Photon Voice client state.
- float FramesReceivedPerSecond `[get]`

  Number of frames received per second.
- float FramesLostPerSecond `[get]`

  Number of frames lost per second.
- float FramesLostPercent `[get]`

  Percentage of lost frames.
- GameObject SpeakerPrefab `[get, set]`

  Prefab that contains Speaker component to be instantiated when receiving a new remote audio source info

Events

- Action< Speaker > SpeakerLinked

  Fires when a speaker has been linked to a remote audio stream
- Action< RemoteVoiceLink > RemoteVoiceAdded

  Fires when a remote voice stream is added

3.99.1 Detailed Description

Component that represents a client voice connection to Photon Servers.

3.99.2 Member Function Documentation

3.99.2.1 bool ConnectUsingSettings (AppSettings *overwriteSettings* = `null`)

Connect to Photon server using Settings

Parameters

overwrite↩ Settings	Overwrites Settings before connecting

Returns

If true voice connection command was sent from client

3.99.3 Member Data Documentation

3.99.3.1 Recorder PrimaryRecorder

Main Recorder to be used for transmission by default

3.99.3.2 AppSettings Settings

Settings to be used by this voice connection

3.99.3.3 Func<int, byte, object, Speaker> SpeakerFactory

Special factory to link Speaker components with incoming remote audio streams

3.99.4 Property Documentation

3.99.4.1 new LoadBalancingFrontend Client [get]

Returns underlying Photon LoadBalancing client.

3.99.4.2 ClientState ClientState [get]

Returns Photon Voice client state.

3.99.4.3 float FramesLostPercent [get]

Percentage of lost frames.

3.99.4.4 float FramesLostPerSecond [get]

Number of frames lost per second.

3.99.4.5 float FramesReceivedPerSecond [get]

Number of frames received per second.

3.99.4.6 VoiceLogger Logger [get], [protected set]

Logger used by this component

3.99.4.7 DebugLevel LogLevel [get], [set]

Log level for this component

3.99.4.8 GameObject SpeakerPrefab [get], [set]

Prefab that contains Speaker component to be instantiated when receiving a new remote audio source info

3.99.4.9 VoiceClient VoiceClient [get]

Returns underlying Photon Voice client.

3.99.5 Event Documentation

3.99.5.1 Action<RemoteVoiceLink> RemoteVoiceAdded

Fires when a remote voice stream is added

3.99.5.2 Action<Speaker> SpeakerLinked

Fires when a speaker has been linked to a remote audio stream

3.100 AudioUtil.VoiceDetector< T > Class Template Reference

Simple voice activity detector triggered by signal level.

Inherits IProcessor< T >, and AudioUtil.IVoiceDetector.

Inherited by AudioUtil.VoiceDetectorFloat, and AudioUtil.VoiceDetectorShort.

Public Member Functions

- abstract T[] Process (T[] buf)
  Process a frame of audio data.
- void **Dispose** ()

Protected Attributes

- int **activityDelay**
- int **autoSilenceCounter** = 0
- int **valuesCountPerSec**
- int **activityDelayValuesCount**

Properties

- bool On [get, set]
  If true, voice detection enabled.
- float Threshold [get, set]
  Voice detected as soon as signal level exceeds threshold.
- bool Detected [get, protected set]
  If true, voice detected.
- DateTime DetectedTime [get]
  Last time when switched to detected state.
- int ActivityDelayMs [get, set]
  Keep detected state during this time after signal level dropped below threshold.

Events

- Action OnDetected
  Called when switched to detected state.

3.100.1 Detailed Description

Simple voice activity detector triggered by signal level.

3.100.2 Member Function Documentation

3.100.2.1 abstract T [ ] Process (T[ ] *buf*) [pure virtual]

Process a frame of audio data.

Parameters

buf	Buffer containing input audio data

Returns

Buffer containing output audio data

Implements IProcessor< T >.

3.100.3 Property Documentation

3.100.3.1 int ActivityDelayMs [get], [set]

Keep detected state during this time after signal level dropped below threshold.

3.100.3.2 bool Detected [get], [protected set]

If true, voice detected.

3.100.3.3 DateTime DetectedTime [get]

Last time when switched to detected state.

3.100.3.4 bool On [get], [set]

If true, voice detection enabled.

3.100.3.5 float Threshold [get], [set]

Voice detected as soon as signal level exceeds threshold.

3.100.4 Event Documentation

3.100.4.1 Action OnDetected

Called when switched to detected state.

3.101 AudioUtil.VoiceDetectorCalibration< T > Class Template Reference

Calibration Utility for Voice Detector

Inherits IProcessor< T >.

Public Member Functions

- VoiceDetectorCalibration (IVoiceDetector voiceDetector, ILevelMeter levelMeter, int samplingRate, int channels)

  Create new VoiceDetectorCalibration instance.
- void VoiceDetectorCalibrate (int durationMs)

  Start calibration.
- T[ ] Process (T[ ] buf)

  Process a frame of audio data.
- void **Dispose** ()

Protected Attributes

- int **voiceDetectorCalibrateCount**

Properties

- bool **VoiceDetectorCalibrating** `[get]`

3.101.1 Detailed Description

Calibration Utility for Voice Detector

Using this audio processor, you can calibrate the IVoiceDetector.Threshold.

3.101.2 Constructor & Destructor Documentation

3.101.2.1 VoiceDetectorCalibration (IVoiceDetector *voiceDetector,* ILevelMeter *levelMeter,* int *samplingRate,* int *channels*)

Create new VoiceDetectorCalibration instance.

Parameters

voiceDetector	Voice Detector to calibrate.
levelMeter	Level Meter to look at for calibration.
samplingRate	Sampling rate of the audio signal (in Hz).
numChannels	Number of channels in the audio signal.

3.101.3 Member Function Documentation

3.101.3.1 T [ ] Process (T[ ] *buf*)

Process a frame of audio data.

Parameters

buf	Buffer containing input audio data

Returns

Buffer containing output audio data

Implements IProcessor< T >.

3.101.3.2 void VoiceDetectorCalibrate (int *durationMs*)

Start calibration.

Parameters

durationMs	Duration of the calibration procedure (in milliseconds).

This activates the Calibration process. It will reset the given LevelMeter's AccumAvgPeakAmp (accumulated average peak amplitude), and when the duration has passed, use it for the VoiceDetector's detection threshold.

3.102 AudioUtil.VoiceDetectorDummy Class Reference

Dummy VoiceDetector that doesn't actually do anything.

Inherits AudioUtil.IVoiceDetector.

Properties

- bool **On** `[get, set]`
- float **Threshold** `[get, set]`
- bool **Detected** `[get]`
- int **ActivityDelayMs** `[get, set]`
- DateTime **DetectedTime** `[get]`
- Action **OnDetected**

Additional Inherited Members

3.102.1 Detailed Description

Dummy VoiceDetector that doesn't actually do anything.

3.103 AudioUtil.VoiceDetectorFloat Class Reference

VoiceDetector specialization for float audio.

Inherits AudioUtil.VoiceDetector< T >.

Public Member Functions

- VoiceDetectorFloat (int samplingRate, int numChannels)
  Create a new VoiceDetectorFloat instance.
- override float[ ] **Process** (float[ ] buffer)

Additional Inherited Members

3.103.1 Detailed Description

VoiceDetector specialization for float audio.

3.103.2 Constructor & Destructor Documentation

3.103.2.1 VoiceDetectorFloat (int *samplingRate*, int *numChannels*)

Create a new VoiceDetectorFloat instance.

Parameters

samplingRate	Sampling rate of the audio signal (in Hz).
numChannels	Number of channels in the audio signal.

3.104 AudioUtil.VoiceDetectorShort Class Reference

VoiceDetector specialization for float audio.

Inherits AudioUtil.VoiceDetector< T >.

Public Member Functions

- VoiceDetectorShort (int samplingRate, int numChannels)

  Create a new VoiceDetectorFloat instance
- override short[ ] **Process** (short[ ] buffer)

Additional Inherited Members

3.104.1 Detailed Description

VoiceDetector specialization for float audio.

3.104.2 Constructor & Destructor Documentation

3.104.2.1 VoiceDetectorShort (int *samplingRate,* int *numChannels*)

Create a new VoiceDetectorFloat instance

Parameters

samplingRate	Sampling rate of the audio signal (in Hz).
numChannels	Number of channels in the audio signal.

3.105 VoiceEventCode Class Reference

PhotonVoice communication uses a single type of event, but differentiates transmission Channels by encoding a channelId into VoiceEventCode.

Static Public Member Functions

- static byte GetCode (int channelID)

  Get the event code for the given channel ID.
- static bool TryGetChannelID (byte evCode, int maxChannels, out byte channelID)

  Try to get the channel ID for the given event code.

Public Attributes

- const byte Code0 = 201

  Start of voice event codes range.

3.105.1 Detailed Description

PhotonVoice communication uses a single type of event, but differentiates transmission Channels by encoding a channelId into VoiceEventCode.

Transmission Channels are not for selective forwarding: use AudioGroups for that. Instead, they are to differentiate opus audio from (future) other codecs or media.

For this purpose, a range of event codes of length LoadBalancingPeer.ChannelCount, starting from Code0, is used.

3.105.2 Member Function Documentation

3.105.2.1 static byte GetCode (int *channelID*) [static]

Get the event code for the given channel ID.

Parameters

channelID	Channel ID to get event code for.

Returns

The corresponding event code.

3.105.2.2 static bool TryGetChannelID (byte *evCode,* int *maxChannels,* out byte *channelID*) [static]

Try to get the channel ID for the given event code.

Parameters

evCode	Event code to find Channel ID from.
maxChannels	Maximum Channel ID in use.
channelID	(output) Channel ID found.

Returns

True if a valid channel ID could be recovered from evCode, false otherwise.

3.105.3 Member Data Documentation

3.105.3.1 const byte Code0 = 201

Start of voice event codes range.

Change if it conflicts with other event codes used in the same Photon room.

3.106 VoiceInfo Struct Reference

Describes stream properties.

Public Member Functions

- override string **ToString** ()

Static Public Member Functions

- static VoiceInfo CreateAudioOpus (POpusCodec.Enums.SamplingRate samplingRate, int sourceSampling↩ Rate, int channels, OpusCodec.FrameDuration frameDurationUs, int bitrate, object userdata=null)

  Create stream info for an Opus audio stream.

Properties

- Codec **Codec** `[get, set]`
- int SamplingRate `[get, set]`

  Audio sampling rate (frequency, in Hz).
- int SourceSamplingRate `[get, set]`

  Source audio sampling rate (to be resampled to SamplingRate; in Hz).
- int Channels `[get, set]`

  Number of channels.
- int FrameDurationUs `[get, set]`

  Uncompressed frame (audio packet) size in microseconds.
- int Bitrate `[get, set]`

  Target bitrate (in bits/second).
- object UserData `[get, set]`

  Optional user data. Should be serializable by Photon.
- int FrameDurationSamples `[get]`

  Uncompressed frame (data packet) size in samples.
- int FrameSize `[get]`

  Uncompressed frame (data packet) size in samples.
- int Width `[get, set]`

  Video width (optional).
- int Height `[get, set]`

  Video height (optional)

3.106.1 Detailed Description

Describes stream properties.

3.106.2 Member Function Documentation

3.106.2.1 static VoiceInfo CreateAudioOpus (POpusCodec.Enums.SamplingRate *samplingRate,* int *sourceSamplingRate,* int *channels,* OpusCodec.FrameDuration *frameDurationUs,* int *bitrate,* object *userdata* = `null`) `[static]`

Create stream info for an Opus audio stream.

Parameters

samplingRate	Audio sampling rate.
source↩ SamplingRate	Source audio sampling rate (to be resampled to samplingRate; in Hz).
channels	Number of channels.
frameDurationUs	Uncompressed frame (audio packet) size in microseconds.

bitrate	Stream bitrate (in bits/second).
userdata	Optional user data. Should be serializable by Photon.

Returns

VoiceInfo instance.

3.106.3 Property Documentation

3.106.3.1 int Bitrate [get], [set]

Target bitrate (in bits/second).

3.106.3.2 int Channels [get], [set]

Number of channels.

3.106.3.3 int FrameDurationSamples [get]

Uncompressed frame (data packet) size in samples.

3.106.3.4 int FrameDurationUs [get], [set]

Uncompressed frame (audio packet) size in microseconds.

3.106.3.5 int FrameSize [get]

Uncompressed frame (data packet) size in samples.

3.106.3.6 int Height [get], [set]

Video height (optional)

3.106.3.7 int SamplingRate [get], [set]

Audio sampling rate (frequency, in Hz).

3.106.3.8 int SourceSamplingRate [get], [set]

Source audio sampling rate (to be resampled to SamplingRate; in Hz).

3.106.3.9 object UserData [get], [set]

Optional user data. Should be serializable by Photon.

3.106.3.10 int Width [get], [set]

Video width (optional).

3.107 AudioUtil.VoiceLevelDetectCalibrate< T > Class Template Reference

Utility Audio Processor Voice Detection Calibration.

Inherits IProcessor< T >.

Public Member Functions

- VoiceLevelDetectCalibrate (int samplingRate, int channels)

  Create new VoiceLevelDetectCalibrate instance
- void Calibrate (int durationMs)

  Start calibration
- T[ ] Process (T[ ] buf)

  Process a frame of audio data.
- void **Dispose** ()

Properties

- ILevelMeter Level `[get]`

  The LevelMeter in use.
- IVoiceDetector Detector `[get]`

  The VoiceDetector in use

3.107.1 Detailed Description

Utility Audio Processor Voice Detection Calibration.

Encapsulates level meter, voice detector and voice detector calibrator in single instance.

3.107.2 Constructor & Destructor Documentation

3.107.2.1 VoiceLevelDetectCalibrate (int *samplingRate,* int *channels*)

Create new VoiceLevelDetectCalibrate instance

Parameters

samplingRate	Sampling rate of the audio signal (in Hz).
numChannels	Number of channels in the audio signal.

3.107.3 Member Function Documentation

3.107.3.1 void Calibrate (int *durationMs*)

Start calibration

Parameters

durationMs	Duration of the calibration procedure (in milliseconds).

This activates the Calibration process. It will reset the given LevelMeter's AccumAvgPeakAmp (accumulated average peak amplitude), and when the duration has passed, use it for the VoiceDetector's detection threshold.

3.107.3.2 T [ ] Process (T[ ] *buf*)

Process a frame of audio data.

Parameters

buf	Buffer containing input audio data

Returns

Buffer containing output audio data

Implements IProcessor< T >.

3.107.4 Property Documentation

3.107.4.1 IVoiceDetector Detector [get]

The VoiceDetector in use

3.107.4.2 ILevelMeter Level [get]

The LevelMeter in use.

3.108 VoiceLogger Class Reference

Inherits ILogger.

Public Member Functions

- **VoiceLogger** (Object context, string tag, DebugLevel level=DebugLevel.ERROR)
- **VoiceLogger** (string tag, DebugLevel level=DebugLevel.ERROR)
- void **LogError** (string fmt, params object[ ] args)
- void **LogWarning** (string fmt, params object[ ] args)
- void **LogInfo** (string fmt, params object[ ] args)
- void **LogDebug** (string fmt, params object[ ] args)

Properties

- string **Tag** [get, set]
- DebugLevel **LogLevel** [get, set]
- bool **IsErrorEnabled** [get]
- bool **IsWarningEnabled** [get]
- bool **IsInfoEnabled** [get]
- bool **IsDebugEnabled** [get]

3.109 WebRtcAudioDsp Class Reference

Inherits VoiceComponent.

Protected Member Functions

- override void **Awake** ()

Properties

- bool **AEC** [get, set]
- bool **AECMobile** [get, set]
- int **ReverseStreamDelayMs** [get, set]
- bool **NoiseSuppression** [get, set]
- bool **HighPass** [get, set]
- bool **Bypass** [get, set]
- bool **AGC** [get, set]
- bool **VAD** [get, set]

Additional Inherited Members

3.110 WebRTCAudioLib Class Reference

Inherited by WebRTCAudioProcessor.

Classes

- struct ConfigParam
- struct Param

Public Member Functions

- static IntPtr **webrtc_audio_processor_create** (int samplingRate, int channels, int frameSize, int rev↩ SamplingRate, int revChannels)
- static int **webrtc_audio_processor_set_config_param** (IntPtr proc, int param, int v)
- static int **webrtc_audio_processor_init** (IntPtr proc)
- static int **webrtc_audio_processor_set_param** (IntPtr proc, int param, int v)
- static int **webrtc_audio_processor_process** (IntPtr proc, short[ ] buffer, int offset, out bool voiceDetected)
- static int **webrtc_audio_processor_process_reverse** (IntPtr proc, short[ ] buffer, int bufferSize)
- static void **webrtc_audio_processor_destroy** (IntPtr proc)

3.111 WebRTCAudioProcessor Class Reference

Inherits WebRTCAudioLib, and IProcessor< T >.

Public Member Functions

- **WebRTCAudioProcessor** (ILogger logger, int frameSize, int samplingRate, int channels, int reverse↩ SamplingRate, int reverseChannels)
- short[ ] **Process** (short[ ] buf)
- void **OnAudioOutFrameFloat** (float[ ] data)
- void **Dispose** ()

Properties

- int **AECStreamDelayMs** [set]
- bool **AEC** [set]
- bool **AECMobile** [set]
- int **AECMRoutingMode** [set]
- bool **AECMComfortNoise** [set]
- bool **HighPass** [set]
- bool **NoiseSuppression** [set]
- bool **AGC** [set]
- bool **VAD** [set]
- bool **Bypass** [set]

Index