SOUND4 x1.CL Library [1.5.12]

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Chapter 1

SOUND4 x1.CL Library

1.1 General library information

The library interface is in C to avoid any compatibility issue.

If you are using C++, you might be better using Generic C++ access to SOUND4 .CL librairies.

Note

In all library, all `char*` are **UTF-8** encoded

To access the presets/settings, you need to use JSON syntax.

Have a look at our Examples.

1.2 General C usage

You may check library configuration and setup logging Global setup and Environment variables and parameters

You have to create/destroy an instance Process creation/destruction.

For audio, you can either use direct optimized form with Direct processing or you can use Audio managing (any audio) to have any format. You may use Audio convert helpers.

You need to start a thread calling cloudx1_StartUpdateThread see Update Management

You can start a web server for configuration, see Web server

If it is needed, you can use metadata : see Metadata Management

If you need, you may use your own custom preset manager for saving files and presets. See Custom preset managagement

You may communicate with the instance with JSON syntax using :

- the socket opened with cloudx1_StartUpdateThread
- the direct API, see Client's JSon config interfacing.

Chapter 2

Generic C++ access to SOUND4 .CL librairies

This is the easier way to integrate, and works for all .CL engines.

2.1 General usage

See Sample using Generic C++ interface (multi-process compatible).

The main steps are the following :

1. Load the want library with CProcessor::Load
2. Configure logging with CProcessor::SetLogSeverity and CProcessor::SetLoggerCallback
3. Allocate an CInstance
4. Configure parameters with CInstance::SetParam (see Environment variables and parameters)
5. Create the instance with CInstance::Create.
6. Create a web server with CInstance::StartWebServer
7. Send the audio to the instance using CInstance::ProcessAudio

Note

All `std::string` are **UTF-8** encoded

2.2 Communicating with the instance

If you need to communicate with the instance, you can create a CInstance::NewClient and use it with JSON syntax.

2.3 Metadata

You can update the metadata by calling CInstance::SetMetadata or CInstance::SetMetadataMulti.

This may be used by plugins, like Stream.CL.

2.4 Advanced tasks

2.4.1 Custom storage

You can use your own storage implementation by deriving CPresetLoader.

You have then to select it in your instance with CInstance::SetPresetManager.

Whenever some change from storage happens, you should inform the instance with CInstance::PresetManager_InformChange

2.4.2 Using a bus

You can group instances for processes which supports it with CInstance::SetBus

2.4.3 Convert helpers

You can use helpers to convert audio from different formats using Audio convert helpers (C++).

2.4.4 Adding a health point in the web server

Your application can define exactly what will be returned by the web server on the /apphealth path. Use CInstance::SetWebServerAppHealth.

Chapter 3

JSON syntax

JSON protocol to configure the process and get its state.

See also JSON syntax for internal setup

3.1 Commands

```
{ "get" : `object` }
```

get values.
If `object` is null, get all parameters, and so show the possibilities
```
{ "set" : `object` }
```

set values.
`object` can be any subpart, only those will be changed
```
{ "change" : `object` }
```

like get, but shows only changes since last request.
If `object` is null, get all changes.
Each call resets the state for this connection to current.

Note

In x1.Cloud version <= 1.3.7, the state resetted also for filtered out objects. So avoid alterning `object` filter between calls, or you will miss some changes.

If a property "`propname`" is an array, you can use "`propname[0]`" instead of "`propname`" for get and set to access only the first element.

```
{ "load" : "`presetname`" }
```

load the preset
```
{ "save" : "`presetname`" }
```

save the preset.
If null is given, save onair preset
```
{ "delete" : "`presetname`" }
```

delete the preset.
can also be an array of presetnames
```
{ "factoryload" : "`presetname`" }
```

Create a preset from factory and load it
```
{ "rename" : { "preset" : "`presetname`", "name": "`newname`" } }
```

Rename a preset
```
{ "import" : { "preset" : "`presetname`", "content": `presetcontent` } }
```

Import a preset
```
{ "export" : "`presetname`"  }
```

Export a preset: get preset's content so it can be imported later
```
{ "new" : { "name": "`presetname`", "factory": "`presetname`" } }
```

Create a new preset from a factory.
Can use array for multiple.
```
{ "undo" : `count`  }
```

Undo last(s) `count` preset change
```
{ "redo" : `count`  }
```

Redo last(s) `count` preset change

3.2 Answers

Answer is also a JSON object, starting with the command for `get` and `change`.
```
{ "get" : ... }
{ "change" : ... }
```

For other commands, if there is no error the answer is
```
{ "OK" : {"command" : "original command" } }
```

If there is an error, answer has the syntax
```
{ "ERROR" : {"command" : "faulty command", "message" : "explaining"} }
```

and may have more properties. The message may be empty.

Note

In x1.Cloud version <= 1.2.2, the `OK` and `ERROR` answers had the syntax
```
{ "OK" : "original command" }
{ "ERROR" : "faulty command" }
```

3.3 Examples

3.3.1 Get status

```
{"get":{"status":null}}
```

answer:
```
{"get":{"status":{"preset_changed":false,"license_valid":true,"version":"1.1.19"}}}
```

3.3.2 Get all changes since last request

```
{"change":null}
```

answer:
```
{"change":{
       "processorname":"Best Radio of the world",
       "settings":{"general":{"operate":true},...},
       "preset":{"setup": {"gate_on": true, ...},...},
       "vu":{"setup": null,"in":{...}},
       ...
       }
```

3.3.3 Check license

```
{"get":{"status":{"license_valid":null}}}
```

answer:
```
{"get":{"status":{"license_valid":true}}}
```

3.3.4 Set Processor name

```
{"set":{"processorname":"Best Radio of the world"}}
```

answer:
```
{"OK":"set"}
```

3.3.5 Get presetlist

```
{"get":{"presetlist":null}}
```

answer:
```
{"get":{"presetlist":[
        {"name":"Urban","factory_name":"Urban","create":"2020-10-15 16:19:17","modify":"2020-10-15
      16:19:17"},
        {"name":"Rock Classic","factory_name":"Rock Classic","create":"2020-10-15
      16:19:17","modify":"2020-10-15 16:19:17"},
        {"name":"Rock","factory_name":"Rock","create":"2020-10-15 16:19:17","modify":"2020-10-15
      16:19:17"},
        ...
       ]}}
```

3.3.6 Load a preset

```
{"load":"Rock Classic"}
```

answer:
```
{"OK":"load"}
```

3.3.7 Get information on preset on air

```
{"get":{"presetinfo":null}}
```

answer:
```
{"get":{"presetinfo":{"name":"Rock Classic","factory_name":"Rock Classic","create":"2020-10-15
      16:19:17","modify":"2020-10-15 16:19:17"}}}
```

3.3.8 Set input gain

```
{"set":{"settings":{"gain":{"in":-3.0}}}}
```

answer:
```
{"OK":"set"}
```

3.3.9 Set bypass

```
{"set":{"settings":{"general":{"operate":false}}}}
```

answer:
```
{"OK":"set"}
```

3.3.10 Export a preset

```
{"export":"MyPresetName"}
```

answer:

```
{"export":{"processor":"Best Radio of the world","presets":{
          "MyPresetName":{
              "presetinfo":{"name":"MyPresetName","factory_name":"Open Sound","create":"2020-10-16
      06:53:20","modify":"2020-10-16 06:53:26"},
              "preset":{"setup":{"gate":-39.0}},
              "undoredo":{"undo":[{"time":"2020-10-16
      06:53:23","action":{"preset":{"setup":{"gate":-30.0}}}}],"redo":[],"has_undo":true,"has_redo":false}
              }
          }}}
```

Note

the object *export.presets["MyPresetName"]* in the answer is the one to use as *content* in Import a preset

3.3.11 Import a preset

```
{"import":{"preset":"MyNewPreset","content":{
          "presetinfo":{"name":"MyPresetName","factory_name":"Open Sound","create":"2020-10-16
      06:53:20","modify":"2020-10-16 06:53:26"},
          "preset":{"setup":{"gate":-39.0}},
          "undoredo":{"undo":[{"time":"2020-10-16
      06:53:23","action":{"preset":{"setup":{"gate":-30.0}}}}],"redo":[],"has_undo":true,"has_redo":false}
          }
       }}
```

answer:

```
{"OK":"import"}
```

Chapter 4

JSON syntax for internal setup

JSON commands for internal setup and information.

This is used internally for the web server.

This API might change in the future.

Those commands can be used when directly interfacing to the process (see Client's JSon config interfacing). They are blocked web going through web server (`http://.../json`)

The Authentication is effective only through the web server. The direct JSON commands are not filtered.

4.1 Get process and modules information

```
{"_info": null}
```

answer:

```
{"_info":{"product":"SOUND4 x1.CLOUD","version": "1.3.7","title": "x1
      .CLOUD","preset_extension":"clx1","use_presets":true,"use_undoredo":true,
       "_modules_":["","wm"],
       "_modules_infos_":{
            "wm":{"product":"SOUND4 WM","version": "0.1.0","title":"SOUND4
      WM","use_presets":false,"use_undoredo":false}
       }}}
```

4.2 Authentication management

Some API are available only if there is a setup/admin account.

Secret stored is

```
MD5(username+":"+realm+":"+password)
```

4.2.1 Difference between setup and admin account

There are 2 modes:

1. Setup mode: you define a setup account, which can then create an administrator account.
   The setup account always keeps the access and can delete the administrator.
2. Admin mode: you define the administrator, which will be the single administrator.

From JSON, changing setup_is_admin can change the mode.

4.2.2 Access encoding

Access is a combinaison of letters.

- **'S'** Setup account : Allow Admin and delete admin
- **'A'** Admin access : Access to all overrides any other except setup
- **'x'** eXecute : change preset, list presets and preset infos and access settings.general fields
- **'v'** View : read preset and settings values
- **'w'** Write : change preset/settings (and undo/redo)
- **'s'** Save : create/save/delete/rename/import preset
- **'p'** Password : change own password
- **'-'** inactive : account is inactive

4.2.3 Change setup account

Allows to setup a setup account (even when is was not configured) or to remove it

4.2.3.1 Set the setup/admin account

```
{"_auth":{"init":{"setup_account":{"user":"admin","secret":"be666f22c03f199e05d3805430d69599"},"setup_is_admin":true,"unlogge
```

answer:
```
{"OK":{"command":"_auth"}}
```

4.2.3.2 Set the setup/admin account with clear password

```
{"_auth":{"init":{"setup_account":{"user":"admin","secret_clear":"admin"},"setup_is_admin":true,"unlogged_access":"rx"}}}
```

answer:
```
{"OK":{"command":"_auth"}}
```

4.2.3.3 Remove the setup/admin account

```
{"_auth":{"init":{"setup_account":null}}}
```

answer:
```
{"OK":{"command":"_auth"}}
```

4.2.4 Get user info

```
{"_auth":{"get":{"user":"username"}}}
```

answer:
```
{"_auth":{"get":{"user":"username","secret":"secrethash","access":"rwx"}}}
```

4.2.5 Add or modify a user

```
{"_auth":{"add":{"user":"username","secret":"secrethash","access":"rwx"}}}
```

answer:
```
{"_auth":{"add":{"user":"username","secret":"secrethash","access":"rwx"}}}
```

4.2.6 Removes a user

```
{"_auth":{"remove":{"user":"username"}}
```

answer:
```
{"_auth":{"remove":{"user":"username"}}
```

4.2.7 List users

```
{"_auth":{"list":null}}
```

answer:
```
{"_auth":{"list":["user1","user2",...]}}
```

4.2.8 Get/set unlogged access

```
{"_auth":{"get":{"unlogged_access":null}}}
```

answer:
```
{"_auth":{"get":{"unlogged_access":"rwx"}}}
```

4.2.9 Get realm

```
{"_auth":{"get":{"realm":null}}}
```

answer:
```
{"_auth":{"get":{"realm":"Authentification is required"}}}
```

4.2.10 Get API version

```
{"_auth":{"get":{"api_version":null}}}
```

answer:
```
{"_auth":{"get":{"api_version":2}}}
```

4.2.11 Get setup is admin

```
{"_auth":{"get":{"setup_is_admin":null}}}
```

answer:
```
{"_auth":{"get":{"setup_is_admin":true}}}
```

4.2.12 Get/set setup account

```
{"_auth":{"get":{"setup_account":null}}}
```

answer:
```
{"_auth":{"get":{"setup_account":{"user":"setup","secret":"secrethash","access":"sarwx"}}}}
```

4.2.13 Get/set custom storage

Implementation defined extra storage, stored in auth.json
```
{"_auth":{"get":{"storage":null}}}
```

answer:
```
{"_auth":{"get":{"storage":whateverjson...}}}
```

4.3 Get process' interface description

4.3.1 Get XML decription

```
{"_vars_xml": null}
```

answer:

```
<?xml version="1.0"?>
<Process title="x1 .CLOUD" default_name="" preset_extension="clx1">
...
</Process>
```

Attention

The answer is XML, not JSON !

4.3.2 Get Process Image

```
{"_image": null}
```

answer:

```
{"_image":"iVBORw0KGgoAA..." }
```

The string is the base64 encoding of the image (png format)

4.3.3 Get Process Ico

```
{"_ico": null}
```

answer:

```
{"_ico":"AAABAAUAEBAAAAEAIABo..." }
```

The string is the base64 encoding of the icon (ico format)

Chapter 5

Environment variables and parameters

5.1 Parameters defaulting from environment

The following environment variables are used by software library:

Note

Those variables can be passed as parameters when creating the instance.

Note

boolvalue are (case insensitive):

- 0,false,no,n : disable
- 1,true,yes,y,(empty),(any) : enable

5.1.1 Webserver authentification setup :

- `SETUP_USER` : The setup user name
- `SETUP_SECRET` : The setup user password
- `ADMIN_USER` : The admin user name
- `ADMIN_SECRET` : The admin user password

Web login initialization

If the storage is not yet initialized, you can choose how to protect the web access.
There are 2 modes:

1. Setup mode: you define a setup account, which can then create an administrator account.
   The setup account always keeps the access and can delete the administrator.
2. Admin mode: you define the administrator, which will be the single administrator.

To select the mode, you have to put in the parameters

1. SETUP_USER (and optionally SETUP_SECRET) to select Setup mode
2. ADMIN_USER (and optionally ADMIN_SECRET) to select Admin mode
3. none: the web access is opened, no login will be asked

If you do not set the xxx_SECRET, then the setuppassword will be randomly generated and print in logs (at info severity).

You can also use the JSON api to change this after the storage is created : see Change setup account

5.1.2 Webserver secure :

- SSL_CERTIFICATE_PATH : path to the SSL public certificate
- SSL_PRIVATE_PATH : path to the SSL private certificate

5.1.3 Network access :

- LICENSE_SERVER : the SOUND4 license server's URL
- LICENSE_SERVER_PROXY : proxy server to use for licenses [user:pass@]host:port
- LICENSE_CERT_DIR : optional certificates dirs for HTTPS verification
- LICENSE_CERT_BUNDLE : optional certificates bundle for HTTPS verification
- LICENSE_CERT_CHECK : if "false", do not check HTTPS certificates

5.2 Parameters

The following parameters can be set before creating instance, but are never taken from environment.

5.2.1 Run mode:

- FILE_MODE=seconds : force file mode, settings the maximum estimated audio duration (non realtime, wait license ok to process)
- STATE_FILENAME=filename : force this instance to store its state in file named filename.json (instead of state.json)
- STATE_ONAIR=filename : force this instance to store its on air preset name in file named filename.onair (instead of none). Used for sharing between instances.
- STORAGE_RO=boolvalue : force the storage in read-only mode
- STATE_RO=boolvalue : force the state in read-only mode (but can save presets/auth)
- WAIT_LICENSE=boolvalue : force to wait the license load before starting (always in file mode)
- FAST_START=boolvalue : do not to try loading the license before starting (never in file mode)
- LOG_HEADER=string : use string as header for logs in instance as much as possible

5.2.2 Web server options:

- `COOKIE_DOMAIN=domain` : Force login cookie's domain
- `COOKIE_PATH=path` : Force login cookie's path
- `COOKIE_SECURE=mode` : Force login cookie's secure mode [true|false]
- `COOKIE_SAMESITE=mode` : Force login cookie's secure mode [default|strict|lax|none]

5.3 Preset sharing

You can use the same folder for multiple instances so they share their presets.

In this case, you should use a different `STATE_FILENAME` per instance so they keep their settings and on air presets separated. If not, each time settings or onair preset are changed, the changes will be reflected to the other intances using same `STATE_FILENAME`.

You may use the same `STATE_ONAIR` for multiple instances sharing the folder, so that changing the on air preset on one immediatly changes the on air preset on other instances using the same `STATE_ONAIR`. If the instance has pending unsaved changes in the on air preset, it will not be updated automatically to avoid loosing changes.

Chapter 6

Deprecated List

Member CLOUDX1_AUDIO_INPUT_COUNT

For binary compatibility, this should be runtime checked to be the same as cloudx1_GetAudioInputCount()

Member CLOUDX1_AUDIO_OUTPUT_COUNT

For binary compatibility, this should be runtime checked to be the same as cloudx1_GetAudioOutputCount()

Member CLOUDX1_AUDIOFRAME_COUNT

For binary compatibility, this should be runtime checked to be the same as cloudx1_GetChunkSizeInFrames()

Member CLOUDX1_CHANNEL_COUNT

For binary compatibility, this should be runtime checked to be the same as cloudx1_GetChannelCount()

Member cloudx1_GetChunkSizeInFrames ()

Use cloudx1_GetPossibleChunkSizeInFrames

Member cloudx1_InitProcess (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path)

Use cloudx1_InitProcess3

Member cloudx1_InitProcess2 (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path, const struct cloudx1_CParameters *parameters)

Use cloudx1_InitProcess3

Member CLOUDX1_SAMPLE_RATE

For binary compatibility, this should be runtime checked to be the same as cloudx1_GetSampleRate()

Member cloudx1_Webserver_tcp (unsigned int listenport, unsigned int listenport_secure, const char *socket_ip, unsigned int socket_port)

Use cloudx1_Webserver_tcp2

Member sound4::cloudx1::ChunkFrames

use GetPossibleChunkSizeInFrames

Member sound4::cloudx1::dyn::ChunkFrames

use GetPossibleChunkSizeInFrames()

Member sound4::cloudx1::dyn::GetChunkSizeInFrames (CDynLib &dynlib)

Use GetPossibleChunkSizeInFrames

Member sound4::cloudx1::dyn::InputChannels

Use GetChannelCount and GetAudioInputCount

Member sound4::cloudx1::dyn::InputSampleSize

Use GetPossibleChunkSizeInFrames and GetAudioInputCount

Member sound4::cloudx1::dyn::OutputChannels

Use GetChannelCount and GetAudioOutputCount

Member sound4::cloudx1::dyn::OutputSampleSize

Use GetPossibleChunkSizeInFrames and GetAudioOutputCount

Member sound4::cloudx1::dyn::SampleRate

Use GetSampleRate

Member sound4::cloudx1::GetChunkSizeInFrames ()

Use GetPossibleChunkSizeInFrames

Member sound4::cloudx1::InputChannels

Use GetChannelCount and GetAudioInputCount

Member sound4::cloudx1::InputSampleSize

Use GetPossibleChunkSizeInFrames and GetAudioInputCount

Member sound4::cloudx1::OutputChannels

Use GetChannelCount and GetAudioOutputCount

Member sound4::cloudx1::OutputSampleSize

Use GetPossibleChunkSizeInFrames and GetAudioOutputCount

Member sound4::cloudx1::SampleRate

Use GetSampleRate

Member sound4::CProcessor::GetChunkSizeInFrames ()

Use GetPossibleChunkSizeInFrames

Chapter 7

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7.1 Topics

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Chapter 12

Topic Documentation

12.1 Audio convert helpers

Helpers to convert audio.

Functions

- void cloudx1_AudioConvertFrom (const uint8_t ∗payload, float ∗output, size_t nSpl, enum cloudx1_SampleFormat fmt)
- void cloudx1_AudioConvertTo (const float ∗input, uint8_t ∗payload, size_t nSpl, enum cloudx1_SampleFormat fmt)
- void cloudx1_StereoToMono (const float ∗input, float ∗output, size_t nFrame)
- void cloudx1_MonoToStereo (const float ∗input, float ∗output, size_t nFrame)
- void cloudx1_StereoToMono_Planar (const float ∗inputL, const float ∗inputR, float ∗output, size_t nFrame)
- void cloudx1_MonoToStereo_Planar (const float ∗input, float ∗outputL, float ∗outputR, size_t nFrame)
- void cloudx1_AudioMonoFromLiveStereo (const uint8_t ∗payload, float ∗output)
- void cloudx1_AudioMonoToLiveStereo (const float ∗input, uint8_t ∗payload)

12.1.1 Detailed Description

Helpers to convert audio in an optimized way

12.1.2 Function Documentation

12.1.2.1 cloudx1_AudioConvertFrom()

```
void cloudx1_AudioConvertFrom (
            const uint8_t * payload,
            float * output,
            size_t nSpl,
            enum cloudx1_SampleFormat fmt )
```

Convert the payload to floating-point array

Warning

Output buffer must be 64-byte aligned

Parameters

payload	the binary raw audio buffer
output	audio output buffer (64 byte aligned)
nSpl	the number of samples (not frames)
fmt	the format of the payload

12.1.2.2 cloudx1_AudioConvertTo()

```
void cloudx1_AudioConvertTo (
            const float * input,
            uint8_t * payload,
            size_t nSpl,
            enum cloudx1_SampleFormat fmt )
```

Convert floating-point array to payload

Warning

Input buffer must be 64-byte aligned

Parameters

input	audio input buffer (64 byte aligned)
payload	the binary raw audio buffer
nSpl	the number of samples (not frames)
fmt	the format of the payload

12.1.2.3 cloudx1_AudioMonoFromLiveStereo()

```
void cloudx1_AudioMonoFromLiveStereo (
            const uint8_t * payload,
            float * output )
```

Convert Livewire Livestereo payload to floating-point Mono (12 samples)

Parameters

payload	Livewire Live Stereo raw buffer
output	audio output mono buffer (64 byte aligned)

12.1.2.4 cloudx1_AudioMonoToLiveStereo()

```
void cloudx1_AudioMonoToLiveStereo (
            const float * input,
            uint8_t * payload )
```

Convert floating-point Mono (12 samples) to Livewire Livestereo payload

Parameters

input	audio input mono buffer (64 byte aligned)
payload	Livewire Live Stereo raw buffer

12.1.2.5 cloudx1_MonoToStereo()

```
void cloudx1_MonoToStereo (
            const float * input,
            float * output,
            size_t nFrame )
```

Convert floating-point Mono to Stereo (L,L)

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input mono buffer (64 byte aligned)
output	audio output stereo buffer (64 byte aligned)
nFrame	the number of frames

12.1.2.6 cloudx1_MonoToStereo_Planar()

```
void cloudx1_MonoToStereo_Planar (
            const float * input,
            float * outputL,
            float * outputR,
            size_t nFrame )
```

Convert floating-point Mono to Stereo (planar) (L,L)

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input mono buffer (64 byte aligned)
outputL	audio output left buffer (64 byte aligned)
outputR	audio output right buffer (64 byte aligned)
nFrame	the number of frames

12.1.2.7 cloudx1_StereoToMono()

```
void cloudx1_StereoToMono (
            const float * input,
            float * output,
            size_t nFrame )
```

Convert floating-point Stereo to Mono (L+R)/2

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input stereo buffer (64 byte aligned)
output	audio output mono buffer (64 byte aligned)
nFrame	the number of frames

12.1.2.8 cloudx1_StereoToMono_Planar()

```
void cloudx1_StereoToMono_Planar (
            const float * inputL,
            const float * inputR,
            float * output,
            size_t nFrame )
```

Convert floating-point Stereo (planar) to Mono (L+R)/2

Warning

Buffers must be 64-byte aligned

Parameters

inputL	audio input left buffer (64 byte aligned)
inputR	audio input right buffer (64 byte aligned)
output	audio output mono buffer (64 byte aligned)
nFrame	the number of frames

12.2 Audio convert helpers (C++)

Helpers to convert audio (C++)

Functions

- void sound4::CProcessor::AudioConvertFrom (const uint8_t *payload, float *output, size_t nSpl, SampleFormat fmt)

- void sound4::CProcessor::AudioConvertTo (const float *input, uint8_t *payload, size_t nSpl, SampleFormat fmt)
- void sound4::CProcessor::StereoToMono (const float *input, float *output, size_t nFrame)
- void sound4::CProcessor::MonoToStereo (const float *input, float *output, size_t nFrame)
- void sound4::CProcessor::StereoToMono_Planar (const float *inputL, const float *inputR, float *output, size_t nFrame)
- void sound4::CProcessor::MonoToStereo_Planar (const float *input, float *outputL, float *outputR, size_t nFrame)
- void sound4::CProcessor::AudioMonoFromLiveStereo (const uint8_t *payload, float *output)
- void sound4::CProcessor::AudioMonoToLiveStereo (const float *input, uint8_t *payload)

12.2.1 Detailed Description

Helpers to convert audio in an optimized way

12.2.2 Function Documentation

12.2.2.1 AudioConvertFrom()

```
void sound4::CProcessor::AudioConvertFrom (
            const uint8_t * payload,
            float * output,
            size_t nSpl,
            SampleFormat fmt )  [inline]
```

Convert the payload to floating-point array

Warning

Output buffer must be 64-byte aligned

Parameters

payload	the binary raw audio buffer
output	audio output buffer (64 byte aligned)
nSpl	the number of samples (not frames)
fmt	the format of the payload

Definition at line 637 of file sound4cl.hpp.

12.2.2.2 AudioConvertTo()

```
void sound4::CProcessor::AudioConvertTo (
            const float * input,
            uint8_t * payload,
            size_t nSpl,
            SampleFormat fmt )  [inline]
```

Convert floating-point array to payload

Warning

Input buffer must be 64-byte aligned

Parameters

input	audio input buffer (64 byte aligned)
payload	the binary raw audio buffer
nSpl	the number of samples (not frames)
fmt	the format of the payload

Definition at line 650 of file sound4cl.hpp.

12.2.2.3 AudioMonoFromLiveStereo()

```
void sound4::CProcessor::AudioMonoFromLiveStereo (
            const uint8_t * payload,
            float * output )  [inline]
```

Convert Livewire Livestereo payload to floating-point Mono (12 samples)

Parameters

payload	Livewire Live Stereo raw buffer
output	audio output mono buffer (64 byte aligned)

Definition at line 709 of file sound4cl.hpp.

12.2.2.4 AudioMonoToLiveStereo()

```
void sound4::CProcessor::AudioMonoToLiveStereo (
            const float * input,
            uint8_t * payload )  [inline]
```

Convert floating-point Mono (12 samples) to Livewire Livestereo payload

Parameters

input	audio input mono buffer (64 byte aligned)
payload	Livewire Live Stereo raw buffer

Definition at line 718 of file sound4cl.hpp.

12.2.2.5 MonoToStereo()

```
void sound4::CProcessor::MonoToStereo (
            const float * input,
```

```
            float * output,
            size_t nFrame )  [inline]
```

Convert floating-point Mono to Stereo (L,L)

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input mono buffer (64 byte aligned)
output	audio output stereo buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 674 of file sound4cl.hpp.

12.2.2.6 MonoToStereo_Planar()

```
void sound4::CProcessor::MonoToStereo_Planar (
            const float * input,
            float * outputL,
            float * outputR,
            size_t nFrame )  [inline]
```

Convert floating-point Mono to Stereo (planar) (L,L)

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input mono buffer (64 byte aligned)
outputL	audio output left buffer (64 byte aligned)
outputR	audio output right buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 700 of file sound4cl.hpp.

12.2.2.7 StereoToMono()

```
void sound4::CProcessor::StereoToMono (
            const float * input,
            float * output,
            size_t nFrame )  [inline]
```

Convert floating-point Stereo to Mono (L+R)/2

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input stereo buffer (64 byte aligned)
output	audio output mono buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 662 of file sound4cl.hpp.

12.2.2.8 StereoToMono_Planar()

```
void sound4::CProcessor::StereoToMono_Planar (
            const float * inputL,
            const float * inputR,
            float * output,
            size_t nFrame )  [inline]
```

Convert floating-point Stereo (planar) to Mono (L+R)/2

Warning

Buffers must be 64-byte aligned

Parameters

inputL	audio input left buffer (64 byte aligned)
inputR	audio input right buffer (64 byte aligned)
output	audio output mono buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 687 of file sound4cl.hpp.

12.3 Audio managing (any audio)

Process audio in any format and size.

Enumerations

- enum cloudx1_SampleFormat {
  INVALID_FORMAT =0 , S16_LE , S16_BE , S24_LE ,
  S24_BE , S32_LE , S32_BE , F32_LE ,
  F32_BE , S16_NATIVE =S16_LE , S24_NATIVE =S24_LE , S32_NATIVE =S32_LE ,
  F32_NATIVE =F32_LE }

Functions

- const char * cloudx1_GetFormatName (const enum cloudx1_SampleFormat fmt)
- enum cloudx1_SampleFormat cloudx1_GetFormatFromName (const char *name)
- unsigned int cloudx1_GetBytesFromFormat (const enum cloudx1_SampleFormat fmt)
- unsigned int cloudx1_GetMaxPacketFrame (struct cloudx1_CInstance *instance)
- unsigned int cloudx1_AddAudio (struct cloudx1_CInstance *instance, const uint8_t *payload, unsigned int nFrame, enum cloudx1_SampleFormat fmt)
- unsigned int cloudx1_AddPadAudio (struct cloudx1_CInstance *instance)
- unsigned int cloudx1_GetOutputCount (struct cloudx1_CInstance *instance)
- unsigned int cloudx1_GetAudio (struct cloudx1_CInstance *instance, uint8_t *payload, unsigned int max_↩ nFrame, enum cloudx1_SampleFormat fmt)

12.3.1 Detailed Description

This allows various payload size and formats, at the expense of internal conversions. This can be useful when receiving audio from network.

Remarks

It is more optimized to use Direct processing.

12.3.2 Enumeration Type Documentation

12.3.2.1 cloudx1_SampleFormat

`enum cloudx1_SampleFormat`

Supported formats for audio I/O

Enumerator

INVALID_FORMAT	Invalid.
S16_LE	16-bit signed integer, little-endian
S16_BE	16-bit signed integer, big-endian
S24_LE	24-bit signed integer, little-endian
S24_BE	24-bit signed integer, big-endian
S32_LE	32-bit signed integer, little-endian
S32_BE	32-bit signed integer, big-endian
F32_LE	32-bit floating-point, little-endian
F32_BE	32-bit floating-point, big-endian
S16_NATIVE	16-bit signed integer, native
S24_NATIVE	24-bit signed integer, native
S32_NATIVE	32-bit signed integer, native
F32_NATIVE	32-bit floating-point, native

Definition at line 879 of file sound4.x1.cloud.h.

12.3.3 Function Documentation

12.3.3.1 cloudx1_AddAudio()

```
unsigned int cloudx1_AddAudio (
            struct cloudx1_CInstance * instance,
            const uint8_t * payload,
            unsigned int nFrame,
            enum cloudx1_SampleFormat fmt )
```

Convert and process the payload.

Parameters

instance	the processing instance
payload	the binary raw audio buffer
nFrame	the number of frames in the payload
fmt	the format of the payload

Returns

number of unprocessed frames (if can not store output) if non zero, consume output and restart where it stopped

12.3.3.2 cloudx1_AddPadAudio()

```
unsigned int cloudx1_AddPadAudio (
            struct cloudx1_CInstance * instance )
```

Add silence to finish the current audio chunk and process it

Parameters

instance	the processing instance

Returns

number of added silence frame

12.3.3.3 cloudx1_GetAudio()

```
unsigned int cloudx1_GetAudio (
            struct cloudx1_CInstance * instance,
            uint8_t * payload,
            unsigned int max_nFrame,
            enum cloudx1_SampleFormat fmt )
```

Consume the output

Parameters

instance	the processing instance
payload	the binary raw audio buffer to store output
max_nFrame	the maximum number of frames that can be stored in the payload
fmt	the wanted format of the payload

Returns

number of frames put in the buffer

12.3.3.4 cloudx1_GetBytesFromFormat()

```
unsigned int cloudx1_GetBytesFromFormat (
            const enum cloudx1_SampleFormat fmt )
```

Get the format byte size

Parameters

fmt	the format

Returns

the number of bytes used by this format for a single channel audio sample

12.3.3.5 cloudx1_GetFormatFromName()

```
enum cloudx1_SampleFormat cloudx1_GetFormatFromName (
            const char * name )
```

Convert string to format

Parameters

name	the format string

Returns

the matching format, or INVALID_FORMAT if invalid.

12.3.3.6 cloudx1_GetFormatName()

```
const char * cloudx1_GetFormatName (
            const enum cloudx1_SampleFormat fmt )
```

Convert format to string

Parameters

fmt	the format

Returns

the string name of the format

12.3.3.7 cloudx1_GetMaxPacketFrame()

```
unsigned int cloudx1_GetMaxPacketFrame (
            struct cloudx1_CInstance * instance )
```

Maximum packet size (in frames) that can be queued at output.

Parameters

instance	The process instance

Returns

Maximum packet size (in frames) that can be queued at output.

12.3.3.8 cloudx1_GetOutputCount()

```
unsigned int cloudx1_GetOutputCount (
            struct cloudx1_CInstance * instance )
```

Get the available output size

Parameters

instance	the processing instance

Returns

number of available frames at output

12.4 Auxiliary outputs

Classes

- struct SOUND4_AuxiliaryOutputInfos

Functions

- struct SOUND4_AuxiliaryOutputInfos ** cloudx1_GetAuxiliaryAudioOutputInfos (struct cloudx1_CInstance *instance)
- void cloudx1_FreeAuxiliaryAudioInfos (struct SOUND4_AuxiliaryOutputInfos **infos)
- int cloudx1_ActivateAuxiliaryAudioID (struct cloudx1_CInstance *instance, const char *id)
- unsigned int cloudx1_GetAuxiliaryAudioEstimatedDelay (struct cloudx1_CInstance *instance, const char *id)

12.4.1 Detailed Description

For advanced processing with multiple simultaneous outputs.

Auxiliary outputs are filled at each call to cloudx1_ProcessAudio or cloudx1_ProcessAudio_Planar.

You can use their buffer to retreive their output.

12.4.2 Function Documentation

12.4.2.1 cloudx1_ActivateAuxiliaryAudioID()

```
int cloudx1_ActivateAuxiliaryAudioID (
            struct cloudx1_CInstance * instance,
            const char * id )
```

Activate an auxiliary output.

This is required to activate the output generation

Parameters

instance	the processing instance
id	the auxiliary output ID to activate

Returns

0 is success

12.4.2.2 cloudx1_FreeAuxiliaryAudioInfos()

```
void cloudx1_FreeAuxiliaryAudioInfos (
            struct SOUND4_AuxiliaryOutputInfos ** infos )
```

Frees the information returned by cloudx1_GetAuxiliaryAudioOutputInfos.

Parameters

infos	the infos to free

12.4.2.3 cloudx1_GetAuxiliaryAudioEstimatedDelay()

```
unsigned int cloudx1_GetAuxiliaryAudioEstimatedDelay (
            struct cloudx1_CInstance * instance,
            const char * id )
```

Get the delay (estimated) of current processing algorithm for a specific auxiliary output

Remarks

This is not very accurate, it does not take into account group delays.

But it is sufficient for file processing adjustements.

Changing the preset and parameters may change the returned value.

Parameters

instance	the processing instance
id	the auxiliary output ID. Use NULL or empty string for main output delay.

Returns

Estimated delay in frames, or 0 if unknown id.

12.4.2.4 cloudx1_GetAuxiliaryAudioOutputInfos()

```
struct SOUND4_AuxiliaryOutputInfos ** cloudx1_GetAuxiliaryAudioOutputInfos (
            struct cloudx1_CInstance * instance )
```

Get the list of possible auxiliary outputs.

Parameters

instance	the processing instance

Returns

a list of SOUND4_AuxiliaryOutputInfos, null terminated, of auxiliary outputs. May be null. Should be freed with cloudx1_FreeAuxiliaryAudioInfos

12.5 Client's JSon config interfacing

Communicate with the instance.

Classes

- struct cloudx1_CClientInstance

Functions

- struct cloudx1_CClientInstance * cloudx1_NewClient (struct cloudx1_CInstance *instance)
- void cloudx1_DeleteClient (struct cloudx1_CClientInstance *client)
- const char * cloudx1_ProcessJson (struct cloudx1_CClientInstance *client, const char *json_str, int *need↩ _save)
- void cloudx1_FreeJsonAnswer (const char *json_str)
- int cloudx1_SaveState (struct cloudx1_CInstance *instance)

12.5.1 Detailed Description

Allow low-level JSON configuration. see also JSON syntax

12.5.2 Function Documentation

12.5.2.1 cloudx1_DeleteClient()

```
void cloudx1_DeleteClient (
            struct cloudx1_CClientInstance * client )
```

Deletes a client

Parameters

client	the client instance

12.5.2.2 cloudx1_FreeJsonAnswer()

```
void cloudx1_FreeJsonAnswer (
            const char * json_str )
```

Free a JSON answer returned by cloudx1_ProcessJson

Parameters

json_str	the JSON request

12.5.2.3 cloudx1_NewClient()

```
struct cloudx1_CClientInstance * cloudx1_NewClient (
            struct cloudx1_CInstance * instance )
```

Creates a new client

Remarks

not needed if using a port for JSON socket in Update Management

Parameters

instance	the processing instance

Returns

A new client instance

12.5.2.4 cloudx1_ProcessJson()

```
const char * cloudx1_ProcessJson (
            struct cloudx1_CClientInstance * client,
            const char * json_str,
            int * need_save )
```

Process a JSON request

For syntax, see JSON syntax

Note

In all library, all `char*` are **UTF-8** encoded

Attention

the return value needs to be freed with cloudx1_FreeJsonAnswer

Parameters

client	the client instance
json_str	the JSON request
need_save	on return will be 1 is saving is required (maybe delayed)

Returns

a JSON answer (to be freed with cloudx1_FreeJsonAnswer)

12.5.2.5 cloudx1_SaveState()

```
int cloudx1_SaveState (
            struct cloudx1_CInstance * instance )
```

Save the current state

Needed when cloudx1_ProcessJson returned with need_save to 1. However it can be postponed as much as wanted.

Remarks

Works only when update thread is running

Parameters

instance	the processing instance

Returns

0 if success, <0 on error

12.6 Custom preset managagement

This allows to provide a customized preset management.

Typedefs

- typedef wchar_t fs_char
- typedef char *(* cloudx1_storage_reader) (const fs_char *filename, void *userdata)
- typedef void(* cloudx1_storage_reader_free) (char *content, void *userdata)
- typedef int(* cloudx1_storage_writer) (const fs_char *filename, const char *content, void *userdata)
- typedef int(* cloudx1_storage_exists) (const fs_char *filename, void *userdata)
- typedef fs_char **(* cloudx1_storage_getall) (void *userdata)
- typedef void(* cloudx1_storage_getall_free) (fs_char **all, void *userdata)
- typedef int(* cloudx1_storage_remove) (const fs_char *filename, void *userdata)
- typedef int(* cloudx1_storage_rename) (const fs_char *from, const fs_char *to, void *userdata)

Enumerations

- enum cloudx1_PresetChange_Kind { change_kind_created = 1 , change_kind_modified , change_kind_deleted }

Functions

- void cloudx1_SetPresetManager (struct cloudx1_CParameters *params, cloudx1_storage_reader reader, cloudx1_storage_reader_free, cloudx1_storage_writer writer, cloudx1_storage_exists exists, cloudx1_storage_getall getall, cloudx1_storage_getall_free getall_free, cloudx1_storage_remove remove, cloudx1_storage_rename rename, int IsReadOnly, void *userdata)
- void cloudx1_PresetManager_InformChange (struct cloudx1_CInstance *instance, const fs_char *relative↩ _path, enum cloudx1_PresetChange_Kind change_kind)

12.6.1 Detailed Description

This allows to provide a customized storage for presets and settings.

By default, the library store data on disk or in memory (see `save_path` parameter in cloudx1_InitProcess2), but you may use these functions to store data.

It can be used for remote storage, database storage, ...

Known files:

- Files with name ending with .pst are presets
- `state.json` is the instance state file, holding settings and unsaved preset changes.
- `auth.json` is the storage for web authentication settings.
- `*`.onair are used for sharing preset on air name between instances (see `STATE_ONAIR` in Parameters).

Attention

state.json name can be overriden per instance with `STATE_FILENAME` in parameters, see Parameters.

File names are in OS native characters (`wchar_t` for Windows, `char` in **UTF-8** for others)

12.6.2 Typedef Documentation

12.6.2.1 cloudx1_storage_exists

```
typedef int(* cloudx1_storage_exists) (const fs_char *filename, void *userdata)
```

Function to call to test if a stored file exists.

Parameters

filename	the name of the file to test.
userdata	the userdata passed to cloudx1_SetPresetManager

Returns

-1 if not exists, 0 if it exists

Definition at line 515 of file sound4.x1.cloud.h.

12.6.2.2 cloudx1_storage_getall

```
typedef fs_char **(* cloudx1_storage_getall) (void *userdata)
```

Function to call to get all stored files' name. Result has to be freed with cloudx1_storage_getall_free callback

Parameters

userdata	the userdata passed to cloudx1_SetPresetManager

Returns

A NULL terminated array of file names

Definition at line 524 of file sound4.x1.cloud.h.

12.6.2.3 cloudx1_storage_getall_free

```
typedef void(* cloudx1_storage_getall_free) (fs_char **all, void *userdata)
```

Function to call to free the result of getall.

Parameters

all	the returned value from cloudx1_storage_getall
userdata	the userdata passed to cloudx1_SetPresetManager

Definition at line 532 of file sound4.x1.cloud.h.

12.6.2.4 cloudx1_storage_reader

```
typedef char *(* cloudx1_storage_reader) (const fs_char *filename, void *userdata)
```

Function to call to read a stored file, returning its content.

Parameters

filename	the name of the file to read.
userdata	the userdata passed to cloudx1_SetPresetManager

Returns

the **UTF-8** content of the file

Definition at line 488 of file sound4.x1.cloud.h.

12.6.2.5 cloudx1_storage_reader_free

```
typedef void(* cloudx1_storage_reader_free) (char *content, void *userdata)
```

Function to call to free the result of cloudx1_storage_reader.

Parameters

content	the returned value from cloudx1_storage_reader
userdata	the userdata passed to cloudx1_SetPresetManager

Definition at line 496 of file sound4.x1.cloud.h.

12.6.2.6 cloudx1_storage_remove

```
typedef int(* cloudx1_storage_remove) (const fs_char *filename, void *userdata)
```

Function to call to remove a stored file.

Parameters

filename	the name of the file to remove.
userdata	the userdata passed to cloudx1_SetPresetManager

Returns

-1 if failed, 0 if OK

Definition at line 541 of file sound4.x1.cloud.h.

12.6.2.7 cloudx1_storage_rename

```
typedef int(* cloudx1_storage_rename) (const fs_char *from, const fs_char *to, void *userdata)
```

Function to call to rename a stored file.

Parameters

from	The source file name (must exist)
to	The destination file name (must not exist)
userdata	the userdata passed to cloudx1_SetPresetManager

Returns

-1 if failed, 0 if OK

Definition at line 551 of file sound4.x1.cloud.h.

12.6.2.8 cloudx1_storage_writer

```
typedef int(* cloudx1_storage_writer) (const fs_char *filename, const char *content, void *userdata)
```

Function to call to write a stored file.

Parameters

filename	the name of the file to write.
content	the **UTF-8** content to write to the file
userdata	the userdata passed to cloudx1_SetPresetManager

Returns

-1 if failed, 0 if OK

Definition at line 506 of file sound4.x1.cloud.h.

12.6.2.9 fs_char

```
typedef wchar_t fs_char
```

Definition at line 476 of file sound4.x1.cloud.h.

12.6.3 Enumeration Type Documentation

12.6.3.1 cloudx1_PresetChange_Kind

```
enum cloudx1_PresetChange_Kind
```

Kind of change on a storage path

Enumerator

change_kind_created	Path has been created.
change_kind_modified	Path has been modified.
change_kind_deleted	Path has been deleted.

Definition at line 584 of file sound4.x1.cloud.h.

12.6.4 Function Documentation

12.6.4.1 cloudx1_PresetManager_InformChange()

```
void cloudx1_PresetManager_InformChange (
            struct cloudx1_CInstance * instance,
            const fs_char * relative_path,
            enum cloudx1_PresetChange_Kind change_kind )
```

Inform that a change happened in the storage. This must be used only in conjonction with cloudx1_SetPresetManager

Parameters

instance	the processing instance
relative_path	The path which changed, relative to the root storage
change_kind	What happened to this path

12.6.4.2 cloudx1_SetPresetManager()

```
void cloudx1_SetPresetManager (
            struct cloudx1_CParameters * params,
            cloudx1_storage_reader reader,
            cloudx1_storage_reader_free ,
            cloudx1_storage_writer writer,
            cloudx1_storage_exists exists,
            cloudx1_storage_getall getall,
            cloudx1_storage_getall_free getall_free,
            cloudx1_storage_remove remove,
            cloudx1_storage_rename rename,
            int IsReadOnly,
            void * userdata )
```

Setup a custom preset manager. This overrides the save_path in cloudx1_InitProcess2

To dynamically update when storage change, see cloudx1_PresetManager_InformChange

Parameters

params	The params to set up
reader	The function to read a file
writer	The function to write a file
exists	The function to test for a file presence
getall	The function to get all files in storage
getall_free	The function to free the result from getall
remove	The function to remove a file from storage
rename	The function to rename a file
IsReadOnly	Set to 1 if storage is read-only
userdata	The userdata parameter for callbacks

12.7 Direct processing

Optimized processing with direct in->out.

Functions

- void cloudx1_ProcessAudio (struct cloudx1_CInstance *instance, const float *input, float *output)
- void cloudx1_ProcessAudio_Planar (struct cloudx1_CInstance *instance, float const *const *input, float *const *output)
- float * cloudx1_GetBufferIn (struct cloudx1_CInstance *instance)
- float * cloudx1_GetBufferOut (struct cloudx1_CInstance *instance)
- unsigned int cloudx1_GetEstimatedDelay (struct cloudx1_CInstance *instance)

12.7.1 Detailed Description

Optimized processing with direct in->out.

12.7.2 Function Documentation

12.7.2.1 cloudx1_GetBufferIn()

```
float * cloudx1_GetBufferIn (
            struct cloudx1_CInstance * instance )
```

Get preallocated aligned buffer for audio input for cloudx1_ProcessAudio

The buffer is a float[256 * cloudx1_GetAudioInputCount() * cloudx1_GetChannelCount()]

So for this process/version : float[256*1*2]

Note

The calling process can allocate the buffer itself, but it must be aligned.

Parameters

instance	the processing instance

Returns

An audio input dedicated buffer.

12.7.2.2 cloudx1_GetBufferOut()

```
float * cloudx1_GetBufferOut (
            struct cloudx1_CInstance * instance )
```

Get preallocated aligned buffer for audio output for cloudx1_ProcessAudio()

The buffer is a float[256 * cloudx1_GetAudioOutputCount() * cloudx1_GetChannelCount()]

So for this process/version : float[256*1*2]

Note

The calling process can allocate the buffer itself, but it must be aligned.

Parameters

instance	the processing instance

Returns

An audio output dedicated buffer.

12.7.2.3 cloudx1_GetEstimatedDelay()

```
unsigned int cloudx1_GetEstimatedDelay (
            struct cloudx1_CInstance * instance )
```

Get the delay (estimated) of current processing algorithm

Remarks

This is not very accurate, it does not take into account group delays.

But it is sufficient for file processing adjustements.

Changing the preset and parameters may change the returned value.

Returns

Estimated delay in frames

12.7.2.4 cloudx1_ProcessAudio()

```
void cloudx1_ProcessAudio (
            struct cloudx1_CInstance * instance,
            const float * input,
            float * output )
```

Process an audio chunk

A chunk contains cloudx1_GetProcessChunkFrames frames, set at init by frames_per_chunk in cloudx1_InitProcess3

Input has cloudx1_GetAudioInputCount() ∗ cloudx1_GetChannelCount() channels

Ouput has cloudx1_GetAudioOutputCount() ∗ cloudx1_GetChannelCount() channels

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are interlaced, so the buffers are [L0,R0,L1,R1,...,Ln,Rn] (L=Left, R=Right)

In case of multiple audio input/output, buffer is [aL0,aR0,bL0,bR0,...,aLn,aRn,bLn,bRn]

Warning

Buffers must be 64-byte aligned

Note

With 64 frames per chunk and 2 channels and 1 audio input, input buffer size is 64∗1∗2∗4=512 bytes

Parameters

instance	the processing instance
input	audio input buffer (64 byte aligned) or NULL to use internal buffer cloudx1_GetBufferIn
output	audio output buffer (64 byte aligned) or NULL to use internal buffer cloudx1_GetBufferOut

12.7.2.5 cloudx1_ProcessAudio_Planar()

```
void cloudx1_ProcessAudio_Planar (
            struct cloudx1_CInstance * instance,
            float const *const * input,
            float *const * output )
```

Process an audio chunk of planar audio

A chunk contains cloudx1_GetProcessChunkFrames frames, set at init by frames_per_chunk in cloudx1_InitProcess3

Input has cloudx1_GetAudioInputCount() * cloudx1_GetChannelCount() channels

Ouput has cloudx1_GetAudioOutputCount() * cloudx1_GetChannelCount() channels

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are NOT interlaced, so the buffers are arrays of planar audio : [[L0,L1,...,Ln] , [R0,R1,...,Rn]] (L=Left, R=Right)

In case of multiple audio input/output, buffer are [[aL...], [aR...], [bL...], [bR...], ...]

Parameters

instance	the processing instance
input	array of audio input buffers for each input channel (no alignment required)
output	array of audio output buffers for each input channel (no alignment required)

12.8 Examples

List all examples.

The C header is sound4.x1.cloud.h.

You can also use the C++ wrappers :

- sound4cl.hpp (using dynamic library loading, compatible with all .CL engines)
- sound4.x1.cloud.hpp
- sound4.x1.cloud_dyn.hpp (using dynamic library loading)

See Sample using C interface

See Sample using Generic C++ interface (multi-process compatible)

See Sample using C++ interface wrapper

See Sample using C++ interface wrapper with dynamic library loading

12.9 Global setup

Get information on the library.

Classes

- struct SOUND4_ProcessInfo

Macros

- #define CLOUDX1_AUDIOFRAME_COUNT 64
- #define CLOUDX1_CHANNEL_COUNT 2
- #define CLOUDX1_AUDIO_INPUT_COUNT 1
- #define CLOUDX1_AUDIO_OUTPUT_COUNT 1
- #define CLOUDX1_SAMPLE_RATE 48000

Typedefs

- typedef void(∗ cloudx1_loggerfn) (enum cloudx1_LogSeverity, const char ∗)

Enumerations

- enum cloudx1_LogSeverity {
  none = 0 , fatal = 1 , error = 2 , warning = 3 ,
  info = 4 , verbose = 5 , verbose2 = 6 , verbose3 = 7 ,
  verbose4 = 8 , verbose5 = 9 }

Functions

- const struct SOUND4_ProcessInfo ∗ SOUND4_GetProcessInfo ()
- const char ∗ cloudx1_GetVersion ()
- unsigned int cloudx1_GetChunkSizeInFrames ()
- unsigned int ∗ cloudx1_GetPossibleChunkSizeInFrames ()
- unsigned int cloudx1_GetChannelCount ()
- unsigned int cloudx1_GetAudioInputCount ()
- unsigned int cloudx1_GetAudioOutputCount ()
- unsigned int cloudx1_GetSampleRate ()
- void cloudx1_SetLoggerCallback (cloudx1_loggerfn logger)
- void cloudx1_SetLogSeverity (enum cloudx1_LogSeverity severity)

12.9.1 Detailed Description

Get information on the library. Set logging mode.

12.9.2 Macro Definition Documentation

12.9.2.1 CLOUDX1_AUDIO_INPUT_COUNT

```
#define CLOUDX1_AUDIO_INPUT_COUNT 1
```

This version number of inputs for this process.

Deprecated For binary compatibility, this should be runtime checked to be the same as cloudx1_GetAudioInputCount()

Definition at line 58 of file sound4.x1.cloud.h.

12.9.2.2 CLOUDX1_AUDIO_OUTPUT_COUNT

```
#define CLOUDX1_AUDIO_OUTPUT_COUNT 1
```

This version number of outputs for this process.

Deprecated For binary compatibility, this should be runtime checked to be the same as cloudx1_GetAudioOutputCount()

Definition at line 64 of file sound4.x1.cloud.h.

12.9.2.3 CLOUDX1_AUDIOFRAME_COUNT

```
#define CLOUDX1_AUDIOFRAME_COUNT 64
```

This version number of frames in a process chunk.

Deprecated For binary compatibility, this should be runtime checked to be the same as cloudx1_GetChunkSizeInFrames()

Definition at line 46 of file sound4.x1.cloud.h.

12.9.2.4 CLOUDX1_CHANNEL_COUNT

```
#define CLOUDX1_CHANNEL_COUNT 2
```

This version number of channels.

Deprecated For binary compatibility, this should be runtime checked to be the same as cloudx1_GetChannelCount()

Definition at line 52 of file sound4.x1.cloud.h.

12.9.2.5 CLOUDX1_SAMPLE_RATE

```
#define CLOUDX1_SAMPLE_RATE 48000
```

This input/output sample-rate.

Deprecated For binary compatibility, this should be runtime checked to be the same as cloudx1_GetSampleRate()

Definition at line 70 of file sound4.x1.cloud.h.

12.9.3 Typedef Documentation

12.9.3.1 cloudx1_loggerfn

```
typedef void(* cloudx1_loggerfn) (enum cloudx1_LogSeverity, const char *)
```

The logging callback format

Warning

Do not block/wait in the callback, it can be called from any place in code

Note

In all library, all `char*` are **UTF-8** encoded

Definition at line 185 of file sound4.x1.cloud.h.

12.9.4 Enumeration Type Documentation

12.9.4.1 cloudx1_LogSeverity

```
enum cloudx1_LogSeverity
```

The logging levels

Enumerator

none	Not used.
fatal	fatal error
error	error
warning	warning
info	info
verbose	verbose
verbose2	verbose2
verbose3	verbose3
verbose4	verbose4
verbose5	verbose5

Definition at line 166 of file sound4.x1.cloud.h.

12.9.5 Function Documentation

12.9.5.1 cloudx1_GetAudioInputCount()

```
unsigned int cloudx1_GetAudioInputCount ( )
```

Get the number of inputs for this process

Remarks

All inputs have cloudx1_GetChannelCount() channels

Fixed to 1, but should be checked for backward compatibility

Returns

The process input count

12.9.5.2 cloudx1_GetAudioOutputCount()

```
unsigned int cloudx1_GetAudioOutputCount ( )
```

Get the number of outputs for this process

Remarks

All outputs have cloudx1_GetChannelCount() channels

Fixed to 1, but should be checked for backward compatibility

Returns

The process outputs count

12.9.5.3 cloudx1_GetChannelCount()

```
unsigned int cloudx1_GetChannelCount ( )
```

Get the number of channels needed by this process

Remarks

Fixed to 2, but should be checked for backward compatibility

Returns

The process channels count

12.9.5.4 cloudx1_GetChunkSizeInFrames()

```
unsigned int cloudx1_GetChunkSizeInFrames ( )
```

Get the default number of frames in a process chunk.

The output will be available only by chunks of this size.

Note

A Frame is a set of cloudx1_GetChannelCount samples

Remarks

Fixed to 64, but should be checked for backward compatibility

Returns

The process chunk size in frame

Deprecated Use cloudx1_GetPossibleChunkSizeInFrames

12.9.5.5 cloudx1_GetPossibleChunkSizeInFrames()

```
unsigned int * cloudx1_GetPossibleChunkSizeInFrames ( )
```

Get the possibles number of frames in a process chunk.

The output will be available only by chunks of this size.

Note

A Frame is a set of cloudx1_GetChannelCount samples

Returns

An array of possible process chunk size in frame, ending with 0

12.9.5.6 cloudx1_GetSampleRate()

```
unsigned int cloudx1_GetSampleRate ( )
```

Get the processing sample-rate

Remarks

For now, always return 48000, but should be checked for backward compatibility

Returns

The process sample-rate in Hz

12.9.5.7 cloudx1_GetVersion()

```
const char * cloudx1_GetVersion ( )
```

Get the process version string

Returns

version string

12.9.5.8 cloudx1_SetLoggerCallback()

```
void cloudx1_SetLoggerCallback (
            cloudx1_loggerfn logger )
```

Set a callback for logging

If not set, a default logger prints to stderr.

Warning

Do not block/wait in the callback, it can be called from any place in code

Parameters

logger	A C callback called for logging.

12.9.5.9 cloudx1_SetLogSeverity()

```
void cloudx1_SetLogSeverity (
            enum cloudx1_LogSeverity severity )
```

Change the global log severity

Logs above this level will not be printed.

Parameters

severity	Log severity

12.9.5.10 SOUND4_GetProcessInfo()

```
const struct SOUND4_ProcessInfo * SOUND4_GetProcessInfo ( )
```

Get this processor description

Common to all SOUND4 processors.

Returns

the process description

12.10 Instance tracing (Windows only)

This allows instances to use windows event tracing.

Functions

- void cloudx1_SetInstanceTracing (struct cloudx1_CParameters *params, TraceLoggingHProvider tracing_provider, GUID activity_guid)
- void cloudx1_SetInstanceTracingProcessActivity (struct cloudx1_CInstance *instance, GUID activity_guid)

12.10.1 Detailed Description

This allows instances to use windows event tracing

12.10.2 Function Documentation

12.10.2.1 cloudx1_SetInstanceTracing()

```
void cloudx1_SetInstanceTracing (
            struct cloudx1_CParameters * params,
            TraceLoggingHProvider tracing_provider,
            GUID activity_guid )
```

Set the instance's tracing provider before creating instance

Parameters

params	the parameters to configure
tracing_provider	the provider as created with TRACELOGGING_DEFINE_PROVIDER
activity_guid	the activity guid, used for creation, updates and destruction

12.10.2.2 cloudx1_SetInstanceTracingProcessActivity()

```
void cloudx1_SetInstanceTracingProcessActivity (
            struct cloudx1_CInstance * instance,
            GUID activity_guid )
```

Set the instance's process activity for tracing (optional). Should be called only in process's thread.

Parameters

instance	the instance to configure
activity_guid	the activity guid

12.11 Metadata Management

Send/update metadata.

Functions

- void cloudx1_SetMetadata (struct cloudx1_CInstance *instance, const char *key, const char *value)
- void cloudx1_SetMetadataMulti (struct cloudx1_CInstance *instance, const char **keyvalue)
- const char ** cloudx1_GetMetadataInfos (struct cloudx1_CInstance *instance)
- void cloudx1_FreeMetadataInfos (struct cloudx1_CInstance *instance, const char **infos)

12.11.1 Detailed Description

Metadata is used on-need, and might be used by extensions modules (Watermarking, Streaming, ...)

12.11.2 Function Documentation

12.11.2.1 cloudx1_FreeMetadataInfos()

```
void cloudx1_FreeMetadataInfos (
            struct cloudx1_CInstance * instance,
            const char ** infos )
```

Frees the information returned by cloudx1_GetMetadataInfos.

Parameters

instance	the instance
infos	the infos

12.11.2.2 cloudx1_GetMetadataInfos()

```
const char ** cloudx1_GetMetadataInfos (
            struct cloudx1_CInstance * instance )
```

Get information on known metadata keys.

Parameters

instance	the instance

Returns

a list of key,descriptions, null terminated, of known metadata keys used in process and extensions. May be null. Should be freed with cloudx1_FreeMetadataInfos

12.11.2.3 cloudx1_SetMetadata()

```
void cloudx1_SetMetadata (
            struct cloudx1_CInstance * instance,
            const char * key,
            const char * value )
```

Adds the specific metadata to the process.

It can come from any thread, and will be used as soon as possible.

Setting a null value erase the metadata, which is different from setting an empty string. Initial metadata might be set as soon as instance is created (and before update thread).

See also

cloudx1_SetMetadataMulti

Parameters

instance	the instance
key	the metadata key. If key contains a dot (like wm.KEY), it will be sent only to the matching plugin (ie wm here) without the prefix (ie KEY here). Use empty prefix for routing to main only.
value	the metadata value or nullptr to erase it.

12.11.2.4 cloudx1_SetMetadataMulti()

```
void cloudx1_SetMetadataMulti (
            struct cloudx1_CInstance * instance,
            const char ** keyvalue )
```

Adds multiple metadata to the process.

This works like cloudx1_SetMetadata but with multiple metadata at once.

See also

cloudx1_SetMetadata

Parameters

instance	the instance
keyvalue	a list of key/value pair, ending with null key.

12.12 Process creation/destruction

Create and destroy a process instance.

Classes

- struct cloudx1_CInstance
- struct cloudx1_CParameters

Functions

- struct cloudx1_CParameters * cloudx1_NewParameters ()
- void cloudx1_FreeParameters (struct cloudx1_CParameters *params)
- void cloudx1_SetParameter (struct cloudx1_CParameters *params, const char *name, const char *value)
- const char * cloudx1_GetParameter (struct cloudx1_CParameters *params, const char *name)
- void cloudx1_FreeParameterValue (const char *value)
- struct cloudx1_CInstance * cloudx1_InitProcess (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path)
- struct cloudx1_CInstance * cloudx1_InitProcess2 (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path, const struct cloudx1_CParameters *parameters)
- struct cloudx1_CInstance * cloudx1_InitProcess3 (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path, const struct cloudx1_CParameters *parameters, unsigned int frames_per_chunk)
- unsigned int cloudx1_GetProcessChunkFrames (struct cloudx1_CInstance *instance)
- int cloudx1_TerminateProcess (struct cloudx1_CInstance *instance)
- void cloudx1_ExitProcess (struct cloudx1_CInstance *instance)

12.12.1 Detailed Description

Create and destroy a process instance, and retrieve some general information about the process.

12.12.2 Function Documentation

12.12.2.1 cloudx1_ExitProcess()

```
void cloudx1_ExitProcess (
            struct cloudx1_CInstance * instance )
```

Quit and destroy the instance

Parameters

instance	the instance to destroy

12.12.2.2 cloudx1_FreeParameters()

```
void cloudx1_FreeParameters (
            struct cloudx1_CParameters * params )
```

Free the parameters created with cloudx1_NewParameters.

12.12.2.3 cloudx1_FreeParameterValue()

```
void cloudx1_FreeParameterValue (
            const char * value )
```

Free a parameter value returned by cloudx1_GetParameter

Parameters

value	the returned value

12.12.2.4 cloudx1_GetParameter()

```
const char * cloudx1_GetParameter (
            struct cloudx1_CParameters * params,
            const char * name )
```

Get current parameter value.

Returned value must be freed with cloudx1_FreeParameterValue

12.12.2.5 cloudx1_GetProcessChunkFrames()

```
unsigned int cloudx1_GetProcessChunkFrames (
            struct cloudx1_CInstance * instance )
```

Get the number of audio frames in each chunk of processing.

The value reflects the frames_per_chunk parameter passed to cloudx1_InitProcess3

Parameters

instance	the instance to destroy

Returns

the number of audio frames in each chunk of processing

Note

A Frame is a set of cloudx1_GetChannelCount samples

12.12.2.6 cloudx1_InitProcess()

```
struct cloudx1_CInstance * cloudx1_InitProcess (
            const char * LoginKey,
            const char * RadioName,
```

```
            const char * Access_Key_ID,
            const char * Access_Key_Secret,
            const char * save_path )
```

Create a process instance with default parameters (from env)

Same as cloudx1_InitProcess2, but with default parameters (from env)

Deprecated Use cloudx1_InitProcess3

12.12.2.7 cloudx1_InitProcess2()

```
struct cloudx1_CInstance * cloudx1_InitProcess2 (
            const char * LoginKey,
            const char * RadioName,
            const char * Access_Key_ID,
            const char * Access_Key_Secret,
            const char * save_path,
            const struct cloudx1_CParameters * parameters )
```

Create a process instance with default frames_per_chunk (64)

Same as cloudx1_InitProcess3, but with default frames_per_chunk

Deprecated Use cloudx1_InitProcess3

12.12.2.8 cloudx1_InitProcess3()

```
struct cloudx1_CInstance * cloudx1_InitProcess3 (
            const char * LoginKey,
            const char * RadioName,
            const char * Access_Key_ID,
            const char * Access_Key_Secret,
            const char * save_path,
            const struct cloudx1_CParameters * parameters,
            unsigned int frames_per_chunk )
```

Create a process instance

The output will have to be freed with cloudx1_ExitProcess

Attention

The **save_path** must be an existing folder with R/W access, or be NULL (then it uses volatile memory storage)

If the save_path is NULL or the folder is empty, a default configuration with a default preset will be loaded, unless using Custom preset managagement.

If used in a container, we recommend to put a volume for this path, so it will survive updates.

License access

The licenses are retrieved via Internet and access some servers. You may use an alternate server by changing `LICENSE_SERVER` in the parameters.

See also Environment variables and parameters

Parameters

LoginKey	SOUND4 Login key (was User ID)
RadioName	SOUND4 RadioName
Access_Key_ID	SOUND4 AWS access ID
Access_Key_Secret	SOUND4 AWS access Secret
save_path	Path where we can load/save the configuration. If NULL, memory storage will be used.
parameters	Parameters
frames_per_chunk	The number of audio frames in each chunk of processing. Must be in the list returned by cloudx1_GetPossibleChunkSizeInFrames

Returns

A new process instance

12.12.2.9 cloudx1_NewParameters()

```
struct cloudx1_CParameters * cloudx1_NewParameters ( )
```

Create parameters to use with cloudx1_InitProcess2.

The output will have to be freed with cloudx1_FreeParameters

The default values are taken from environment (for compatibility).

12.12.2.10 cloudx1_SetParameter()

```
void cloudx1_SetParameter (
            struct cloudx1_CParameters * params,
            const char * name,
            const char * value )
```

Set a new parameter.

Some values are in taken from env, so see Environment variables and parameters for usable variables

See also Custom preset managagement

12.12.2.11 cloudx1_TerminateProcess()

```
int cloudx1_TerminateProcess (
            struct cloudx1_CInstance * instance )
```

Terminate the processing

This is useful only with file processing, to get the final status. For some plugins, this is mandatory

Parameters

instance	the instance to terminate

Returns

0 is success, <0 if error, >0 if some status

12.13 Sample using C interface

C example.

See full example cpp/sound4.x1.cloud-pipe.cpp

12.13.1 Sample to create the processing instance

see Process creation/destruction and Update Management

```
    // Setup parameters
    struct cloudx1_CParameters *params = cloudx1_NewParameters();
    // Optional: activate web authentication, set admin password
    // This creates the authentication only for a new storage path
    cloudx1_SetParameter(params,"ADMIN_USER", "admin");
    cloudx1_SetParameter(params,"ADMIN_SECRET", "admin");

    // Create the processing instance
    pInstance=cloudx1_InitProcess2(pLoginKey,pRadioName,pKeyId,pAccessKey,store_path.c_str(), params);
    cloudx1_FreeParameters(params);
    if (!pInstance) {
      std::cerr « "Failed to create the process instance"« std::endl;
      return 1;
    }

    // Start the update thread, without JSON server (low priority)
    std::thread updater([pInstance](){
       // will returned when stopped or destroyed
       std::cerr « "cloudx1_StartUpdateThread (no json port)" « std::endl;
       cloudx1_StartUpdateThread(pInstance, 0);
       std::cerr « "cloudx1_StartUpdateThread END" « std::endl;
     });

    // This is not mandatory, but better be sure we are ready right now
    std::cerr « "Waiting update thread" « std::endl;
    if (cloudx1_WaitUpdateThreadReady(pInstance, 5000)<0) {
        std::cerr « "Timeout to create the process instance"« std::endl;
    }
    std::cerr « "Waiting update thread DONE" « std::endl;

#if (CLOUDX1_HAS_WEBSERVER)
    // Starts a web server, listening on port http://localhost:8080, https://localhost:8443
    std::cerr « "Starting web server" « std::endl;
    int listenport= 8080;
    int listenport_secure= 8443;
    uint64_t webserver= SOUND4_INVALID_WEBSERVER_ID;
    if (listenport || listenport_secure) {
        webserver = cloudx1_Webserver(listenport,listenport_secure,pInstance);
        if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
            std::cerr « "Starting web server FAILED" « std::endl;
        } else {
            int web_status=cloudx1_Webserver_Status(webserver);
            if (listenport) {
                if (web_status & SOUND4_WEBSERVER_HTTP_OK) {
                    std::cerr « "Web server listening on port " « listenport;
                } else {
                    std::cerr « "Web server failed to listen on port " « listenport;
                }
            }
            if (listenport_secure) {
                if (web_status & SOUND4_WEBSERVER_HTTPS_OK) {
                    std::cerr « "Web server listening on secure port " « listenport_secure;
                } else {
                    std::cerr « "Web server failed to listen on secure port " « listenport_secure;
```

```
                }
            }
            std::cerr « "Starting web server DONE" « std::endl;
        }
    }
#endif // (CLOUDX1_HAS_WEBSERVER)

     // Force load a factory preset now
     // Could be used instead of setting a store_path
     /*{
         cloudx1_CClientInstance *pClient=cloudx1_NewClient(pInstance);
         const char *answer=cloudx1_ProcessJson(pClient, "{ \"factoryload\": \"All Programs\" }", NULL);
         std::cerr « "Loaded factory preset answer: " « answer« std::endl;
         cloudx1_FreeJsonAnswer(answer);
         cloudx1_DeleteClient(pClient);
     }*/
```

12.13.2 Sample processing loop

see Direct processing

```
bool stopthread=false;
alignas(64) float audio_in[CHUNK_SIZE*CHANNEL_COUNT];
alignas(64) float audio_out[CHUNK_SIZE*CHANNEL_COUNT];

    #if defined(_WIN32) || defined(WIN32)
        // Windows: The stdin, stdout, and stderr streams always open in text mode by default
        _setmode(_fileno(stdin), _O_BINARY);
        _setmode(_fileno(stdout), _O_BINARY);
    #endif

    while (!stopthread)
    {
        // Read a chunk from stdin
        if (std::fread(&audio_in[0], sizeof(float), CHUNK_SIZE*CHANNEL_COUNT, stdin) !=
      CHUNK_SIZE*CHANNEL_COUNT) {
            std::cerr « "ProcessLoop: input stopped"« std::endl;
            stopthread=true;
            break;
        }
        if (stopthread) break;
        // Process it
        cloudx1_ProcessAudio(pInstance, audio_in, audio_out);
        // Write it to stdout
        if (fwrite(&audio_out[0], sizeof(float), CHUNK_SIZE*CHANNEL_COUNT, stdout) !=
      CHUNK_SIZE*CHANNEL_COUNT) {
            std::cerr « "Failed to write audio output" « std::endl;
            stopthread=true;
        }
    }
```

12.13.3 Sample to stop the processing instance

see Process creation/destruction

```
#if (CLOUDX1_HAS_WEBSERVER)
    // Stopping the webserver
    std::cerr « "Stopping web server" « std::endl;
    cloudx1_Webserver_Stop(webserver, 1000);
    std::cerr « "Stopping web server DONE" « std::endl;
#endif // (CLOUDX1_HAS_WEBSERVER)

    // Stopping the processing instance
    std::cerr « "Stopping Update thread" « std::endl;
    cloudx1_StopUpdateThread(pInstance); // this will exit the update thread
    std::cerr « "Stopping Update thread DONE" « std::endl;

    updater.join();

    cloudx1_ExitProcess(pInstance);
```

12.14 Sample using C++ interface wrapper

C++ example (static link)

See full example cpp/sound4.x1.cloud-pipe-cxx.cpp

12.14.1 Setup and sanity checks

```
sound4::cloudx1::SetLogSeverity(verbose5);
sound4::cloudx1::SetLoggerCallback(MyLogger);

sound4::cloudx1::CInstance instance;
instance.SetParam("ADMIN_USER","admin");
instance.SetParam("ADMIN_SECRET","admin");
```

12.14.2 Sample to create the processing instance

```
if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, store_path)) {
    std::cerr « "Failed to create the processing instance" « std::endl;
    return 1;
}
```

12.14.3 Communicating with the instance

See also JSON syntax

```
    auto client = instance.NewClient();
    auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
    std::cerr « "Request for processor name returned "«answer«std::endl;
```

12.14.4 Starting a web-server

```
if (!instance.StartWebServer(listen_port,0)) {
    std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
    return 1;
}
```

12.14.5 Sample processing loop

```
while (!stopthread)
{
    // Read a chunk from stdin
    if (std::fread(instance.GetBufferIn().data(), sizeof(float), sound4::cloudx1::InputSampleSize,
  stdin) != sound4::cloudx1::InputSampleSize) {
        std::cerr « "ProcessLoop: input stopped"« std::endl;
        stopthread=true;
        break;
    }
    if (stopthread) break;
    // Process it
    instance.ProcessAudio();
    // Write it to stdout
    if (fwrite(instance.GetBufferOut().data(), sizeof(float), sound4::cloudx1::OutputSampleSize, stdout)
  != sound4::cloudx1::OutputSampleSize) {
        std::cerr « "Failed to write audio output" « std::endl;
        stopthread=true;
    }
}
```

12.15 Sample using C++ interface wrapper with dynamic library loading

C++ example (dynamic link) See full example cpp/sound4.x1.cloud-pipe-dyn.cpp.

12.15.1 Dynamic loading

```
sound4::cloudx1::dyn::CDynLib dynlib;
if (!dynlib.Load()) {
    std::cerr « "Failed to load processing library" « std::endl;
    return 1;
}
```

12.15.2 Setup and sanity checks

```
sound4::cloudx1::dyn::SetLogSeverity(dynlib, verbose5);
sound4::cloudx1::dyn::SetLoggerCallback(dynlib, MyLogger);

sound4::cloudx1::dyn::CInstance instance(dynlib);
instance.SetParam("ADMIN_USER","admin");
instance.SetParam("ADMIN_SECRET","admin");
```

12.15.3 Sample to create the processing instance

```
if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, {})) {
    std::cerr « "Failed to create the processing instance" « std::endl;
    return 1;
}
```

12.15.4 Communicating with the instance

See also JSON syntax

```
    auto client = instance.NewClient();
    auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
    std::cerr « "Request for processor name returned "«answer«std::endl;
```

12.15.5 Starting a web-server

```
if (!instance.StartWebServer(listen_port,0)) {
    std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
    return 1;
}
```

12.15.6 Sample processing loop

```
while (!stopthread)
{
    // Read a chunk from stdin
    if (std::fread(instance.GetBufferIn().data(), sizeof(float), sound4::cloudx1::dyn::InputSampleSize,
  stdin) != sound4::cloudx1::dyn::InputSampleSize) {
        std::cerr « "ProcessLoop: input stopped"« std::endl;
        stopthread=true;
        break;
    }
    if (stopthread) break;
    // Process it
    instance.ProcessAudio();
    // Write it to stdout
    if (fwrite(instance.GetBufferOut().data(), sizeof(float), sound4::cloudx1::dyn::OutputSampleSize,
  stdout) != sound4::cloudx1::dyn::OutputSampleSize) {
        std::cerr « "Failed to write audio output" « std::endl;
        stopthread=true;
    }
}
```

12.15.7 Custom preset manager

```
class MyPresetManager : public sound4::cloudx1::dyn::CPresetLoader {
public:
    MyPresetManager() = default;
    virtual ~MyPresetManager() = default;

    bool SetupPath(const std::filesystem::path& a_preset_path)
        {
            m_preset_path=a_preset_path;
            std::error_code ec;
            if ( !std::filesystem::exists(m_preset_path,ec ) ) {
                return false;
            }
            if ( !std::filesystem::is_directory(m_preset_path, ec) ) {
                return false;
            }
            return true;
        }
```

```
    virtual bool IsReadOnly() override { return false; };
    virtual bool Exists(const std::filesystem::path &name) override
        {
            std::error_code ec;
            return std::filesystem::exists(GetRealPath(name), ec);
        }
    virtual bool Remove(const std::filesystem::path &name) override
        {
            std::error_code ec;
            return std::filesystem::remove(GetRealPath(name), ec);
        }
    virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) override
        {
            std::error_code ec;
            std::filesystem::rename(GetRealPath(from), GetRealPath(to), ec);
            return (!ec);
        }
    virtual std::vector<std::filesystem::path> GetAll() override
        {
            std::vector<std::filesystem::path> list;
            std::error_code ec;
            for (auto it = std::filesystem::directory_iterator(m_preset_path.c_str(),
      std::filesystem::directory_options::skip_permission_denied, ec);
                 !ec && it != std::filesystem::directory_iterator{};
                  it.increment(ec) )
            {
                if (it->is_regular_file(ec)) {
                    list.push_back(it->path().lexically_relative(m_preset_path));
                }
            }
            return list;
        }
    virtual std::string Read(const std::filesystem::path &filename) override
        {
            std::ifstream f(GetRealPath(filename));
            if ( f.fail() ) {
                return std::string();
            }
            std::ostringstream ss;
            ss « f.rdbuf();
            return ss.str();
        }
    virtual bool Write(const std::filesystem::path &filename, const std::string &content) override
        {
            std::ofstream f(GetRealPath(filename));
            if ( f.fail() ) {
                return false;
            }
            f « content;
            if ( f.fail() ) {
                return false;
            }
            return true;
        }
private:
    std::filesystem::path m_preset_path;
    std::filesystem::path GetRealPath(const std::filesystem::path &name)
        {
            return m_preset_path / name;
        }
};
```

12.15.8 Custom preset manager loading

```
    MyPresetManager preset_manager;
    if (!store_path.empty()) {
        if (!preset_manager.SetupPath(store_path)) {
            std::cerr « "Failed to setup the custom preset manager on path " « (const
      char*)store_path.u8string().c_str() « std::endl;
            return 1;
        }
        instance.SetPresetManager(&preset_manager);
    }
```

12.16 Sample using Generic C++ interface (multi-process compatible)

C++ example (dynamic link, any process)

This wrapper abstracts the processing specifics, working with any SOUND4 .CL process.

It uses sound4cl.hpp header.

See full example cpp/sound4cl-pipe.cpp

12.16.1 Loading the library

```
std::string libname =  "libsound4.x1.cloud.so";
sound4::CProcessor processor;
if (!processor.Load(libname)) {
    std::cerr « "Failed to load processing library" « std::endl;
    return 1;
}
```

12.16.2 Setup and configure

```
processor.SetLogSeverity(sound4::verbose5);
processor.SetLoggerCallback([](sound4::LogSeverity severity,const std::string& msg) {
        std::cerr « msg « std::endl;
    });

sound4::CInstance instance(processor);
instance.SetParam("ADMIN_USER","admin");
instance.SetParam("ADMIN_SECRET","admin");
```

12.16.3 Create the processing instance

```
if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, {})) {
    std::cerr « "Failed to create the processing instance" « std::endl;
    return 1;
}
```

12.16.4 Processing loop

```
size_t input_sample_count = instance.GetChunkFrames() * processor.GetChannelCount();
size_t output_sample_count = instance.GetChunkFrames() * processor.GetChannelCount();
while (!stopthread)
{
    // Read a chunk from stdin
    if (std::fread(instance.GetBufferIn(), sizeof(float), input_sample_count, stdin) !=
  input_sample_count) {
        std::cerr « "ProcessLoop: input stopped"« std::endl;
        stopthread=true;
        break;
    }
    if (stopthread) break;
    // Process it
    instance.ProcessAudio();
    // Write it to stdout
    if (fwrite(instance.GetBufferOut(), sizeof(float), output_sample_count, stdout) !=
  output_sample_count) {
        std::cerr « "Failed to write audio output" « std::endl;
        stopthread=true;
    }
}
```

12.16.5 Starting a web-server

```
if (!instance.StartWebServer(listen_port,0)) {
    std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
    return 1;
}
```

12.16.6 Communicating with the instance

See also JSON syntax

```
    auto client = instance.NewClient();
    auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
    std::cerr « "Request for processor name returned "«answer«std::endl;
```

12.16.7 Custom preset manager example

```
class MyPresetManager : public sound4::CPresetLoader {
public:
    MyPresetManager() = default;
    virtual ~MyPresetManager() = default;

    bool SetupPath(const std::filesystem::path& a_preset_path)
        {
            m_preset_path=a_preset_path;
            std::error_code ec;
            if ( !std::filesystem::exists(m_preset_path,ec ) ) {
                return false;
            }
            if ( !std::filesystem::is_directory(m_preset_path, ec) ) {
                return false;
            }
            return true;
        }
    virtual bool IsReadOnly() override { return false; };
    virtual bool Exists(const std::filesystem::path &name) override
        {
            std::error_code ec;
            return std::filesystem::exists(GetRealPath(name), ec);
        }
    virtual bool Remove(const std::filesystem::path &name) override
        {
            std::error_code ec;
            return std::filesystem::remove(GetRealPath(name), ec);
        }
    virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) override
        {
            std::error_code ec;
            std::filesystem::rename(GetRealPath(from), GetRealPath(to), ec);
            return (!ec);
        }
    virtual std::vector<std::filesystem::path> GetAll() override
        {
            std::vector<std::filesystem::path> list;
            std::error_code ec;
            for (auto it = std::filesystem::directory_iterator(m_preset_path.c_str(),
      std::filesystem::directory_options::skip_permission_denied, ec);
                !ec && it != std::filesystem::directory_iterator{};
                 it.increment(ec) )
            {
                if (it->is_regular_file(ec)) {
                    list.push_back(it->path().lexically_relative(m_preset_path));
                }
            }
            return list;
        }
    virtual std::string Read(const std::filesystem::path &filename) override
        {
            std::ifstream f(GetRealPath(filename));
            if ( f.fail() ) {
                return std::string();
            }
            std::ostringstream ss;
            ss « f.rdbuf();
            return ss.str();
        }
    virtual bool Write(const std::filesystem::path &filename, const std::string &content) override
        {
            std::ofstream f(GetRealPath(filename));
            if ( f.fail() ) {
                return false;
            }
            f « content;
            if ( f.fail() ) {
                return false;
            }
            return true;
        }
private:
    std::filesystem::path m_preset_path;
    std::filesystem::path GetRealPath(const std::filesystem::path &name)
        {
            return m_preset_path / name;
        }
};
```

12.16.8 Custom preset manager loading

```
    MyPresetManager preset_manager;
```

```
    if (!store_path.empty()) {
        if (!preset_manager.SetupPath(store_path)) {
            std::cerr « "Failed to setup the custom preset manager on path " « (const
      char*)store_path.u8string().c_str() « std::endl;
            return 1;
        }
        instance.SetPresetManager(&preset_manager);
    }
```

12.17 Update Management

Manage the process update.

Functions

- void cloudx1_StartUpdateThread (struct cloudx1_CInstance *instance, unsigned int port)
- void cloudx1_StopUpdateThread (struct cloudx1_CInstance *instance)
- int cloudx1_WaitUpdateThreadReady (struct cloudx1_CInstance *instance, int milliseconds)

12.17.1 Detailed Description

Manage the process update and communications.

12.17.2 Function Documentation

12.17.2.1 cloudx1_StartUpdateThread()

```
void cloudx1_StartUpdateThread (
            struct cloudx1_CInstance * instance,
            unsigned int port )
```

Update function

This needs to run in a thread, which can have low priority. It will also allow the JSON access via TCP.

Remarks

This function does not return until it is stopped with cloudx1_StopUpdateThread

Parameters

instance	the instance
port	the port to listen for incoming JSON connections. If 0, the JSON server is not accessible

12.17.2.2 cloudx1_StopUpdateThread()

```
void cloudx1_StopUpdateThread (
            struct cloudx1_CInstance * instance )
```

Stop the update thread

Parameters

instance	the processing instance

12.17.2.3 cloudx1_WaitUpdateThreadReady()

```
int cloudx1_WaitUpdateThreadReady (
            struct cloudx1_CInstance * instance,
            int milliseconds )
```

Wait for the update thread to be ready

Parameters

instance	the processing instance
milliseconds	maximum time to wait in milliseconds

Returns

-1 if timeout waiting for the thread, 0 if OK

12.18 Web server

Web server configuring.

Macros

- #define SOUND4_INVALID_WEBSERVER_ID ((uint64_t)-1)
- #define SOUND4_WEBSERVER_HTTP_OK (1<<0)
- #define SOUND4_WEBSERVER_HTTPS_OK (1<<1)

Functions

- uint64_t cloudx1_Webserver_tcp (unsigned int listenport, unsigned int listenport_secure, const char *socket_ip, unsigned int socket_port)
- uint64_t cloudx1_Webserver_tcp2 (unsigned int listenport, unsigned int listenport_secure, const char *socket_ip, unsigned int socket_port, const struct cloudx1_CParameters *parameters)
- uint64_t cloudx1_Webserver (unsigned int listenport, unsigned int listenport_secure, struct cloudx1_CInstance *instance)
- int cloudx1_Webserver_Stop (uint64_t id, int timeout_ms)
- int cloudx1_Webserver_Status (uint64_t id)
- void cloudx1_Webserver_SetAppHealth (struct cloudx1_CInstance *instance, int httpcode, const char *contenttype, const char *content)
- void cloudx1_Webserver_GetAppHealth (struct cloudx1_CInstance *instance, int *httpcode, char **contenttype, char **content)
- void cloudx1_Webserver_FreeString (char *str)

12.18.1 Detailed Description

Run a web server to configure the processor

The web server also expose `/health` which should always answer 200.

The web server also expose `/licvalid` which should answer 200 when license is valid, 402 when it is not valid, other standard code for other errors.

You can also use `/livalid/[module]` (where `[module]` is the name of a module) to check for validity of the [module] extension in the same way. For instance '/livalid/stream' will check the stream extension.

See also how to setup authentication with Environment variables and parameters. Their use is documented in cloudx1_InitProcess3.

12.18.2 Macro Definition Documentation

12.18.2.1 SOUND4_INVALID_WEBSERVER_ID

```
#define SOUND4_INVALID_WEBSERVER_ID ((uint64_t)-1)
```

This represents an invalid webserver id cloudx1_Webserver and cloudx1_Webserver_tcp will never return this value

Definition at line 1266 of file sound4.x1.cloud.h.

12.18.2.2 SOUND4_WEBSERVER_HTTP_OK

```
#define SOUND4_WEBSERVER_HTTP_OK (1<<0)
```

If this bit is set in the return value from cloudx1_Webserver_Status, then HTTP server is OK

Definition at line 1271 of file sound4.x1.cloud.h.

12.18.2.3 SOUND4_WEBSERVER_HTTPS_OK

```
#define SOUND4_WEBSERVER_HTTPS_OK (1<<1)
```

If this bit is set in the return value from cloudx1_Webserver_Status, then HTTPS server is OK

Definition at line 1275 of file sound4.x1.cloud.h.

12.18.3 Function Documentation

12.18.3.1 cloudx1_Webserver()

```
uint64_t cloudx1_Webserver (
            unsigned int listenport,
            unsigned int listenport_secure,
            struct cloudx1_CInstance * instance )
```

Run a web server, connecting to local instance internally (no expose port needed)

This function returns after connecting to the process, and continue to run in background See cloudx1_Webserver_Stop too stop it gracefully

For secure connection, it will use privatekey.pem and certificate.pem from current directory. Environment variables `SSL_PRIVATE_PATH` and `SSL_CERTIFICATE_PATH` can override those (see Environment variables and parameters). If none is valid, it will try also /etc/ssl/certs/server.key and /etc/ssl/certs/server.crt.

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

listenport	The port to listen for HTTP connections (0 to disable)
listenport_secure	The port to listen for HTTPS connections (0 to disable)
instance	The process instance to connect to

Returns

id of webserver (starting at 0), to use with cloudx1_Webserver_Stop

12.18.3.2 cloudx1_Webserver_FreeString()

```
void cloudx1_Webserver_FreeString (
            char * str )
```

Free a a string returned by cloudx1_Webserver_GetAppHealth

Parameters

str	the string to free

12.18.3.3 cloudx1_Webserver_GetAppHealth()

```
void cloudx1_Webserver_GetAppHealth (
            struct cloudx1_CInstance * instance,
            int * httpcode,
            char ** contenttype,
            char ** content )
```

Get the current web server /apphealth returned http code,content-type and content

Parameters

instance	The process instance
httpcode	The http code pointer
contenttype	The http Content-Type header pointer (to be freed with cloudx1_Webserver_FreeString)
content	The http body content pointer (to be freed with cloudx1_Webserver_FreeString)

12.18.3.4 cloudx1_Webserver_SetAppHealth()

```
void cloudx1_Webserver_SetAppHealth (
            struct cloudx1_CInstance * instance,
            int httpcode,
            const char * contenttype,
            const char * content )
```

Set the web server /apphealth status info

The hosting application can use this to customize the handling of /apphealth path.

Parameters

instance	The process instance
httpcode	The http code
contenttype	The http Content-Type header
content	The http body content

12.18.3.5 cloudx1_Webserver_Status()

```
int cloudx1_Webserver_Status (
            uint64_t id )
```

Get the web server status

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

id	The web server Id, returned by cloudx1_Webserver_tcp or cloudx1_Webserver

Returns

a combinaison of SOUND4_WEBSERVER_HTTP_OK and SOUND4_WEBSERVER_HTTPS_OK depending on the server status

12.18.3.6 cloudx1_Webserver_Stop()

```
int cloudx1_Webserver_Stop (
            uint64_t id,
            int timeout_ms )
```

Stop a web server started with cloudx1_Webserver_tcp

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

id	The web server Id, returned by cloudx1_Webserver_tcp or cloudx1_Webserver
timeout_ms	The timeout to wait gracefull shutdown

Returns

0 if succeed, -1 if the id is not found

12.18.3.7 cloudx1_Webserver_tcp()

```
uint64_t cloudx1_Webserver_tcp (
            unsigned int listenport,
            unsigned int listenport_secure,
            const char * socket_ip,
            unsigned int socket_port )
```

Run a web server, connecting to process with JSON over TCP

Same as cloudx1_Webserver_tcp2, but with default parameters (from env)

Deprecated Use cloudx1_Webserver_tcp2

12.18.3.8 cloudx1_Webserver_tcp2()

```
uint64_t cloudx1_Webserver_tcp2 (
            unsigned int listenport,
            unsigned int listenport_secure,
            const char * socket_ip,
            unsigned int socket_port,
            const struct cloudx1_CParameters * parameters )
```

Run a web server, connecting to process with JSON over TCP, using parameters

This function returns after connecting to the process, and continue to run in background See cloudx1_Webserver_Stop too stop it gracefully

For secure connection, it will use privatekey.pem and certificate.pem from current directory. Environment variables `SSL_PRIVATE_PATH` and `SSL_CERTIFICATE_PATH` can override those (see Environment variables and parameters). If none is valid, it will try also /etc/ssl/certs/server.key and /etc/ssl/certs/server.crt.

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

listenport	The port to listen for HTTP connections
listenport_secure	The port to listen for HTTPS connections
socket_ip	The ip of the process to connect to
socket_port	The port of the process's JSON server to connect to
parameters	The parameters to use, created with cloudx1_NewParameters

Returns

id of webserver (starting at 0), to use with cloudx1_Webserver_Stop

Chapter 13

Namespace Documentation

13.1 sound4 Namespace Reference

Namespaces

- namespace cloudx1
- namespace helper

Classes

- struct AuxiliaryOutputInfos
- class CBus

  Shared Bus.
- class CInstance

  Instance handling class.
- class CPresetLoader

  Custom preset handler helper.
- class CProcessor

  Dynamic library interface.

Typedefs

- using log_cb_t = std::function< void(LogSeverity, const std::string &)>

Enumerations

- enum SampleFormat {
  INVALID_FORMAT , S16_LE , S16_BE , S24_LE ,
  S24_BE , S32_LE , S32_BE , F32_LE ,
  F32_BE , S16_NATIVE , S24_NATIVE , S32_NATIVE ,
  F32_NATIVE }
- enum LogSeverity {
  none , fatal , error , warning ,
  info , verbose , verbose2 , verbose3 ,
  verbose4 , verbose5 }
- enum PresetChange_Kind { change_kind_created , change_kind_modified , change_kind_deleted }

Functions

- static void _log_cb_c (sound4cl_LogSeverity severity, const char *c_msg)

Variables

- static log_cb_t _log_cb

13.1.1 Detailed Description

SOUND4 namespace

13.1.2 Typedef Documentation

13.1.2.1 log_cb_t

```
using sound4::log_cb_t = typedef std::function<void(LogSeverity,const std::string&)>
```

Log callback type

Definition at line 291 of file sound4cl.hpp.

13.1.3 Enumeration Type Documentation

13.1.3.1 LogSeverity

```
enum sound4::LogSeverity
```

Log Severity levels

Enumerator

none	Not used.
fatal	fatal error
error	error
warning	warning
info	info
verbose	verbose
verbose2	verbose2
verbose3	verbose3
verbose4	verbose4
verbose5	verbose5

Definition at line 275 of file sound4cl.hpp.

13.1.3.2 PresetChange_Kind

```
enum sound4::PresetChange_Kind
```

Enumerator

change_kind_created	has been created
change_kind_modified	has been modified
change_kind_deleted	has been deleted

Definition at line 890 of file sound4cl.hpp.

13.1.3.3 SampleFormat

```
enum sound4::SampleFormat
```

Supported formats for audio I/O

Enumerator

INVALID_FORMAT	Invalid.
S16_LE	16-bit signed integer, little-endian
S16_BE	16-bit signed integer, big-endian
S24_LE	24-bit signed integer, little-endian
S24_BE	24-bit signed integer, big-endian
S32_LE	32-bit signed integer, little-endian
S32_BE	32-bit signed integer, big-endian
F32_LE	32-bit floating-point, little-endian
F32_BE	32-bit floating-point, big-endian
S16_NATIVE	16-bit signed integer, native
S24_NATIVE	24-bit signed integer, native
S32_NATIVE	32-bit signed integer, native
F32_NATIVE	32-bit floating-point, native

Definition at line 60 of file sound4cl.hpp.

13.1.4 Function Documentation

13.1.4.1 _log_cb_c()

```
static void sound4::_log_cb_c (
            sound4cl_LogSeverity severity,
            const char * c_msg )  [inline], [static]
```

Definition at line 298 of file sound4cl.hpp.

13.1.5 Variable Documentation

13.1.5.1 _log_cb

```
log_cb_t sound4::_log_cb  [static]
```

internal helpers for C log callbacks

Definition at line 296 of file sound4cl.hpp.

13.2 sound4::cloudx1 Namespace Reference

Namespaces

- namespace dyn
- namespace helper

Classes

- class CInstance

  Instance handling class.
- class CPresetLoader

  Custom preset handler helper.

Typedefs

- using SampleFormat = cloudx1_SampleFormat
- using LogSeverity = cloudx1_LogSeverity
- using log_cb_t = std::function< void(LogSeverity, const std::string &)>
- using PresetChange_Kind = cloudx1_PresetChange_Kind

Functions

- static std::string GetVersion ()
- static unsigned int GetChunkSizeInFrames ()
- static std::vector< unsigned int > GetPossibleChunkSizeInFrames ()
- static unsigned int GetChannelCount ()
- static unsigned int GetAudioInputCount ()
- static unsigned int GetAudioOutputCount ()
- static unsigned int GetSampleRate ()
- static void SanityCheck (bool a_bCheckFrames=true)
- static std::string GetFormatName (const SampleFormat fmt)
- static SampleFormat GetFormatFromName (const std::string &name)
- static unsigned int GetBytesFromFormat (const SampleFormat fmt)
- static void _log_cb_c (cloudx1_LogSeverity severity, const char *c_msg)
- static void SetLogSeverity (LogSeverity severity)
- static void SetLoggerCallback (log_cb_t cb)

Variables

- static constexpr const char * process_name = "SOUND4 x1.CL"
- static constexpr const char * process_shortname = "x1"
- const size_t ChunkFrames = 64
- const size_t InputChannels = 2 * 1
- const size_t OutputChannels = 2 * 1
- const size_t InputSampleSize =ChunkFrames*InputChannels
- const size_t OutputSampleSize =ChunkFrames*OutputChannels
- const size_t SampleRate = 48000
- static log_cb_t _log_cb

13.2.1 Detailed Description

cloudx1 namespace

13.2.2 Typedef Documentation

13.2.2.1 log_cb_t

```
using sound4::cloudx1::log_cb_t = typedef std::function<void(LogSeverity,const std::string&)>
```

Log callback type

Definition at line 405 of file sound4.x1.cloud.hpp.

13.2.2.2 LogSeverity

```
using sound4::cloudx1::LogSeverity = typedef cloudx1_LogSeverity
```

Log Severity levels

Definition at line 401 of file sound4.x1.cloud.hpp.

13.2.2.3 PresetChange_Kind

```
using sound4::cloudx1::PresetChange_Kind = typedef cloudx1_PresetChange_Kind
```

Definition at line 471 of file sound4.x1.cloud.hpp.

13.2.2.4 SampleFormat

```
using sound4::cloudx1::SampleFormat = typedef cloudx1_SampleFormat
```

Definition at line 63 of file sound4.x1.cloud.hpp.

13.2.3 Function Documentation

13.2.3.1 _log_cb_c()

```
static void sound4::cloudx1::_log_cb_c (
            cloudx1_LogSeverity severity,
            const char * c_msg )  [inline], [static]
```

Definition at line 412 of file sound4.x1.cloud.hpp.

13.2.3.2 GetAudioInputCount()

```
static unsigned int sound4::cloudx1::GetAudioInputCount ( )  [inline], [static]
```

Get the number of inputs for this process

Remarks

All inputs have GetChannelCount() channels

Returns

The process input count

Definition at line 311 of file sound4.x1.cloud.hpp.

13.2.3.3 GetAudioOutputCount()

```
static unsigned int sound4::cloudx1::GetAudioOutputCount ( )  [inline], [static]
```

Get the number of outputs for this process

Remarks

All outputs have GetChannelCount() channels

Returns

The process outputs count

Definition at line 323 of file sound4.x1.cloud.hpp.

13.2.3.4 GetBytesFromFormat()

```
static unsigned int sound4::cloudx1::GetBytesFromFormat (
            const SampleFormat fmt )  [inline], [static]
```

Get the format byte size

Parameters

fmt	the format

Returns

the number of bytes used by this format for a single channel audio sample

Definition at line 393 of file sound4.x1.cloud.hpp.

13.2.3.5 GetChannelCount()

```
static unsigned int sound4::cloudx1::GetChannelCount ( )  [inline], [static]
```

Get the number of channels needed by this process

Returns

The process channels count

Definition at line 299 of file sound4.x1.cloud.hpp.

13.2.3.6 GetChunkSizeInFrames()

```
static unsigned int sound4::cloudx1::GetChunkSizeInFrames ( )  [inline], [static]
```

Get the default number of frames in a process chunk.

The output will be available only by chunks of this size.

Note

A Frame is a set of GetChannelCount samples

Returns

The process chunk size in frame

Deprecated Use GetPossibleChunkSizeInFrames

Definition at line 272 of file sound4.x1.cloud.hpp.

13.2.3.7 GetFormatFromName()

```
static SampleFormat sound4::cloudx1::GetFormatFromName (
            const std::string & name )  [inline], [static]
```

Convert string to format

Parameters

name	the format string

Returns

the matching format, or INVALID_FORMAT if invalid.

Definition at line 382 of file sound4.x1.cloud.hpp.

13.2.3.8 GetFormatName()

```
static std::string sound4::cloudx1::GetFormatName (
            const SampleFormat fmt )  [inline], [static]
```

Convert format to string

Parameters

fmt	the format

Returns

the string name of the format

Definition at line 371 of file sound4.x1.cloud.hpp.

13.2.3.9 GetPossibleChunkSizeInFrames()

```
static std::vector< unsigned int > sound4::cloudx1::GetPossibleChunkSizeInFrames ( )  [inline],
[static]
```

Get the possibles number of frames in a process chunk.

The output will be available only by chunks of this size.

Note

A Frame is a set of GetChannelCount samples

Returns

An vector of possible process chunk size in frame

Definition at line 285 of file sound4.x1.cloud.hpp.

13.2.3.10 GetSampleRate()

```
static unsigned int sound4::cloudx1::GetSampleRate ( )  [inline], [static]
```

Get the processing sample-rate

Remarks

For now, always return 48000, but should be checked for backward compatibility

Returns

The process sample-rate in Hz

Definition at line 335 of file sound4.x1.cloud.hpp.

13.2.3.11 GetVersion()

```
static std::string sound4::cloudx1::GetVersion ( )  [inline], [static]
```

Get the process version string

Returns

version string

Definition at line 257 of file sound4.x1.cloud.hpp.

13.2.3.12 SanityCheck()

```
static void sound4::cloudx1::SanityCheck (
            bool a_bCheckFrames = true )  [inline], [static]
```

Checks for library compatibility with const/defines

Throws std::runtime_error on failure

Definition at line 345 of file sound4.x1.cloud.hpp.

13.2.3.13 SetLoggerCallback()

```
static void sound4::cloudx1::SetLoggerCallback (
            log_cb_t cb )  [inline], [static]
```

Sets the log callback. If not set, console output will be used.

Definition at line 426 of file sound4.x1.cloud.hpp.

13.2.3.14 SetLogSeverity()

```
static void sound4::cloudx1::SetLogSeverity (
            LogSeverity severity )  [inline], [static]
```

Sets the log severity (global)

Definition at line 419 of file sound4.x1.cloud.hpp.

13.2.4 Variable Documentation

13.2.4.1 _log_cb

```
log_cb_t sound4::cloudx1::_log_cb  [static]
```

internal helpers for C log callbacks

Definition at line 410 of file sound4.x1.cloud.hpp.

13.2.4.2 ChunkFrames

```
const size_t sound4::cloudx1::ChunkFrames = 64
```

Number of frames in a chunk

Deprecated use GetPossibleChunkSizeInFrames

Definition at line 68 of file sound4.x1.cloud.hpp.

13.2.4.3 InputChannels

```
const size_t sound4::cloudx1::InputChannels = 2 * 1
```

Number of float values in an input frame

Deprecated Use GetChannelCount and GetAudioInputCount

Definition at line 73 of file sound4.x1.cloud.hpp.

13.2.4.4 InputSampleSize

```
const size_t sound4::cloudx1::InputSampleSize =ChunkFrames*InputChannels
```

Number of float values for an input chunk

Deprecated Use GetPossibleChunkSizeInFrames and GetAudioInputCount

Definition at line 83 of file sound4.x1.cloud.hpp.

13.2.4.5 OutputChannels

```
const size_t sound4::cloudx1::OutputChannels = 2 * 1
```

Number of float values in an output frame

Deprecated Use GetChannelCount and GetAudioOutputCount

Definition at line 78 of file sound4.x1.cloud.hpp.

13.2.4.6 OutputSampleSize

```
const size_t sound4::cloudx1::OutputSampleSize =ChunkFrames*OutputChannels
```

Number of float values for an output chunk

Deprecated Use GetPossibleChunkSizeInFrames and GetAudioOutputCount

Definition at line 88 of file sound4.x1.cloud.hpp.

13.2.4.7 process_name

```
constexpr const char* sound4::cloudx1::process_name = "SOUND4 x1.CL"  [static], [constexpr]
```

Definition at line 61 of file sound4.x1.cloud.hpp.

13.2.4.8 process_shortname

```
constexpr const char* sound4::cloudx1::process_shortname = "x1"  [static], [constexpr]
```

Definition at line 62 of file sound4.x1.cloud.hpp.

13.2.4.9 SampleRate

```
const size_t sound4::cloudx1::SampleRate = 48000
```

Sample rate of library

Deprecated Use GetSampleRate

Definition at line 93 of file sound4.x1.cloud.hpp.

13.3 sound4::cloudx1::dyn Namespace Reference

Namespaces

- namespace helper

Classes

- class CDynLib

  Dynamic library interface.
- class CInstance

  Instance handling class.
- class CPresetLoader

  Custom preset handler helper.

Typedefs

- using SampleFormat = cloudx1_SampleFormat
- using LogSeverity = cloudx1_LogSeverity
- using log_cb_t = std::function< void(LogSeverity, const std::string &)>
- using PresetChange_Kind = cloudx1_PresetChange_Kind

Functions

- static std::string GetVersion (CDynLib &dynlib)
- static unsigned int GetChunkSizeInFrames (CDynLib &dynlib)
- static std::vector< unsigned int > GetPossibleChunkSizeInFrames (CDynLib &dynlib)
- static unsigned int GetChannelCount (CDynLib &dynlib)
- static unsigned int GetAudioInputCount (CDynLib &dynlib)
- static unsigned int GetAudioOutputCount (CDynLib &dynlib)
- static unsigned int GetSampleRate (CDynLib &dynlib)
- static void SanityCheck (CDynLib &dynlib, bool a_bCheckFrames=true)
- static std::string GetFormatName (CDynLib &dynlib, const SampleFormat fmt)
- static SampleFormat GetFormatFromName (CDynLib &dynlib, const std::string &name)
- static unsigned int GetBytesFromFormat (CDynLib &dynlib, const SampleFormat fmt)
- static void _log_cb_c (cloudx1_LogSeverity severity, const char *c_msg)
- static void SetLogSeverity (CDynLib &dynlib, LogSeverity severity)
- static void SetLoggerCallback (CDynLib &dynlib, log_cb_t cb)

Variables

- static constexpr const char * process_name = "SOUND4 x1.CL"
- static constexpr const char * process_shortname = "x1"
- const size_t ChunkFrames = 64
- const size_t InputChannels = 2 * 1
- const size_t OutputChannels = 2 * 1
- const size_t InputSampleSize =ChunkFrames*InputChannels
- const size_t OutputSampleSize =ChunkFrames*OutputChannels
- const size_t SampleRate = 48000
- static log_cb_t _log_cb

13.3.1 Detailed Description

Dynamic loading namespace

13.3.2 Typedef Documentation

13.3.2.1 log_cb_t

```
using sound4::cloudx1::dyn::log_cb_t = typedef std::function<void(LogSeverity,const std↩
::string&)>
```

Log callback type

Definition at line 863 of file sound4.x1.cloud_dyn.hpp.

13.3.2.2 LogSeverity

```
using sound4::cloudx1::dyn::LogSeverity = typedef cloudx1_LogSeverity
```

Log Severity levels

Definition at line 859 of file sound4.x1.cloud_dyn.hpp.

13.3.2.3 PresetChange_Kind

```
using sound4::cloudx1::dyn::PresetChange_Kind = typedef cloudx1_PresetChange_Kind
```

Definition at line 937 of file sound4.x1.cloud_dyn.hpp.

13.3.2.4 SampleFormat

```
using sound4::cloudx1::dyn::SampleFormat = typedef cloudx1_SampleFormat
```

Definition at line 497 of file sound4.x1.cloud_dyn.hpp.

13.3.3 Function Documentation

13.3.3.1 _log_cb_c()

```
static void sound4::cloudx1::dyn::_log_cb_c (
            cloudx1_LogSeverity severity,
            const char * c_msg )  [inline], [static]
```

Definition at line 870 of file sound4.x1.cloud_dyn.hpp.

13.3.3.2 GetAudioInputCount()

```
static unsigned int sound4::cloudx1::dyn::GetAudioInputCount (
            CDynLib & dynlib )  [inline], [static]
```

Get the number of inputs for this process

Remarks

All inputs have GetChannelCount() channels

Parameters

dynlib	the dynamic library

Returns

The process input count

Definition at line 762 of file sound4.x1.cloud_dyn.hpp.

13.3.3.3 GetAudioOutputCount()

```
static unsigned int sound4::cloudx1::dyn::GetAudioOutputCount (
            CDynLib & dynlib )  [inline], [static]
```

Get the number of outputs for this process

Remarks

All outputs have GetChannelCount() channels

Parameters

dynlib	the dynamic library

Returns

The process outputs count

Definition at line 775 of file sound4.x1.cloud_dyn.hpp.

13.3.3.4 GetBytesFromFormat()

```
static unsigned int sound4::cloudx1::dyn::GetBytesFromFormat (
            CDynLib & dynlib,
            const SampleFormat fmt )  [inline], [static]
```

Get the format byte size

Parameters

dynlib	the dynamic library
fmt	the format

Returns

the number of bytes used by this format for a single channel audio sample

Definition at line 851 of file sound4.x1.cloud_dyn.hpp.

13.3.3.5 GetChannelCount()

```
static unsigned int sound4::cloudx1::dyn::GetChannelCount (
            CDynLib & dynlib )  [inline], [static]
```

Get the number of channels needed by this process

Parameters

dynlib	the dynamic library

Returns

The process channels count

Definition at line 749 of file sound4.x1.cloud_dyn.hpp.

13.3.3.6 GetChunkSizeInFrames()

```
static unsigned int sound4::cloudx1::dyn::GetChunkSizeInFrames (
            CDynLib & dynlib )  [inline], [static]
```

Get the default number of frames in a process chunk.

The output will be available only by chunks of this size.

Note

A Frame is a set of GetChannelCount samples

Deprecated Use GetPossibleChunkSizeInFrames

Parameters

dynlib	the dynamic library

Returns

The process chunk size in frame

Definition at line 716 of file sound4.x1.cloud_dyn.hpp.

13.3.3.7 GetFormatFromName()

```
static SampleFormat sound4::cloudx1::dyn::GetFormatFromName (
            CDynLib & dynlib,
            const std::string & name )  [inline], [static]
```

Convert string to format

Parameters

dynlib	the dynamic library
name	the format string

Returns

the matching format, or INVALID_FORMAT if invalid.

Definition at line 839 of file sound4.x1.cloud_dyn.hpp.

13.3.3.8 GetFormatName()

```
static std::string sound4::cloudx1::dyn::GetFormatName (
            CDynLib & dynlib,
            const SampleFormat fmt )  [inline], [static]
```

Convert format to string

Parameters

dynlib	the dynamic library
fmt	the format

Returns

the string name of the format

Definition at line 827 of file sound4.x1.cloud_dyn.hpp.

13.3.3.9 GetPossibleChunkSizeInFrames()

```
static std::vector< unsigned int > sound4::cloudx1::dyn::GetPossibleChunkSizeInFrames (
            CDynLib & dynlib )  [inline], [static]
```

Get the possibles number of frames in a process chunk.

The output will be available only by chunks of this size.

Note

A Frame is a set of GetChannelCount samples

Parameters

dynlib	the dynamic library

Returns

An vector of possible process chunk size in frame

Definition at line 730 of file sound4.x1.cloud_dyn.hpp.

13.3.3.10 GetSampleRate()

```
static unsigned int sound4::cloudx1::dyn::GetSampleRate (
            CDynLib & dynlib )  [inline], [static]
```

Get the processing sample-rate

Remarks

For now, always return 48000, but should be checked for backward compatibility

Parameters

dynlib	the dynamic library

Returns

The process sample-rate in Hz

Definition at line 788 of file sound4.x1.cloud_dyn.hpp.

13.3.3.11 GetVersion()

```
static std::string sound4::cloudx1::dyn::GetVersion (
            CDynLib & dynlib )  [inline], [static]
```

Get the process version string

Parameters

dynlib	the dynamic library

Returns

version string

Definition at line 700 of file sound4.x1.cloud_dyn.hpp.

13.3.3.12 SanityCheck()

```
static void sound4::cloudx1::dyn::SanityCheck (
            CDynLib & dynlib,
            bool a_bCheckFrames = true )  [inline], [static]
```

Checks for library compatibility with const/defines

Exceptions

std::runtime_error	on failure

Parameters

dynlib	the dynamic library
a_bCheckFrames	if false, do not check chunk size

Definition at line 800 of file sound4.x1.cloud_dyn.hpp.

13.3.3.13 SetLoggerCallback()

```
static void sound4::cloudx1::dyn::SetLoggerCallback (
            CDynLib & dynlib,
            log_cb_t cb )  [inline], [static]
```

Sets the log callback. If not set, console output will be used.

Definition at line 884 of file sound4.x1.cloud_dyn.hpp.

13.3.3.14 SetLogSeverity()

```
static void sound4::cloudx1::dyn::SetLogSeverity (
            CDynLib & dynlib,
            LogSeverity severity )  [inline], [static]
```

Sets the log severity (global)

Definition at line 877 of file sound4.x1.cloud_dyn.hpp.

13.3.4 Variable Documentation

13.3.4.1 _log_cb

```
log_cb_t sound4::cloudx1::dyn::_log_cb  [static]
```

internal helpers for C log callbacks

Definition at line 868 of file sound4.x1.cloud_dyn.hpp.

13.3.4.2 ChunkFrames

```
const size_t sound4::cloudx1::dyn::ChunkFrames = 64
```

Number of frames in a chunk

Deprecated use GetPossibleChunkSizeInFrames()

Definition at line 502 of file sound4.x1.cloud_dyn.hpp.

13.3.4.3 InputChannels

```
const size_t sound4::cloudx1::dyn::InputChannels = 2 * 1
```

Number of float values in an input frame

Deprecated Use GetChannelCount and GetAudioInputCount

Definition at line 507 of file sound4.x1.cloud_dyn.hpp.

13.3.4.4 InputSampleSize

```
const size_t sound4::cloudx1::dyn::InputSampleSize =ChunkFrames*InputChannels
```

Number of float values for an input chunk

Deprecated Use GetPossibleChunkSizeInFrames and GetAudioInputCount

Definition at line 517 of file sound4.x1.cloud_dyn.hpp.

13.3.4.5 OutputChannels

```
const size_t sound4::cloudx1::dyn::OutputChannels = 2 * 1
```

Number of float values in an output frame

Deprecated Use GetChannelCount and GetAudioOutputCount

Definition at line 512 of file sound4.x1.cloud_dyn.hpp.

13.3.4.6 OutputSampleSize

```
const size_t sound4::cloudx1::dyn::OutputSampleSize =ChunkFrames*OutputChannels
```

Number of float values for an output chunk

Deprecated Use GetPossibleChunkSizeInFrames and GetAudioOutputCount

Definition at line 522 of file sound4.x1.cloud_dyn.hpp.

13.3.4.7 process_name

```
constexpr const char* sound4::cloudx1::dyn::process_name = "SOUND4 x1.CL"  [static], [constexpr]
```

Definition at line 495 of file sound4.x1.cloud_dyn.hpp.

13.3.4.8 process_shortname

```
constexpr const char* sound4::cloudx1::dyn::process_shortname = "x1"  [static], [constexpr]
```

Definition at line 496 of file sound4.x1.cloud_dyn.hpp.

13.3.4.9 SampleRate

```
const size_t sound4::cloudx1::dyn::SampleRate = 48000
```

Sample rate of library

Deprecated Use GetSampleRate

Definition at line 527 of file sound4.x1.cloud_dyn.hpp.

13.4 sound4::cloudx1::dyn::helper Namespace Reference

Classes

- class CDynLoader

  Helper to load dynamic library.
- class DynFuncHolder

  Helper to wrap a function pointer.
- struct SampleFormat

  Helper for Sample format types.
- struct **SampleFormat**< **float** >
- struct **SampleFormat**< **int16_t** >
- struct **SampleFormat**< **int32_t** >

Functions

- static std::string WStringToUTF8 (const std::wstring &wstr)
- static std::wstring UTF8ToWString (const std::string &str)
- static void AudioConvertFrom (CDynLib &dynlib, const uint8_t *payload, float *output, size_t nSpl, cloudx1_SampleFormat fmt)
- static void AudioConvertTo (CDynLib &dynlib, const float *input, uint8_t *payload, size_t nSpl, cloudx1_SampleFormat fmt)
- static void StereoToMono (CDynLib &dynlib, const float *input, float *output, size_t nFrame)
- static void MonoToStereo (CDynLib &dynlib, const float *input, float *output, size_t nFrame)
- static void StereoToMono_Planar (CDynLib &dynlib, const float *inputL, const float *inputR, float *output, size_t nFrame)
- static void MonoToStereo_Planar (CDynLib &dynlib, const float *input, float *outputL, float *outputR, size_t nFrame)
- static void AudioMonoFromLiveStereo (CDynLib &dynlib, const uint8_t *payload, float *output)
- static void AudioMonoToLiveStereo (CDynLib &dynlib, const float *input, uint8_t *payload)

13.4.1 Detailed Description

helper functions for unicode strings in Windows

13.4.2 Function Documentation

13.4.2.1 AudioConvertFrom()

```
static void sound4::cloudx1::dyn::helper::AudioConvertFrom (
            CDynLib & dynlib,
            const uint8_t * payload,
            float * output,
            size_t nSpl,
            cloudx1_SampleFormat fmt )  [inline], [static]
```

Convert the payload to floating-point array

Warning

Output buffer must be 64-byte aligned

Parameters

dynlib	the dynamic library
payload	the binary raw audio buffer
output	audio output buffer (64 byte aligned)
nSpl	the number of samples (not frames)
fmt	the format of the payload

Definition at line 593 of file sound4.x1.cloud_dyn.hpp.

13.4.2.2 AudioConvertTo()

```
static void sound4::cloudx1::dyn::helper::AudioConvertTo (
            CDynLib & dynlib,
            const float * input,
            uint8_t * payload,
            size_t nSpl,
            cloudx1_SampleFormat fmt )  [inline], [static]
```

Convert floating-point array to payload

Warning

Input buffer must be 64-byte aligned

Parameters

dynlib	the dynamic library

Parameters

input	audio input buffer (64 byte aligned)
payload	the binary raw audio buffer
nSpl	the number of samples (not frames)
fmt	the format of the payload

Definition at line 608 of file sound4.x1.cloud_dyn.hpp.

13.4.2.3 AudioMonoFromLiveStereo()

```
static void sound4::cloudx1::dyn::helper::AudioMonoFromLiveStereo (
            CDynLib & dynlib,
            const uint8_t * payload,
            float * output )  [inline], [static]
```

Convert Livewire Livestereo payload to floating-point Mono (12 samples)

Parameters

dynlib	the dynamic library
payload	Livewire Live Stereo raw buffer
output	audio output mono buffer (64 byte aligned)

Definition at line 677 of file sound4.x1.cloud_dyn.hpp.

13.4.2.4 AudioMonoToLiveStereo()

```
static void sound4::cloudx1::dyn::helper::AudioMonoToLiveStereo (
            CDynLib & dynlib,
            const float * input,
            uint8_t * payload )  [inline], [static]
```

Convert floating-point Mono (12 samples) to Livewire Livestereo payload

Parameters

dynlib	the dynamic library
input	audio input mono buffer (64 byte aligned)
payload	Livewire Live Stereo raw buffer

Definition at line 688 of file sound4.x1.cloud_dyn.hpp.

13.4.2.5 MonoToStereo()

```
static void sound4::cloudx1::dyn::helper::MonoToStereo (
            CDynLib & dynlib,
```

```
            const float * input,
            float * output,
            size_t nFrame )  [inline], [static]
```

Convert floating-point Mono to Stereo (L,L)

Warning

Buffers must be 64-byte aligned

Parameters

dynlib	the dynamic library
input	audio input mono buffer (64 byte aligned)
output	audio output stereo buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 636 of file sound4.x1.cloud_dyn.hpp.

13.4.2.6 MonoToStereo_Planar()

```
static void sound4::cloudx1::dyn::helper::MonoToStereo_Planar (
            CDynLib & dynlib,
            const float * input,
            float * outputL,
            float * outputR,
            size_t nFrame )  [inline], [static]
```

Convert floating-point Mono to Stereo (planar) (L,L)

Warning

Buffers must be 64-byte aligned

Parameters

dynlib	the dynamic library
input	audio input mono buffer (64 byte aligned)
outputL	audio output left buffer (64 byte aligned)
outputR	audio output right buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 666 of file sound4.x1.cloud_dyn.hpp.

13.4.2.7 StereoToMono()

```
static void sound4::cloudx1::dyn::helper::StereoToMono (
            CDynLib & dynlib,
```

```
            const float * input,
            float * output,
            size_t nFrame )  [inline], [static]
```

Convert floating-point Stereo to Mono (L+R)/2

Warning

Buffers must be 64-byte aligned

Parameters

dynlib	the dynamic library
input	audio input stereo buffer (64 byte aligned)
output	audio output mono buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 622 of file sound4.x1.cloud_dyn.hpp.

13.4.2.8 StereoToMono_Planar()

```
static void sound4::cloudx1::dyn::helper::StereoToMono_Planar (
            CDynLib & dynlib,
            const float * inputL,
            const float * inputR,
            float * output,
            size_t nFrame )  [inline], [static]
```

Convert floating-point Stereo (planar) to Mono (L+R)/2

Warning

Buffers must be 64-byte aligned

Parameters

dynlib	the dynamic library
inputL	audio input left buffer (64 byte aligned)
inputR	audio input right buffer (64 byte aligned)
output	audio output mono buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 651 of file sound4.x1.cloud_dyn.hpp.

13.4.2.9 UTF8ToWString()

```
static std::wstring sound4::cloudx1::dyn::helper::UTF8ToWString (
            const std::string & str )  [inline], [static]
```

Helper to convert a std::string (UTF8) to a std::wstring for Windows

Attention

For Windows only

Definition at line 551 of file sound4.x1.cloud_dyn.hpp.

13.4.2.10 WStringToUTF8()

```
static std::string sound4::cloudx1::dyn::helper::WStringToUTF8 (
            const std::wstring & wstr )  [inline], [static]
```

Helper to convert a std::wstring to a std::string (UTF8) for Windows

Attention

For Windows only

Definition at line 539 of file sound4.x1.cloud_dyn.hpp.

13.5 sound4::cloudx1::helper Namespace Reference

Classes

- struct SampleFormat

  Helper for Sample format types.
- struct **SampleFormat**< **float** >
- struct **SampleFormat**< **int16_t** >
- struct **SampleFormat**< **int32_t** >

Functions

- static std::string WStringToUTF8 (const std::wstring &wstr)
- static std::wstring UTF8ToWString (const std::string &str)
- static void AudioConvertFrom (const uint8_t *payload, float *output, size_t nSpl, cloudx1_SampleFormat fmt)
- static void AudioConvertTo (const float *input, uint8_t *payload, size_t nSpl, cloudx1_SampleFormat fmt)
- static void StereoToMono (const float *input, float *output, size_t nFrame)
- static void MonoToStereo (const float *input, float *output, size_t nFrame)
- static void StereoToMono_Planar (const float *inputL, const float *inputR, float *output, size_t nFrame)
- static void MonoToStereo_Planar (const float *input, float *outputL, float *outputR, size_t nFrame)
- static void AudioMonoFromLiveStereo (const uint8_t *payload, float *output)
- static void AudioMonoToLiveStereo (const float *input, uint8_t *payload)

13.5.1 Detailed Description

helper functions for unicode strings in Windows

13.5.2 Function Documentation

13.5.2.1 AudioConvertFrom()

```
static void sound4::cloudx1::helper::AudioConvertFrom (
            const uint8_t * payload,
            float * output,
            size_t nSpl,
            cloudx1_SampleFormat fmt )  [inline], [static]
```

Convert the payload to floating-point array

Warning

Output buffer must be 64-byte aligned

Parameters

payload	the binary raw audio buffer
output	audio output buffer (64 byte aligned)
nSpl	the number of samples (not frames)
fmt	the format of the payload

Definition at line 158 of file sound4.x1.cloud.hpp.

13.5.2.2 AudioConvertTo()

```
static void sound4::cloudx1::helper::AudioConvertTo (
            const float * input,
            uint8_t * payload,
            size_t nSpl,
            cloudx1_SampleFormat fmt )  [inline], [static]
```

Convert floating-point array to payload

Warning

Input buffer must be 64-byte aligned

Parameters

input	audio input buffer (64 byte aligned)
payload	the binary raw audio buffer
nSpl	the number of samples (not frames)
fmt	the format of the payload

Definition at line 172 of file sound4.x1.cloud.hpp.

13.5.2.3 AudioMonoFromLiveStereo()

```
static void sound4::cloudx1::helper::AudioMonoFromLiveStereo (
            const uint8_t * payload,
            float * output )  [inline], [static]
```

Convert Livewire Livestereo payload to floating-point Mono (12 samples)

Parameters

payload	Livewire Live Stereo raw buffer
output	audio output mono buffer (64 byte aligned)

Definition at line 236 of file sound4.x1.cloud.hpp.

13.5.2.4 AudioMonoToLiveStereo()

```
static void sound4::cloudx1::helper::AudioMonoToLiveStereo (
            const float * input,
            uint8_t * payload )  [inline], [static]
```

Convert floating-point Mono (12 samples) to Livewire Livestereo payload

Parameters

input	audio input mono buffer (64 byte aligned)
payload	Livewire Live Stereo raw buffer

Definition at line 246 of file sound4.x1.cloud.hpp.

13.5.2.5 MonoToStereo()

```
static void sound4::cloudx1::helper::MonoToStereo (
            const float * input,
            float * output,
            size_t nFrame )  [inline], [static]
```

Convert floating-point Mono to Stereo (L,L)

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input mono buffer (64 byte aligned)
output	audio output stereo buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 198 of file sound4.x1.cloud.hpp.

13.5.2.6 MonoToStereo_Planar()

```
static void sound4::cloudx1::helper::MonoToStereo_Planar (
            const float * input,
            float * outputL,
            float * outputR,
            size_t nFrame )  [inline], [static]
```

Convert floating-point Mono to Stereo (planar) (L,L)

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input mono buffer (64 byte aligned)
outputL	audio output left buffer (64 byte aligned)
outputR	audio output right buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 226 of file sound4.x1.cloud.hpp.

13.5.2.7 StereoToMono()

```
static void sound4::cloudx1::helper::StereoToMono (
            const float * input,
            float * output,
            size_t nFrame )  [inline], [static]
```

Convert floating-point Stereo to Mono (L+R)/2

Warning

Buffers must be 64-byte aligned

Parameters

input	audio input stereo buffer (64 byte aligned)
output	audio output mono buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 185 of file sound4.x1.cloud.hpp.

13.5.2.8 StereoToMono_Planar()

```
static void sound4::cloudx1::helper::StereoToMono_Planar (
            const float * inputL,
            const float * inputR,
            float * output,
            size_t nFrame )  [inline], [static]
```

Convert floating-point Stereo (planar) to Mono (L+R)/2

Warning

Buffers must be 64-byte aligned

Parameters

inputL	audio input left buffer (64 byte aligned)
inputR	audio input right buffer (64 byte aligned)
output	audio output mono buffer (64 byte aligned)
nFrame	the number of frames

Definition at line 212 of file sound4.x1.cloud.hpp.

13.5.2.9 UTF8ToWString()

```
static std::wstring sound4::cloudx1::helper::UTF8ToWString (
            const std::string & str )  [inline], [static]
```

Helper to convert a std::string (UTF8) to a std::wstring for Windows

Attention

For Windows only

Definition at line 117 of file sound4.x1.cloud.hpp.

13.5.2.10 WStringToUTF8()

```
static std::string sound4::cloudx1::helper::WStringToUTF8 (
            const std::wstring & wstr )  [inline], [static]
```

Helper to convert a std::wstring to a std::string (UTF8) for Windows

Attention

For Windows only

Definition at line 105 of file sound4.x1.cloud.hpp.

13.6 sound4::helper Namespace Reference

Classes

- class CDynLoader

  Helper to load dynamic library.
- class DynFuncHolder

  Helper to wrap a function pointer.
- struct SampleFormat

  Helper for Sample format types.
- struct **SampleFormat**< **float** >
- struct **SampleFormat**< **int16_t** >
- struct **SampleFormat**< **int32_t** >

Functions

- static std::string WStringToUTF8 (const std::wstring &wstr)
- static std::wstring UTF8ToWString (const std::string &str)

13.6.1 Detailed Description

helper functions for unicode strings in Windows

13.6.2 Function Documentation

13.6.2.1 UTF8ToWString()

```
static std::wstring sound4::helper::UTF8ToWString (
            const std::string & str )  [inline], [static]
```

Helper to convert a std::string (UTF8) to a std::wstring for Windows

Attention

For Windows only

Definition at line 98 of file sound4cl.hpp.

13.6.2.2 WStringToUTF8()

```
static std::string sound4::helper::WStringToUTF8 (
            const std::wstring & wstr )  [inline], [static]
```

Helper to convert a std::wstring to a std::string (UTF8) for Windows

Attention

For Windows only

Definition at line 86 of file sound4cl.hpp.

Chapter 14

Class Documentation

14.1 sound4::AuxiliaryOutputInfos Struct Reference

`#include <sound4.x1.cloud.hpp>`

Public Attributes

- std::string id

  The ID of the output (fixed across versions)
- std::string description

  The description of the output.
- unsigned int sample_rate

  The sampling rate of this output.
- unsigned int channel_count

  The number of channels of this output.
- const float * buffer

  The output buffer of the output. See sound4::cloudx1::CInstance::ProcessAudio for format.

14.1.1 Detailed Description

Definition at line 50 of file sound4.x1.cloud.hpp.

14.1.2 Member Data Documentation

14.1.2.1 buffer

`const float* sound4::AuxiliaryOutputInfos::buffer`

Definition at line 55 of file sound4.x1.cloud.hpp.

14.1.2.2 channel_count

```
unsigned int sound4::AuxiliaryOutputInfos::channel_count
```

Definition at line 54 of file sound4.x1.cloud.hpp.

14.1.2.3 description

```
std::string sound4::AuxiliaryOutputInfos::description
```

Definition at line 52 of file sound4.x1.cloud.hpp.

14.1.2.4 id

```
std::string sound4::AuxiliaryOutputInfos::id
```

Definition at line 51 of file sound4.x1.cloud.hpp.

14.1.2.5 sample_rate

```
unsigned int sound4::AuxiliaryOutputInfos::sample_rate
```

Definition at line 53 of file sound4.x1.cloud.hpp.

The documentation for this struct was generated from the following file:

- sound4.x1.cloud.hpp

14.2 sound4::CBus Class Reference

Shared Bus.

```
#include <sound4cl.hpp>
```

Public Member Functions

- CBus (CProcessor &dynlib)
- ~CBus ()

Protected Member Functions

- sound4cl_CBus * Get () const

Friends

- class CInstance

14.2.1 Detailed Description

Some processor can share a bus for realtime data exchange

Definition at line 848 of file sound4cl.hpp.

14.2.2 Constructor & Destructor Documentation

14.2.2.1 CBus()

```
sound4::CBus::CBus (
            CProcessor & dynlib )  [inline]
```

Definition at line 850 of file sound4cl.hpp.

14.2.2.2 ~CBus()

```
sound4::CBus::~CBus ( )  [inline]
```

Definition at line 857 of file sound4cl.hpp.

14.2.3 Member Function Documentation

14.2.3.1 Get()

```
sound4cl_CBus * sound4::CBus::Get ( ) const  [inline], [protected]
```

Definition at line 866 of file sound4cl.hpp.

14.2.4 Friends And Related Symbol Documentation

14.2.4.1 CInstance

```
friend class CInstance  [friend]
```

Definition at line 865 of file sound4cl.hpp.

The documentation for this class was generated from the following file:

- sound4cl.hpp

14.3 sound4::CInstance::CClient Class Reference

```
#include <sound4cl.hpp>
```

Public Member Functions

- CClient (sound4cl_CInstance *instance, CProcessor &dynlib)
- CClient (const CInstance &)=delete
- CClient & operator= (const CInstance &)=delete
- ~CClient ()
- std::string ProcessJson (const std::string &request, bool *NeedSave=nullptr)

  Process a JSON request and returns the answer.

14.3.1 Detailed Description

Low-level JSON client.

See also JSON syntax

Definition at line 1424 of file sound4cl.hpp.

14.3.2 Constructor & Destructor Documentation

14.3.2.1 CClient() [1/2]

```
sound4::CInstance::CClient::CClient (
            sound4cl_CInstance * instance,
            CProcessor & dynlib )  [inline]
```

Definition at line 1426 of file sound4cl.hpp.

14.3.2.2 CClient() [2/2]

```
sound4::CInstance::CClient::CClient (
            const CInstance &  )  [delete]
```

14.3.2.3 ~CClient()

```
sound4::CInstance::CClient::~CClient ( )  [inline]
```

Definition at line 1436 of file sound4cl.hpp.

14.3.3 Member Function Documentation

14.3.3.1 operator=()

```
CClient & sound4::CInstance::CClient::operator= (
            const CInstance &  )  [delete]
```

14.3.3.2 ProcessJson()

```
std::string sound4::CInstance::CClient::ProcessJson (
            const std::string & request,
            bool * NeedSave = nullptr )  [inline]
```

Parameters

request	the JSON request. See also JSON syntax
NeedSave	if non null, returns if the saving is required (maybe delayed)

Returns

the JSON answer

Definition at line 1450 of file sound4cl.hpp.

The documentation for this class was generated from the following file:

- sound4cl.hpp

14.4 sound4::cloudx1::CInstance::CClient Class Reference

`#include <sound4.x1.cloud.hpp>`

Public Member Functions

- CClient (cloudx1_CInstance *instance)
- CClient (const CInstance &)=delete
- CClient & operator= (const CInstance &)=delete
- ~CClient ()
- std::string ProcessJson (const std::string &request, bool *NeedSave=nullptr)

  Process a JSON request and returns the answer.

14.4.1 Detailed Description

Low-level JSON client.

See also JSON syntax

Definition at line 986 of file sound4.x1.cloud.hpp.

14.4.2 Constructor & Destructor Documentation

14.4.2.1 CClient() [1/2]

```
sound4::cloudx1::CInstance::CClient::CClient (
            cloudx1_CInstance * instance )  [inline]
```

Definition at line 988 of file sound4.x1.cloud.hpp.

14.4.2.2 CClient() [2/2]

```
sound4::cloudx1::CInstance::CClient::CClient (
            const CInstance &  )  [delete]
```

14.4.2.3 ~CClient()

```
sound4::cloudx1::CInstance::CClient::~CClient ( )  [inline]
```

Definition at line 997 of file sound4.x1.cloud.hpp.

14.4.3 Member Function Documentation

14.4.3.1 operator=()

```
CClient & sound4::cloudx1::CInstance::CClient::operator= (
            const CInstance &  )  [delete]
```

14.4.3.2 ProcessJson()

```
std::string sound4::cloudx1::CInstance::CClient::ProcessJson (
            const std::string & request,
            bool * NeedSave = nullptr )  [inline]
```

Parameters

request	the JSON request. See also JSON syntax
NeedSave	if non null, returns if the saving is required (maybe delayed)

Returns

the JSON answer

Definition at line 1011 of file sound4.x1.cloud.hpp.

The documentation for this class was generated from the following file:

- sound4.x1.cloud.hpp

14.5 sound4::cloudx1::dyn::CInstance::CClient Class Reference

```
#include <sound4.x1.cloud_dyn.hpp>
```

Public Member Functions

- CClient (cloudx1_CInstance *instance, CDynLib &dynlib)
- CClient (const CInstance &)=delete
- CClient & operator= (const CInstance &)=delete
- ~CClient ()
- std::string ProcessJson (const std::string &request, bool *NeedSave=nullptr)

  Process a JSON request and returns the answer.

14.5.1 Detailed Description

Low-level JSON client.

See also JSON syntax

Definition at line 1448 of file sound4.x1.cloud_dyn.hpp.

14.5.2 Constructor & Destructor Documentation

14.5.2.1 CClient() [1/2]

```
sound4::cloudx1::dyn::CInstance::CClient::CClient (
            cloudx1_CInstance * instance,
            CDynLib & dynlib )  [inline]
```

Definition at line 1450 of file sound4.x1.cloud_dyn.hpp.

14.5.2.2 CClient() [2/2]

```
sound4::cloudx1::dyn::CInstance::CClient::CClient (
            const CInstance &  )  [delete]
```

14.5.2.3 ~CClient()

```
sound4::cloudx1::dyn::CInstance::CClient::~CClient ( )  [inline]
```

Definition at line 1460 of file sound4.x1.cloud_dyn.hpp.

14.5.3 Member Function Documentation

14.5.3.1 operator=()

```
CClient & sound4::cloudx1::dyn::CInstance::CClient::operator= (
            const CInstance &  )  [delete]
```

14.5.3.2 ProcessJson()

```
std::string sound4::cloudx1::dyn::CInstance::CClient::ProcessJson (
            const std::string & request,
            bool * NeedSave = nullptr )  [inline]
```

Parameters

request	the JSON request. See also JSON syntax
NeedSave	if non null, returns if the saving is required (maybe delayed)

Returns

the JSON answer

Definition at line 1474 of file sound4.x1.cloud_dyn.hpp.

The documentation for this class was generated from the following file:

- sound4.x1.cloud_dyn.hpp

14.6 sound4::cloudx1::dyn::CDynLib Class Reference

Dynamic library interface.

`#include <sound4.x1.cloud_dyn.hpp>`

Public Member Functions

- CDynLib ()=default
- bool Load (const std::filesystem::path &path={})

  Loads the library.
- bool IsOk () const

  Check if the library was loaded correctly.

Public Attributes

- helper::DynFuncHolder< decltype(cloudx1_GetVersion) > GetVersion
- helper::DynFuncHolder< decltype(cloudx1_GetChunkSizeInFrames) > GetChunkSizeInFrames
- helper::DynFuncHolder< decltype(cloudx1_GetChannelCount) > GetChannelCount
- helper::DynFuncHolder< decltype(cloudx1_GetAudioInputCount) > GetAudioInputCount
- helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount) > GetAudioOutputCount
- helper::DynFuncHolder< decltype(cloudx1_GetSampleRate) > GetSampleRate
- helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback) > SetLoggerCallback
- helper::DynFuncHolder< decltype(cloudx1_SetLogSeverity) > SetLogSeverity
- helper::DynFuncHolder< decltype(cloudx1_NewParameters) > NewParameters
- helper::DynFuncHolder< decltype(cloudx1_FreeParameters) > FreeParameters
- helper::DynFuncHolder< decltype(cloudx1_SetParameter) > SetParameter
- helper::DynFuncHolder< decltype(cloudx1_GetParameter) > GetParameter
- helper::DynFuncHolder< decltype(cloudx1_FreeParameterValue) > FreeParameterValue
- helper::DynFuncHolder< decltype(cloudx1_InitProcess) > InitProcess
- helper::DynFuncHolder< decltype(cloudx1_InitProcess2) > InitProcess2
- helper::DynFuncHolder< decltype(cloudx1_TerminateProcess) > TerminateProcess
- helper::DynFuncHolder< decltype(cloudx1_ExitProcess) > ExitProcess
- helper::DynFuncHolder< decltype(cloudx1_StartUpdateThread) > StartUpdateThread

- helper::DynFuncHolder< decltype(cloudx1_StopUpdateThread) > StopUpdateThread
- helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady) > WaitUpdateThreadReady
- helper::DynFuncHolder< decltype(cloudx1_ProcessAudio) > ProcessAudio
- helper::DynFuncHolder< decltype(cloudx1_ProcessAudio_Planar) > ProcessAudio_Planar
- helper::DynFuncHolder< decltype(cloudx1_GetBufferIn) > GetBufferIn
- helper::DynFuncHolder< decltype(cloudx1_GetBufferOut) > GetBufferOut
- helper::DynFuncHolder< decltype(cloudx1_GetEstimatedDelay) > GetEstimatedDelay
- helper::DynFuncHolder< decltype(cloudx1_GetFormatName) > GetFormatName
- helper::DynFuncHolder< decltype(cloudx1_GetFormatFromName) > GetFormatFromName
- helper::DynFuncHolder< decltype(cloudx1_GetBytesFromFormat) > GetBytesFromFormat
- helper::DynFuncHolder< decltype(cloudx1_GetMaxPacketFrame) > GetMaxPacketFrame
- helper::DynFuncHolder< decltype(cloudx1_AddAudio) > AddAudio
- helper::DynFuncHolder< decltype(cloudx1_AddPadAudio) > AddPadAudio
- helper::DynFuncHolder< decltype(cloudx1_GetOutputCount) > GetOutputCount
- helper::DynFuncHolder< decltype(cloudx1_GetAudio) > GetAudio
- helper::DynFuncHolder< decltype(cloudx1_AudioConvertFrom) > AudioConvertFrom
- helper::DynFuncHolder< decltype(cloudx1_AudioConvertTo) > AudioConvertTo
- helper::DynFuncHolder< decltype(cloudx1_StereoToMono) > StereoToMono
- helper::DynFuncHolder< decltype(cloudx1_MonoToStereo) > MonoToStereo
- helper::DynFuncHolder< decltype(cloudx1_AudioMonoFromLiveStereo) > AudioMonoFromLiveStereo
- helper::DynFuncHolder< decltype(cloudx1_AudioMonoToLiveStereo) > AudioMonoToLiveStereo
- helper::DynFuncHolder< decltype(cloudx1_NewClient) > NewClient
- helper::DynFuncHolder< decltype(cloudx1_DeleteClient) > DeleteClient
- helper::DynFuncHolder< decltype(cloudx1_ProcessJson) > ProcessJson
- helper::DynFuncHolder< decltype(cloudx1_FreeJsonAnswer) > FreeJsonAnswer
- helper::DynFuncHolder< decltype(cloudx1_SaveState) > SaveState
- helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp) > Webserver_tcp
- helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp2) > Webserver_tcp2
- helper::DynFuncHolder< decltype(cloudx1_Webserver) > Webserver
- helper::DynFuncHolder< decltype(cloudx1_Webserver_Stop) > Webserver_Stop
- helper::DynFuncHolder< decltype(cloudx1_Webserver_Status) > Webserver_Status
- helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar) > StereoToMono_Planar
- helper::DynFuncHolder< decltype(cloudx1_MonoToStereo_Planar) > MonoToStereo_Planar
- helper::DynFuncHolder< decltype(cloudx1_SetMetadata) > SetMetadata
- helper::DynFuncHolder< decltype(cloudx1_GetMetadataInfos) > GetMetadataInfos
- helper::DynFuncHolder< decltype(cloudx1_FreeMetadataInfos) > FreeMetadataInfos
- helper::DynFuncHolder< decltype(cloudx1_SetPresetManager) > SetPresetManager
- helper::DynFuncHolder< decltype(cloudx1_PresetManager_InformChange) > PresetManager_InformChange
- helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames) > GetPossibleChunkSizeInFrames
- helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames) > GetProcessChunkFrames
- helper::DynFuncHolder< decltype(cloudx1_InitProcess3) > InitProcess3
- helper::DynFuncHolder< decltype(cloudx1_SetMetadataMulti) > SetMetadataMulti
- helper::DynFuncHolder< decltype(cloudx1_Webserver_SetAppHealth) > Webserver_SetAppHealth
- helper::DynFuncHolder< decltype(cloudx1_Webserver_GetAppHealth) > Webserver_GetAppHealth
- helper::DynFuncHolder< decltype(cloudx1_Webserver_FreeString) > Webserver_FreeString
- helper::DynFuncHolder< decltype(cloudx1_SetInstanceTracing) > SetInstanceTracing
- helper::DynFuncHolder< decltype(cloudx1_SetInstanceTracingProcessActivity) > SetInstanceTracingProcessActivity

14.6.1 Detailed Description

Once you loaded the library with Load(), if it succeed you can use all the standard C functions from this library.

Definition at line 230 of file sound4.x1.cloud_dyn.hpp.

14.6.2 Constructor & Destructor Documentation

14.6.2.1 CDynLib()

```
sound4::cloudx1::dyn::CDynLib::CDynLib ( )  [default]
```

14.6.3 Member Function Documentation

14.6.3.1 IsOk()

```
bool sound4::cloudx1::dyn::CDynLib::IsOk ( ) const  [inline]
```

Returns

true if OK.

false if not OK.

Definition at line 487 of file sound4.x1.cloud_dyn.hpp.

14.6.3.2 Load()

```
bool sound4::cloudx1::dyn::CDynLib::Load (
            const std::filesystem::path & path = {} )  [inline]
```

Parameters

path	the path of the library to load.

Returns

true if library was loaded correctly.

false if library load failed. Do not use in this case !

Definition at line 338 of file sound4.x1.cloud_dyn.hpp.

14.6.4 Member Data Documentation

14.6.4.1 AddAudio

```
helper::DynFuncHolder< decltype(cloudx1_AddAudio ) > sound4::cloudx1::dyn::CDynLib::AddAudio
```

Definition at line 267 of file sound4.x1.cloud_dyn.hpp.

14.6.4.2 AddPadAudio

```
helper::DynFuncHolder< decltype(cloudx1_AddPadAudio ) > sound4::cloudx1::dyn::CDynLib::Add↩
PadAudio
```

Definition at line 268 of file sound4.x1.cloud_dyn.hpp.

14.6.4.3 AudioConvertFrom

```
helper::DynFuncHolder< decltype(cloudx1_AudioConvertFrom ) > sound4::cloudx1::dyn::CDynLib::↩
AudioConvertFrom
```

Definition at line 271 of file sound4.x1.cloud_dyn.hpp.

14.6.4.4 AudioConvertTo

```
helper::DynFuncHolder< decltype(cloudx1_AudioConvertTo ) > sound4::cloudx1::dyn::CDynLib::↩
AudioConvertTo
```

Definition at line 272 of file sound4.x1.cloud_dyn.hpp.

14.6.4.5 AudioMonoFromLiveStereo

```
helper::DynFuncHolder< decltype(cloudx1_AudioMonoFromLiveStereo) > sound4::cloudx1::dyn::↩
CDynLib::AudioMonoFromLiveStereo
```

Definition at line 275 of file sound4.x1.cloud_dyn.hpp.

14.6.4.6 AudioMonoToLiveStereo

```
helper::DynFuncHolder< decltype(cloudx1_AudioMonoToLiveStereo ) > sound4::cloudx1::dyn::CDyn↩
Lib::AudioMonoToLiveStereo
```

Definition at line 276 of file sound4.x1.cloud_dyn.hpp.

14.6.4.7 DeleteClient

```
helper::DynFuncHolder< decltype(cloudx1_DeleteClient ) > sound4::cloudx1::dyn::CDynLib::↩
DeleteClient
```

Definition at line 278 of file sound4.x1.cloud_dyn.hpp.

14.6.4.8 ExitProcess

```
helper::DynFuncHolder< decltype(cloudx1_ExitProcess ) > sound4::cloudx1::dyn::CDynLib::Exit↩
Process
```

Definition at line 254 of file sound4.x1.cloud_dyn.hpp.

14.6.4.9 FreeJsonAnswer

```
helper::DynFuncHolder< decltype(cloudx1_FreeJsonAnswer ) > sound4::cloudx1::dyn::CDynLib::↩
FreeJsonAnswer
```

Definition at line 280 of file sound4.x1.cloud_dyn.hpp.

14.6.4.10 FreeMetadataInfos

```
helper::DynFuncHolder< decltype(cloudx1_FreeMetadataInfos ) > sound4::cloudx1::dyn::CDynLib↩
::FreeMetadataInfos
```

Definition at line 297 of file sound4.x1.cloud_dyn.hpp.

14.6.4.11 FreeParameters

```
helper::DynFuncHolder< decltype(cloudx1_FreeParameters ) > sound4::cloudx1::dyn::CDynLib::↩
FreeParameters
```

Definition at line 247 of file sound4.x1.cloud_dyn.hpp.

14.6.4.12 FreeParameterValue

```
helper::DynFuncHolder< decltype(cloudx1_FreeParameterValue ) > sound4::cloudx1::dyn::CDynLib↩
::FreeParameterValue
```

Definition at line 250 of file sound4.x1.cloud_dyn.hpp.

14.6.4.13 GetAudio

```
helper::DynFuncHolder< decltype(cloudx1_GetAudio ) > sound4::cloudx1::dyn::CDynLib::GetAudio
```

Definition at line 270 of file sound4.x1.cloud_dyn.hpp.

14.6.4.14 GetAudioInputCount

```
helper::DynFuncHolder< decltype(cloudx1_GetAudioInputCount ) > sound4::cloudx1::dyn::CDynLib↩
::GetAudioInputCount
```

Definition at line 241 of file sound4.x1.cloud_dyn.hpp.

14.6.4.15 GetAudioOutputCount

```
helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount ) > sound4::cloudx1::dyn::CDyn↩
Lib::GetAudioOutputCount
```

Definition at line 242 of file sound4.x1.cloud_dyn.hpp.

14.6.4.16 GetBufferIn

```
helper::DynFuncHolder< decltype(cloudx1_GetBufferIn ) > sound4::cloudx1::dyn::CDynLib::Get↩
BufferIn
```

Definition at line 260 of file sound4.x1.cloud_dyn.hpp.

14.6.4.17 GetBufferOut

```
helper::DynFuncHolder< decltype(cloudx1_GetBufferOut ) > sound4::cloudx1::dyn::CDynLib::Get↩
BufferOut
```

Definition at line 261 of file sound4.x1.cloud_dyn.hpp.

14.6.4.18 GetBytesFromFormat

```
helper::DynFuncHolder< decltype(cloudx1_GetBytesFromFormat ) > sound4::cloudx1::dyn::CDynLib↩
::GetBytesFromFormat
```

Definition at line 265 of file sound4.x1.cloud_dyn.hpp.

14.6.4.19 GetChannelCount

```
helper::DynFuncHolder< decltype(cloudx1_GetChannelCount ) > sound4::cloudx1::dyn::CDynLib::↩
GetChannelCount
```

Definition at line 240 of file sound4.x1.cloud_dyn.hpp.

14.6.4.20 GetChunkSizeInFrames

```
helper::DynFuncHolder< decltype(cloudx1_GetChunkSizeInFrames ) > sound4::cloudx1::dyn::CDyn↩
Lib::GetChunkSizeInFrames
```

Definition at line 239 of file sound4.x1.cloud_dyn.hpp.

14.6.4.21 GetEstimatedDelay

```
helper::DynFuncHolder< decltype(cloudx1_GetEstimatedDelay ) > sound4::cloudx1::dyn::CDynLib↩
::GetEstimatedDelay
```

Definition at line 262 of file sound4.x1.cloud_dyn.hpp.

14.6.4.22 GetFormatFromName

```
helper::DynFuncHolder< decltype(cloudx1_GetFormatFromName ) > sound4::cloudx1::dyn::CDynLib↩
::GetFormatFromName
```

Definition at line 264 of file sound4.x1.cloud_dyn.hpp.

14.6.4.23 GetFormatName

```
helper::DynFuncHolder< decltype(cloudx1_GetFormatName ) > sound4::cloudx1::dyn::CDynLib::Get↩
FormatName
```

Definition at line 263 of file sound4.x1.cloud_dyn.hpp.

14.6.4.24 GetMaxPacketFrame

```
helper::DynFuncHolder< decltype(cloudx1_GetMaxPacketFrame ) > sound4::cloudx1::dyn::CDynLib↩
::GetMaxPacketFrame
```

Definition at line 266 of file sound4.x1.cloud_dyn.hpp.

14.6.4.25 GetMetadataInfos

```
helper::DynFuncHolder< decltype(cloudx1_GetMetadataInfos ) > sound4::cloudx1::dyn::CDynLib::↩
GetMetadataInfos
```

Definition at line 296 of file sound4.x1.cloud_dyn.hpp.

14.6.4.26 GetOutputCount

```
helper::DynFuncHolder< decltype(cloudx1_GetOutputCount ) > sound4::cloudx1::dyn::CDynLib::↩
GetOutputCount
```

Definition at line 269 of file sound4.x1.cloud_dyn.hpp.

14.6.4.27 GetParameter

```
helper::DynFuncHolder< decltype(cloudx1_GetParameter ) > sound4::cloudx1::dyn::CDynLib::Get↩
Parameter
```

Definition at line 249 of file sound4.x1.cloud_dyn.hpp.

14.6.4.28 GetPossibleChunkSizeInFrames

```
helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames ) > sound4::cloudx1↩
::dyn::CDynLib::GetPossibleChunkSizeInFrames
```

Definition at line 304 of file sound4.x1.cloud_dyn.hpp.

14.6.4.29 GetProcessChunkFrames

```
helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames ) > sound4::cloudx1::dyn::CDyn↩
Lib::GetProcessChunkFrames
```

Definition at line 305 of file sound4.x1.cloud_dyn.hpp.

14.6.4.30 GetSampleRate

```
helper::DynFuncHolder< decltype(cloudx1_GetSampleRate ) > sound4::cloudx1::dyn::CDynLib::Get↩
SampleRate
```

Definition at line 243 of file sound4.x1.cloud_dyn.hpp.

14.6.4.31 GetVersion

```
helper::DynFuncHolder< decltype(cloudx1_GetVersion ) > sound4::cloudx1::dyn::CDynLib::Get↩
Version
```

Definition at line 238 of file sound4.x1.cloud_dyn.hpp.

14.6.4.32 InitProcess

```
helper::DynFuncHolder< decltype(cloudx1_InitProcess ) > sound4::cloudx1::dyn::CDynLib::Init↩
Process
```

Definition at line 251 of file sound4.x1.cloud_dyn.hpp.

14.6.4.33 InitProcess2

```
helper::DynFuncHolder< decltype(cloudx1_InitProcess2 ) > sound4::cloudx1::dyn::CDynLib::Init↩
Process2
```

Definition at line 252 of file sound4.x1.cloud_dyn.hpp.

14.6.4.34 InitProcess3

```
helper::DynFuncHolder< decltype(cloudx1_InitProcess3 ) > sound4::cloudx1::dyn::CDynLib::Init↩
Process3
```

Definition at line 306 of file sound4.x1.cloud_dyn.hpp.

14.6.4.35 MonoToStereo

```
helper::DynFuncHolder< decltype(cloudx1_MonoToStereo ) > sound4::cloudx1::dyn::CDynLib::Mono↩
ToStereo
```

Definition at line 274 of file sound4.x1.cloud_dyn.hpp.

14.6.4.36 MonoToStereo_Planar

```
helper::DynFuncHolder< decltype(cloudx1_MonoToStereo_Planar ) > sound4::cloudx1::dyn::CDyn↩
Lib::MonoToStereo_Planar
```

Definition at line 292 of file sound4.x1.cloud_dyn.hpp.

14.6.4.37 NewClient

```
helper::DynFuncHolder< decltype(cloudx1_NewClient ) > sound4::cloudx1::dyn::CDynLib::NewClient
```

Definition at line 277 of file sound4.x1.cloud_dyn.hpp.

14.6.4.38 NewParameters

```
helper::DynFuncHolder< decltype(cloudx1_NewParameters ) > sound4::cloudx1::dyn::CDynLib::New↩
Parameters
```

Definition at line 246 of file sound4.x1.cloud_dyn.hpp.

14.6.4.39 PresetManager_InformChange

```
helper::DynFuncHolder< decltype(cloudx1_PresetManager_InformChange ) > sound4::cloudx1::dyn↩
::CDynLib::PresetManager_InformChange
```

Definition at line 301 of file sound4.x1.cloud_dyn.hpp.

14.6.4.40 ProcessAudio

```
helper::DynFuncHolder< decltype(cloudx1_ProcessAudio ) > sound4::cloudx1::dyn::CDynLib::↩
ProcessAudio
```

Definition at line 258 of file sound4.x1.cloud_dyn.hpp.

14.6.4.41 ProcessAudio_Planar

```
helper::DynFuncHolder< decltype(cloudx1_ProcessAudio_Planar ) > sound4::cloudx1::dyn::CDyn↩
Lib::ProcessAudio_Planar
```

Definition at line 259 of file sound4.x1.cloud_dyn.hpp.

14.6.4.42 ProcessJson

```
helper::DynFuncHolder< decltype(cloudx1_ProcessJson ) > sound4::cloudx1::dyn::CDynLib::↩
ProcessJson
```

Definition at line 279 of file sound4.x1.cloud_dyn.hpp.

14.6.4.43 SaveState

```
helper::DynFuncHolder< decltype(cloudx1_SaveState ) > sound4::cloudx1::dyn::CDynLib::SaveState
```

Definition at line 281 of file sound4.x1.cloud_dyn.hpp.

14.6.4.44 SetInstanceTracing

```
helper::DynFuncHolder< decltype(cloudx1_SetInstanceTracing ) > sound4::cloudx1::dyn::CDynLib↩
::SetInstanceTracing
```

Definition at line 327 of file sound4.x1.cloud_dyn.hpp.

14.6.4.45 SetInstanceTracingProcessActivity

```
helper::DynFuncHolder< decltype(cloudx1_SetInstanceTracingProcessActivity ) > sound4::cloudx1↩
::dyn::CDynLib::SetInstanceTracingProcessActivity
```

Definition at line 328 of file sound4.x1.cloud_dyn.hpp.

14.6.4.46 SetLoggerCallback

```
helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback ) > sound4::cloudx1::dyn::CDynLib↩
::SetLoggerCallback
```

Definition at line 244 of file sound4.x1.cloud_dyn.hpp.

14.6.4.47 SetLogSeverity

```
helper::DynFuncHolder< decltype(cloudx1_SetLogSeverity ) > sound4::cloudx1::dyn::CDynLib::↩
SetLogSeverity
```

Definition at line 245 of file sound4.x1.cloud_dyn.hpp.

14.6.4.48 SetMetadata

```
helper::DynFuncHolder< decltype(cloudx1_SetMetadata ) > sound4::cloudx1::dyn::CDynLib::Set↩
Metadata
```

Definition at line 295 of file sound4.x1.cloud_dyn.hpp.

14.6.4.49 SetMetadataMulti

```
helper::DynFuncHolder< decltype(cloudx1_SetMetadataMulti ) > sound4::cloudx1::dyn::CDynLib::↩
SetMetadataMulti
```

Definition at line 316 of file sound4.x1.cloud_dyn.hpp.

14.6.4.50 SetParameter

```
helper::DynFuncHolder< decltype(cloudx1_SetParameter ) > sound4::cloudx1::dyn::CDynLib::Set↩
Parameter
```

Definition at line 248 of file sound4.x1.cloud_dyn.hpp.

14.6.4.51 SetPresetManager

```
helper::DynFuncHolder< decltype(cloudx1_SetPresetManager ) > sound4::cloudx1::dyn::CDynLib::↩
SetPresetManager
```

Definition at line 300 of file sound4.x1.cloud_dyn.hpp.

14.6.4.52 StartUpdateThread

```
helper::DynFuncHolder< decltype(cloudx1_StartUpdateThread ) > sound4::cloudx1::dyn::CDynLib↩
::StartUpdateThread
```

Definition at line 255 of file sound4.x1.cloud_dyn.hpp.

14.6.4.53 StereoToMono

```
helper::DynFuncHolder< decltype(cloudx1_StereoToMono ) > sound4::cloudx1::dyn::CDynLib::↩
StereoToMono
```

Definition at line 273 of file sound4.x1.cloud_dyn.hpp.

14.6.4.54 StereoToMono_Planar

```
helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar ) > sound4::cloudx1::dyn::CDyn↩
Lib::StereoToMono_Planar
```

Definition at line 291 of file sound4.x1.cloud_dyn.hpp.

14.6.4.55 StopUpdateThread

```
helper::DynFuncHolder< decltype(cloudx1_StopUpdateThread ) > sound4::cloudx1::dyn::CDynLib::↩
StopUpdateThread
```

Definition at line 256 of file sound4.x1.cloud_dyn.hpp.

14.6.4.56 TerminateProcess

```
helper::DynFuncHolder< decltype(cloudx1_TerminateProcess ) > sound4::cloudx1::dyn::CDynLib::↩
TerminateProcess
```

Definition at line 253 of file sound4.x1.cloud_dyn.hpp.

14.6.4.57 WaitUpdateThreadReady

```
helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady ) > sound4::cloudx1::dyn::CDyn↩
Lib::WaitUpdateThreadReady
```

Definition at line 257 of file sound4.x1.cloud_dyn.hpp.

14.6.4.58 Webserver

```
helper::DynFuncHolder< decltype(cloudx1_Webserver ) > sound4::cloudx1::dyn::CDynLib::Webserver
```

Definition at line 285 of file sound4.x1.cloud_dyn.hpp.

14.6.4.59 Webserver_FreeString

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_FreeString ) > sound4::cloudx1::dyn::CDyn↩
Lib::Webserver_FreeString
```

Definition at line 322 of file sound4.x1.cloud_dyn.hpp.

14.6.4.60 Webserver_GetAppHealth

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_GetAppHealth ) > sound4::cloudx1::dyn::↩
CDynLib::Webserver_GetAppHealth
```

Definition at line 321 of file sound4.x1.cloud_dyn.hpp.

14.6.4.61 Webserver_SetAppHealth

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_SetAppHealth ) > sound4::cloudx1::dyn::↩
CDynLib::Webserver_SetAppHealth
```

Definition at line 320 of file sound4.x1.cloud_dyn.hpp.

14.6.4.62 Webserver_Status

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_Status ) > sound4::cloudx1::dyn::CDynLib::↩
Webserver_Status
```

Definition at line 287 of file sound4.x1.cloud_dyn.hpp.

14.6.4.63 Webserver_Stop

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_Stop ) > sound4::cloudx1::dyn::CDynLib::↩
Webserver_Stop
```

Definition at line 286 of file sound4.x1.cloud_dyn.hpp.

14.6.4.64 Webserver_tcp

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp ) > sound4::cloudx1::dyn::CDynLib::↩
Webserver_tcp
```

Definition at line 283 of file sound4.x1.cloud_dyn.hpp.

14.6.4.65 Webserver_tcp2

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp2 ) > sound4::cloudx1::dyn::CDynLib::↩
Webserver_tcp2
```

Definition at line 284 of file sound4.x1.cloud_dyn.hpp.

The documentation for this class was generated from the following file:

- sound4.x1.cloud_dyn.hpp

14.7 sound4::cloudx1::dyn::helper::CDynLoader Class Reference

Helper to load dynamic library.

```
#include <sound4.x1.cloud_dyn.hpp>
```

Public Member Functions

- CDynLoader ()=default
- CDynLoader (CDynLoader &&)=default
- CDynLoader (const CDynLoader &)=delete
- CDynLoader & operator= (CDynLoader const &)=delete
- operator bool () const
- bool IsOk () const
- bool Load (const std::filesystem::path &dynlib, uint32_t loadflags=LOAD_LIBRARY_SEARCH_DLL_LOAD_DIR|LOAD_LIBRAR
- void Close ()
- template<typename T >
  DynFuncHolder< T > GetSymbol (const std::string &name)
- template<typename T >
  DynFuncHolder< T > GetSymbol_safe (const std::string &name)
- virtual ~CDynLoader ()

Static Public Member Functions

- static std::filesystem::path GetThisLibraryPath (void)

14.7.1 Detailed Description

Definition at line 108 of file sound4.x1.cloud_dyn.hpp.

14.7.2 Constructor & Destructor Documentation

14.7.2.1 CDynLoader() [1/3]

```
sound4::cloudx1::dyn::helper::CDynLoader::CDynLoader ( )  [default]
```

14.7.2.2 CDynLoader() [2/3]

```
sound4::cloudx1::dyn::helper::CDynLoader::CDynLoader (
            CDynLoader &&  )  [default]
```

14.7.2.3 CDynLoader() [3/3]

```
sound4::cloudx1::dyn::helper::CDynLoader::CDynLoader (
            const CDynLoader &  )  [delete]
```

14.7.2.4 ~CDynLoader()

```
virtual sound4::cloudx1::dyn::helper::CDynLoader::~CDynLoader ( )  [inline], [virtual]
```

Definition at line 218 of file sound4.x1.cloud_dyn.hpp.

14.7.3 Member Function Documentation

14.7.3.1 Close()

```
void sound4::cloudx1::dyn::helper::CDynLoader::Close ( )  [inline]
```

Definition at line 179 of file sound4.x1.cloud_dyn.hpp.

14.7.3.2 GetSymbol()

```
template<typename T >
DynFuncHolder< T > sound4::cloudx1::dyn::helper::CDynLoader::GetSymbol (
            const std::string & name )  [inline]
```

Definition at line 192 of file sound4.x1.cloud_dyn.hpp.

14.7.3.3 GetSymbol_safe()

```
template<typename T >
DynFuncHolder< T > sound4::cloudx1::dyn::helper::CDynLoader::GetSymbol_safe (
            const std::string & name )  [inline]
```

Definition at line 200 of file sound4.x1.cloud_dyn.hpp.

14.7.3.4 GetThisLibraryPath()

```
static std::filesystem::path sound4::cloudx1::dyn::helper::CDynLoader::GetThisLibraryPath (
            void  )  [inline], [static]
```

Definition at line 204 of file sound4.x1.cloud_dyn.hpp.

14.7.3.5 IsOk()

```
bool sound4::cloudx1::dyn::helper::CDynLoader::IsOk ( ) const  [inline]
```

Definition at line 126 of file sound4.x1.cloud_dyn.hpp.

14.7.3.6 Load()

```
bool sound4::cloudx1::dyn::helper::CDynLoader::Load (
            const std::filesystem::path & dynlib,
            uint32_t loadflags = LOAD_LIBRARY_SEARCH_DLL_LOAD_DIR|LOAD_LIBRARY_SEARCH_APPLICATION_DIR|LOAD_LIB
)  [inline]
```

Definition at line 173 of file sound4.x1.cloud_dyn.hpp.

14.7.3.7 operator bool()

```
sound4::cloudx1::dyn::helper::CDynLoader::operator bool ( ) const  [inline]
```

Definition at line 123 of file sound4.x1.cloud_dyn.hpp.

14.7.3.8 operator=()

```
CDynLoader & sound4::cloudx1::dyn::helper::CDynLoader::operator= (
            CDynLoader const &  )  [delete]
```

The documentation for this class was generated from the following file:

- sound4.x1.cloud_dyn.hpp

14.8 sound4::helper::CDynLoader Class Reference

Helper to load dynamic library.

`#include <sound4cl.hpp>`

Public Member Functions

- CDynLoader ()=default
- CDynLoader (CDynLoader &&)=default
- CDynLoader (const CDynLoader &)=delete
- CDynLoader & operator= (CDynLoader const &)=delete
- operator bool () const
- bool IsOk () const
- bool Load (const std::filesystem::path &dynlib, uint32_t loadflags=LOAD_LIBRARY_SEARCH_DLL_LOAD_DIR|LOAD_LIBRAF
- void Close ()
- template<typename T >
  DynFuncHolder< T > GetSymbol (const std::string &name)
- template<typename T >
  DynFuncHolder< T > GetSymbol_safe (const std::string &name)
- virtual ~CDynLoader ()

Static Public Member Functions

- static std::filesystem::path GetThisLibraryPath (void)

14.8.1 Detailed Description

Definition at line 155 of file sound4cl.hpp.

14.8.2 Constructor & Destructor Documentation

14.8.2.1 CDynLoader() [1/3]

```
sound4::helper::CDynLoader::CDynLoader ( )  [default]
```

14.8.2.2 CDynLoader() [2/3]

```
sound4::helper::CDynLoader::CDynLoader (
            CDynLoader &&  )  [default]
```

14.8.2.3 CDynLoader() [3/3]

```
sound4::helper::CDynLoader::CDynLoader (
            const CDynLoader &  )  [delete]
```

14.8.2.4 ~CDynLoader()

```
virtual sound4::helper::CDynLoader::~CDynLoader ( )  [inline], [virtual]
```

Definition at line 265 of file sound4cl.hpp.

14.8.3 Member Function Documentation

14.8.3.1 Close()

```
void sound4::helper::CDynLoader::Close ( )  [inline]
```

Definition at line 226 of file sound4cl.hpp.

14.8.3.2 GetSymbol()

```
template<typename T >
DynFuncHolder< T > sound4::helper::CDynLoader::GetSymbol (
            const std::string & name )  [inline]
```

Definition at line 239 of file sound4cl.hpp.

14.8.3.3 GetSymbol_safe()

```
template<typename T >
DynFuncHolder< T > sound4::helper::CDynLoader::GetSymbol_safe (
            const std::string & name )  [inline]
```

Definition at line 247 of file sound4cl.hpp.

14.8.3.4 GetThisLibraryPath()

```
static std::filesystem::path sound4::helper::CDynLoader::GetThisLibraryPath (
            void  )  [inline], [static]
```

Definition at line 251 of file sound4cl.hpp.

14.8.3.5 IsOk()

```
bool sound4::helper::CDynLoader::IsOk ( ) const  [inline]
```

Definition at line 173 of file sound4cl.hpp.

14.8.3.6 Load()

```
bool sound4::helper::CDynLoader::Load (
            const std::filesystem::path & dynlib,
            uint32_t loadflags = LOAD_LIBRARY_SEARCH_DLL_LOAD_DIR|LOAD_LIBRARY_SEARCH_APPLICATION_DIR|LOAD_LIB
)  [inline]
```

Definition at line 220 of file sound4cl.hpp.

14.8.3.7 operator bool()

```
sound4::helper::CDynLoader::operator bool ( ) const  [inline]
```

Definition at line 170 of file sound4cl.hpp.

14.8.3.8 operator=()

```
CDynLoader & sound4::helper::CDynLoader::operator= (
            CDynLoader const &  )  [delete]
```

The documentation for this class was generated from the following file:

- sound4cl.hpp

14.9 sound4::CInstance Class Reference

Instance handling class.

`#include <sound4cl.hpp>`

Classes

- class CClient

Public Member Functions

- CInstance (CProcessor &dynlib)
- CInstance (CProcessor &dynlib, void *_instance)
- CInstance (const CInstance &)=delete
- CInstance & operator= (const CInstance &)=delete
- virtual ~CInstance ()
- bool IsOk () const
- void SetParam (const std::string &name, const std::string &value)
- std::string GetParam (const std::string &name)
- void SetBus (const CBus &bus)
- void SetPresetManager (CPresetLoader *preset_manager)
- bool Create (const std::string &LoginKey, const std::string &RadioName, const std::string &Access_Key_ID, const std::string &Access_Key_Secret, const std::filesystem::path &save_path, int json_port=0, unsigned int frames_per_chunk=0)
- unsigned int GetChunkFrames ()
- void PresetManager_InformChange (const std::filesystem::path &relative_path, PresetChange_Kind change_kind)
- void SetMetadata (const std::string &key, const char *value)
- void SetMetadataMulti (const std::unordered_map< std::string, const char * > &list)
- std::vector< std::tuple< std::string, std::string > > GetMetadataInfos ()
- virtual void OnUpdateThreadStart ()
- virtual void OnUpdateThreadStop ()
- bool StartWebServer (int http_port, int https_port=0)
- void StopWebServer (int timeout_ms=1000)
- void SetWebServerAppHealth (int httpcode, const std::string &contenttype, const std::string &content)
- void GetWebServerAppHealth (int &httpcode, std::string &contenttype, std::string &content)
- int Terminate ()
- void Stop ()
- unsigned int GetEstimatedDelay ()
- float * GetBufferIn ()
- float * GetBufferOut ()
- void ProcessAudio ()
- void ProcessAudio_Planar (float const *const *input, float *const *output)
- template<typename T >
  std::vector< T > ProcessAnyAudio (const std::vector< T > input)
- std::shared_ptr< CClient > NewClient ()
- bool SaveState ()
- void SetInstanceTracing (TraceLoggingHProvider tracing_provider, GUID activity_guid={})
- void SetInstanceTracingProcessActivity (GUID activity_guid)

Protected Member Functions

- template<typename T >
  unsigned int AddAudio (const T *payload, unsigned int nFrame)
- template<typename T >
  unsigned int GetAudio (T *payload, unsigned int max_nFrame)

14.9.1 Detailed Description

Holds an instance of processing

Definition at line 900 of file sound4cl.hpp.

14.9.2 Constructor & Destructor Documentation

14.9.2.1 CInstance() [1/3]

```
sound4::CInstance::CInstance (
            CProcessor & dynlib )  [inline]
```

Creates the instance, with default parameters

Parameters

dynlib	the processor dynamic library

Definition at line 907 of file sound4cl.hpp.

14.9.2.2 CInstance() [2/3]

```
sound4::CInstance::CInstance (
            CProcessor & dynlib,
            void * _instance )  [inline]
```

Wrap an already created C instance.

Note

Stop will not stop the instance.

Parameters

dynlib	the processor dynamic library
_instance	the C instance pointer (No check on the pointer is made.)

Definition at line 922 of file sound4cl.hpp.

14.9.2.3 CInstance() [3/3]

```
sound4::CInstance::CInstance (
            const CInstance &  )  [delete]
```

14.9.2.4 ~CInstance()

```
virtual sound4::CInstance::~CInstance ( )  [inline], [virtual]
```

Destructor, stopping any running tasks

Definition at line 934 of file sound4cl.hpp.

14.9.3 Member Function Documentation

14.9.3.1 AddAudio()

```
template<typename T >
unsigned int sound4::CInstance::AddAudio (
            const T * payload,
            unsigned int nFrame )  [inline], [protected]
```

Definition at line 1524 of file sound4cl.hpp.

14.9.3.2 Create()

```
bool sound4::CInstance::Create (
            const std::string & LoginKey,
            const std::string & RadioName,
            const std::string & Access_Key_ID,
            const std::string & Access_Key_Secret,
            const std::filesystem::path & save_path,
            int json_port = 0,
            unsigned int frames_per_chunk = 0 )  [inline]
```

Creates and initialize the instance, and starts its update thread

Attention

The **save_path** must be an existing folder with R/W access, or be NULL (then it uses volatile memory storage) If the save_path is empty or the folder is empty, a default configuration with a default preset will be loaded, unless using SetPresetManager.

If used in a container, we recommend to put a volume for this path, so it will survive updates.

License access

The licenses are retrieved via Internet and access some servers. You may use an alternate server by changing `LICENSE_SERVER` in the parameters.

Parameters

LoginKey	SOUND4 Login key
RadioName	SOUND4 RadioName
Access_Key_ID	SOUND4 AWS access ID
Access_Key_Secret	SOUND4 AWS access Secret
save_path	Path where we can load/save the configuration
json_port	Optional json listening port
frames_per_chunk	The number of audio frames in each chunk of processing. Must be in the list returned by CProcessor::GetChunkSizeInFrames, or 0 to set default

Returns

false if failed

Definition at line 1038 of file sound4cl.hpp.

14.9.3.3 GetAudio()

```
template<typename T >
unsigned int sound4::CInstance::GetAudio (
            T * payload,
            unsigned int max_nFrame )  [inline], [protected]
```

Definition at line 1530 of file sound4cl.hpp.

14.9.3.4 GetBufferIn()

```
float * sound4::CInstance::GetBufferIn ( )  [inline]
```

Get preallocated aligned buffer for audio input for ProcessAudio

The buffer is a big enough for all supported chunk sizes.

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are interlaced, so the buffers are [L0,R0,L1,R1,...,Ln,Rn] (L=Left, R=Right)

In case of multiple audio input/output, buffer is [aL0,aR0,bL0,bR0,...,aLn,aRn,bLn,bRn]

Returns

An audio input dedicated buffer.

Definition at line 1341 of file sound4cl.hpp.

14.9.3.5 GetBufferOut()

```
float * sound4::CInstance::GetBufferOut ( )  [inline]
```

Get preallocated aligned buffer for audio output for ProcessAudio

The buffer is a big enough for all supported chunk sizes.

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are interlaced, so the buffers are [L0,R0,L1,R1,...,Ln,Rn] (L=Left, R=Right)

In case of multiple audio input/output, buffer is [aL0,aR0,bL0,bR0,...,aLn,aRn,bLn,bRn]

Returns

An audio output dedicated buffer.

Definition at line 1358 of file sound4cl.hpp.

14.9.3.6 GetChunkFrames()

```
unsigned int sound4::CInstance::GetChunkFrames ( )  [inline]
```

Get the number of audio frames in each chunk of processing.

The value reflects the frames_per_chunk parameter passed to Create

Returns

the number of audio frames in each chunk of processing

Definition at line 1088 of file sound4cl.hpp.

14.9.3.7 GetEstimatedDelay()

```
unsigned int sound4::CInstance::GetEstimatedDelay ( )  [inline]
```

Get the delay (estimated) of current processing algorithm

Remarks

This is not very accurate, it does not take into account group delays.

But it is sufficient for file processing adjustements.

Changing the preset and parameters may change the returned value.

Returns

Estimated delay in frames

Definition at line 1323 of file sound4cl.hpp.

14.9.3.8 GetMetadataInfos()

```
std::vector< std::tuple< std::string, std::string > > sound4::CInstance::GetMetadataInfos ( )
[inline]
```

Get information on known metadata keys.

Returns

a list of {key,description} of known metadata used in process and extensions.

Definition at line 1176 of file sound4cl.hpp.

14.9.3.9 GetParam()

```
std::string sound4::CInstance::GetParam (
            const std::string & name )  [inline]
```

Gets a parameter value

Parameters

name	the parameter name

Returns

the parameter value

Definition at line 963 of file sound4cl.hpp.

14.9.3.10 GetWebServerAppHealth()

```
void sound4::CInstance::GetWebServerAppHealth (
            int & httpcode,
            std::string & contenttype,
            std::string & content )  [inline]
```

Get the web server /apphealth status info

Definition at line 1269 of file sound4cl.hpp.

14.9.3.11 IsOk()

```
bool sound4::CInstance::IsOk ( ) const  [inline]
```

Returns true if an instance has been created and not stopped.

Definition at line 942 of file sound4cl.hpp.

14.9.3.12 NewClient()

```
std::shared_ptr< CClient > sound4::CInstance::NewClient ( )  [inline]
```

Creates a low-level JSON client

See also JSON syntax

Returns

a new client to communicate with the processing

Definition at line 1474 of file sound4cl.hpp.

14.9.3.13 OnUpdateThreadStart()

```
virtual void sound4::CInstance::OnUpdateThreadStart ( )  [inline], [virtual]
```

Can be overloaded, called at start of UpdateThread in the thread

Definition at line 1200 of file sound4cl.hpp.

14.9.3.14 OnUpdateThreadStop()

```
virtual void sound4::CInstance::OnUpdateThreadStop ( )  [inline], [virtual]
```

Can be overloaded to call at end of UpdateThread in the thread

Definition at line 1204 of file sound4cl.hpp.

14.9.3.15 operator=()

```
CInstance & sound4::CInstance::operator= (
            const CInstance &  )  [delete]
```

14.9.3.16 PresetManager_InformChange()

```
void sound4::CInstance::PresetManager_InformChange (
            const std::filesystem::path & relative_path,
            PresetChange_Kind change_kind )  [inline]
```

Inform that a change happened in the storage. This must be used only in conjonction with SetPresetManager

Parameters

relative_path	The path which changed, relative to the root storage
change_kind	What happened to this path

Definition at line 1102 of file sound4cl.hpp.

14.9.3.17 ProcessAnyAudio()

```
template<typename T >
std::vector< T > sound4::CInstance::ProcessAnyAudio (
            const std::vector< T > input )  [inline]
```

Process audio (different formats, less optimized)

Supports for int16_t, int32_t and float (32) in native endianness

Attention

the return count is independent from the input count

Template Parameters

T	the C type for one audio sample

Parameters

input	audio to process

Returns

processed audio

Definition at line 1400 of file sound4cl.hpp.

14.9.3.18 ProcessAudio()

```
void sound4::CInstance::ProcessAudio ( )  [inline]
```

Process one audio chunk, from GetBufferIn() to GetBufferOut()

Definition at line 1366 of file sound4cl.hpp.

14.9.3.19 ProcessAudio_Planar()

```
void sound4::CInstance::ProcessAudio_Planar (
            float const *const * input,
            float *const * output )  [inline]
```

Process one audio chunk, but with planar audio

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are NOT interlaced, so the buffers are arrays of planar audio : [[L0,L1,...,Ln] , [R0,R1,...,Rn]] (L=Left, R=Right)

In case of multiple audio input/output, buffer are [[aL...], [aR...], [bL...], [bR...], ...]

Parameters

input	has GetAudioInputCount() * GetChannelCount() channels
output	has GetAudioOutputCount() * GetChannelCount() channels

Definition at line 1382 of file sound4cl.hpp.

14.9.3.20 SaveState()

```
bool sound4::CInstance::SaveState ( )  [inline]
```

Save the current state

Needed when CClient::ProcessJson returned with need_save to true. However it can be postponed as much as wanted.

Remarks

Works only when update thread is running

Returns

true if success

Definition at line 1490 of file sound4cl.hpp.

14.9.3.21 SetBus()

```
void sound4::CInstance::SetBus (
            const CBus & bus )  [inline]
```

Set the instance's bus. It can be used by instances to exchange real-time information if needed.

Attention

The bus should be created with the same library

Parameters

bus	the bus to use

Definition at line 980 of file sound4cl.hpp.

14.9.3.22 SetInstanceTracing()

```
void sound4::CInstance::SetInstanceTracing (
            TraceLoggingHProvider tracing_provider,
            GUID activity_guid = {} )  [inline]
```

Set the instance's tracing provider before creating instance

Parameters

activity_guid	the activity guid, used for creation, updates and destruction
tracing_provider	the provider as created with TRACELOGGING_DEFINE_PROVIDER

Definition at line 1504 of file sound4cl.hpp.

14.9.3.23 SetInstanceTracingProcessActivity()

```
void sound4::CInstance::SetInstanceTracingProcessActivity (
            GUID activity_guid )  [inline]
```

Set the instance's process activity for tracing (optional). Should be called only in process's thread.

Parameters

activity_guid	the activity guid

Definition at line 1515 of file sound4cl.hpp.

14.9.3.24 SetMetadata()

```
void sound4::CInstance::SetMetadata (
            const std::string & key,
            const char * value )  [inline]
```

Adds the specific metadata to the process.

It can come from any thread, and will be used as soon as possible. Setting a null value erase the metadata, which is different from setting an empty string.

Parameters

key	the metadata key If key contains a dot (like wm.KEY), it will be sent only to the matching plugin (ie wm here) without the prefix (ie KEY here) Use empty prefix for routing to main only.
value	the metadata value or nullptr to erase it.

Definition at line 1120 of file sound4cl.hpp.

14.9.3.25 SetMetadataMulti()

```
void sound4::CInstance::SetMetadataMulti (
            const std::unordered_map< std::string, const char * > & list )  [inline]
```

Adds multiple metadata to the process.

This works like SetMetadata but with multiple metadata at once.

See also

CInstance::SetMetadata

Parameters

list	a map of key/value pair.

Definition at line 1140 of file sound4cl.hpp.

14.9.3.26 SetParam()

```
void sound4::CInstance::SetParam (
            const std::string & name,
            const std::string & value )  [inline]
```

Set a parameter value

Must be done before Create See also Environment variables and parameters

Parameters

name	the parameter name
value	the parameter value

Definition at line 952 of file sound4cl.hpp.

14.9.3.27 SetPresetManager()

```
void sound4::CInstance::SetPresetManager (
            CPresetLoader * preset_manager )  [inline]
```

Sets a custom preset manager Optional, this overrides the `save_path` in Create

To dynamically update when storage change, see PresetManager_InformChange

Must be done before Create

Parameters

preset_manager	The custom preset manager

Definition at line 997 of file sound4cl.hpp.

14.9.3.28 SetWebServerAppHealth()

```
void sound4::CInstance::SetWebServerAppHealth (
            int httpcode,
```

```
            const std::string & contenttype,
            const std::string & content )  [inline]
```

Set the web server /apphealth status info

Definition at line 1260 of file sound4cl.hpp.

14.9.3.29 StartWebServer()

```
bool sound4::CInstance::StartWebServer (
            int http_port,
            int https_port = 0 )  [inline]
```

Starts a Web server on requested ports

For secure connection, it will use privatekey.pem and certificate.pem from current directory. Environment variables `SSL_PRIVATE_PATH` and `SSL_CERTIFICATE_PATH` can override those (see Environment variables and parameters). If none is valid, it will try also /etc/ssl/certs/server.key and /etc/ssl/certs/server.crt.

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

http_port	The port to listen for HTTP connections (0 to disable)
https_port	The port to listen for HTTPS connections (0 to disable)

Returns

true if ports were opened successfully.

Definition at line 1220 of file sound4cl.hpp.

14.9.3.30 Stop()

```
void sound4::CInstance::Stop ( )  [inline]
```

Stops the instance, its web server and its update thread.

Note

Stop will not stop a wrapped C instance

Definition at line 1300 of file sound4cl.hpp.

14.9.3.31 StopWebServer()

```
void sound4::CInstance::StopWebServer (
            int timeout_ms = 1000 )  [inline]
```

Stop a web server started with StartWebServer

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

timeout_ms	The timeout to wait gracefull shutdown

Definition at line 1248 of file sound4cl.hpp.

14.9.3.32 Terminate()

```
int sound4::CInstance::Terminate ( )  [inline]
```

Terminate the processing.

This is useful only with file processing, to get the final status. For some plugins, this is mandatory

Returns

0 is success, <0 if error, >0 if some status

Definition at line 1289 of file sound4cl.hpp.

The documentation for this class was generated from the following file:

- sound4cl.hpp

14.10 sound4::cloudx1::CInstance Class Reference

Instance handling class.

```
#include <sound4.x1.cloud.hpp>
```

Classes

- class CClient

Public Member Functions

- CInstance ()
- CInstance (const CInstance &)=delete
- CInstance & operator= (const CInstance &)=delete
- virtual ~CInstance ()
- bool IsOk () const
- void SetParam (const std::string &name, const std::string &value)
- std::string GetParam (const std::string &name)
- void SetPresetManager (CPresetLoader *preset_manager)
- bool Create (const std::string &LoginKey, const std::string &RadioName, const std::string &Access_Key_ID, const std::string &Access_Key_Secret, const std::filesystem::path &save_path, int json_port=0, unsigned int frames_per_chunk=64)
- unsigned int GetChunkFrames ()
- void PresetManager_InformChange (const std::filesystem::path &relative_path, PresetChange_Kind change_kind)
- void SetMetadata (const std::string &key, const char *value)
- void SetMetadataMulti (const std::unordered_map< std::string, const char * > &list)
- std::vector< std::tuple< std::string, std::string > > GetMetadataInfos ()
- std::vector< AuxiliaryOutputInfos > GetAuxiliaryAudioOutputInfos ()
- void ActivateAuxiliaryAudioID (const std::string &id)
- virtual void OnUpdateThreadStart ()
- virtual void OnUpdateThreadStop ()
- bool StartWebServer (int http_port, int https_port=0)
- void StopWebServer (int timeout_ms=1000)
- void SetWebServerAppHealth (int httpcode, const std::string &contenttype, const std::string &content)
- void GetWebServerAppHealth (int &httpcode, std::string &contenttype, std::string &content)
- int Terminate ()
- void Stop ()
- unsigned int GetEstimatedDelay ()
- std::array< float, InputSampleSize > & GetBufferIn ()
- std::array< float, OutputSampleSize > & GetBufferOut ()
- void ProcessAudio ()
- void ProcessAudio_Planar (float const *const *input, float *const *output)
- template<typename T >
  std::vector< T > ProcessAnyAudio (const std::vector< T > input)
- std::shared_ptr< CClient > NewClient ()
- bool SaveState ()
- void SetInstanceTracing (TraceLoggingHProvider tracing_provider, GUID activity_guid={})
- void SetInstanceTracingProcessActivity (GUID activity_guid)

Protected Member Functions

- template<typename T >
  unsigned int AddAudio (const T *payload, unsigned int nFrame)
- template<typename T >
  unsigned int GetAudio (T *payload, unsigned int max_nFrame)

14.10.1 Detailed Description

Holds an instance of processing

Definition at line 478 of file sound4.x1.cloud.hpp.

14.10.2 Constructor & Destructor Documentation

14.10.2.1 CInstance() [1/2]

```
sound4::cloudx1::CInstance::CInstance ( )  [inline]
```

Creates the instance, with default parameters

Definition at line 483 of file sound4.x1.cloud.hpp.

14.10.2.2 CInstance() [2/2]

```
sound4::cloudx1::CInstance::CInstance (
            const CInstance &  )  [delete]
```

14.10.2.3 ~CInstance()

```
virtual sound4::cloudx1::CInstance::~CInstance ( )  [inline], [virtual]
```

Destructor, stopping any running tasks

Definition at line 494 of file sound4.x1.cloud.hpp.

14.10.3 Member Function Documentation

14.10.3.1 ActivateAuxiliaryAudioID()

```
void sound4::cloudx1::CInstance::ActivateAuxiliaryAudioID (
            const std::string & id )  [inline]
```

Definition at line 759 of file sound4.x1.cloud.hpp.

14.10.3.2 AddAudio()

```
template<typename T >
unsigned int sound4::cloudx1::CInstance::AddAudio (
            const T * payload,
            unsigned int nFrame )  [inline], [protected]
```

Definition at line 1080 of file sound4.x1.cloud.hpp.

14.10.3.3 Create()

```
bool sound4::cloudx1::CInstance::Create (
            const std::string & LoginKey,
            const std::string & RadioName,
            const std::string & Access_Key_ID,
            const std::string & Access_Key_Secret,
            const std::filesystem::path & save_path,
            int json_port = 0,
            unsigned int frames_per_chunk = 64 )  [inline]
```

Creates and initialize the instance, and starts its update thread

Attention

The **save_path** must be an existing folder with R/W access, or be NULL (then it uses volatile memory storage) If the save_path is empty or the folder is empty, a default configuration with a default preset will be loaded, unless using SetPresetManager.

If used in a container, we recommend to put a volume for this path, so it will survive updates.

License access

The licenses are retrieved via Internet and access some servers. You may use an alternate server by changing `LICENSE_SERVER` in the parameters.

Parameters

LoginKey	SOUND4 Login key
RadioName	SOUND4 RadioName
Access_Key_ID	SOUND4 AWS access ID
Access_Key_Secret	SOUND4 AWS access Secret
save_path	Path where we can load/save the configuration
json_port	Optional json listening port
frames_per_chunk	The number of audio frames in each chunk of processing. Must be in the list returned by cloudx1_GetPossibleChunkSizeInFrames, or 0 to set default

Returns

false if failed

Definition at line 597 of file sound4.x1.cloud.hpp.

14.10.3.4 GetAudio()

```
template<typename T >
unsigned int sound4::cloudx1::CInstance::GetAudio (
            T * payload,
            unsigned int max_nFrame )  [inline], [protected]
```

Definition at line 1086 of file sound4.x1.cloud.hpp.

14.10.3.5 GetAuxiliaryAudioOutputInfos()

```
std::vector< AuxiliaryOutputInfos > sound4::cloudx1::CInstance::GetAuxiliaryAudioOutputInfos (
) [inline]
```

Get information on auxiliary audio outputs.

Returns

a list of AuxiliaryOutputInfos

Definition at line 740 of file sound4.x1.cloud.hpp.

14.10.3.6 GetBufferIn()

```
std::array< float, InputSampleSize > & sound4::cloudx1::CInstance::GetBufferIn ( ) [inline]
```

Get preallocated aligned buffer for audio input for ProcessAudio

The buffer is a big enough for all supported chunk sizes.

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are interlaced, so the buffers are [L0,R0,L1,R1,...,Ln,Rn] (L=Left, R=Right)

In case of multiple audio input/output, buffer is [aL0,aR0,bL0,bR0,...,aLn,aRn,bLn,bRn]

Returns

An audio input dedicated buffer.

Definition at line 901 of file sound4.x1.cloud.hpp.

14.10.3.7 GetBufferOut()

```
std::array< float, OutputSampleSize > & sound4::cloudx1::CInstance::GetBufferOut ( ) [inline]
```

Get preallocated aligned buffer for audio output for ProcessAudio

The buffer is a big enough for all supported chunk sizes.

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are interlaced, so the buffers are [L0,R0,L1,R1,...,Ln,Rn] (L=Left, R=Right)

In case of multiple audio input/output, buffer is [aL0,aR0,bL0,bR0,...,aLn,aRn,bLn,bRn]

Returns

An audio output dedicated buffer.

Definition at line 919 of file sound4.x1.cloud.hpp.

14.10.3.8 GetChunkFrames()

```
unsigned int sound4::cloudx1::CInstance::GetChunkFrames ( )  [inline]
```

Get the number of audio frames in each chunk of processing.

The value reflects the frames_per_chunk parameter passed to Create

Returns

the number of audio frames in each chunk of processing

Definition at line 638 of file sound4.x1.cloud.hpp.

14.10.3.9 GetEstimatedDelay()

```
unsigned int sound4::cloudx1::CInstance::GetEstimatedDelay ( )  [inline]
```

Get the delay (estimated) of current processing algorithm

Remarks

This is not very accurate, it does not take into account group delays.

But it is sufficient for file processing adjustements.

Changing the preset and parameters may change the returned value.

Returns

Estimated delay in frames

Definition at line 883 of file sound4.x1.cloud.hpp.

14.10.3.10 GetMetadataInfos()

```
std::vector< std::tuple< std::string, std::string > > sound4::cloudx1::CInstance::GetMetadata↩
Infos ( )  [inline]
```

Get information on known metadata keys.

Returns

a list of {key,description} of known metadata used in process and extensions.

Definition at line 716 of file sound4.x1.cloud.hpp.

14.10.3.11 GetParam()

```
std::string sound4::cloudx1::CInstance::GetParam (
            const std::string & name )  [inline]
```

Gets a parameter value

Parameters

name	the parameter name

Returns

the parameter value

Definition at line 523 of file sound4.x1.cloud.hpp.

14.10.3.12 GetWebServerAppHealth()

```
void sound4::cloudx1::CInstance::GetWebServerAppHealth (
            int & httpcode,
            std::string & contenttype,
            std::string & content )  [inline]
```

Get the web server /apphealth status info

Definition at line 830 of file sound4.x1.cloud.hpp.

14.10.3.13 IsOk()

```
bool sound4::cloudx1::CInstance::IsOk ( ) const  [inline]
```

Returns true if an instance has been created and not stopped.

Definition at line 502 of file sound4.x1.cloud.hpp.

14.10.3.14 NewClient()

```
std::shared_ptr< CClient > sound4::cloudx1::CInstance::NewClient ( )  [inline]
```

Creates a low-level JSON client

See also JSON syntax

Returns

a new client to communicate with the processing

Definition at line 1034 of file sound4.x1.cloud.hpp.

14.10.3.15 OnUpdateThreadStart()

```
virtual void sound4::cloudx1::CInstance::OnUpdateThreadStart ( )  [inline], [virtual]
```

Can be overloaded, called at start of UpdateThread in the thread

Definition at line 766 of file sound4.x1.cloud.hpp.

14.10.3.16 OnUpdateThreadStop()

```
virtual void sound4::cloudx1::CInstance::OnUpdateThreadStop ( )  [inline], [virtual]
```

Can be overloaded to call at end of UpdateThread in the thread

Definition at line 770 of file sound4.x1.cloud.hpp.

14.10.3.17 operator=()

```
CInstance & sound4::cloudx1::CInstance::operator= (
            const CInstance &  )  [delete]
```

14.10.3.18 PresetManager_InformChange()

```
void sound4::cloudx1::CInstance::PresetManager_InformChange (
            const std::filesystem::path & relative_path,
            PresetChange_Kind change_kind )  [inline]
```

Inform that a change happened in the storage. This must be used only in conjonction with SetPresetManager

Parameters

relative_path	The path which changed, relative to the root storage
change_kind	What happened to this path

Definition at line 652 of file sound4.x1.cloud.hpp.

14.10.3.19 ProcessAnyAudio()

```
template<typename T >
std::vector< T > sound4::cloudx1::CInstance::ProcessAnyAudio (
            const std::vector< T > input )  [inline]
```

Process audio (different formats, less optimized)

Supports for int16_t, int32_t and float (32) in native endianness

Attention

the return count is independent from the input count due to CLOUDX1_AUDIOFRAME_COUNT

Template Parameters

T	the C type for one audio sample

Parameters

input	audio to process

Returns

processed audio

Definition at line 962 of file sound4.x1.cloud.hpp.

14.10.3.20 ProcessAudio()

```
void sound4::cloudx1::CInstance::ProcessAudio ( )  [inline]
```

Process one audio chunk, from GetBufferIn() to GetBufferOut()

Definition at line 928 of file sound4.x1.cloud.hpp.

14.10.3.21 ProcessAudio_Planar()

```
void sound4::cloudx1::CInstance::ProcessAudio_Planar (
            float const *const * input,
            float *const * output )  [inline]
```

Process one audio chunk, but with planar audio

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are NOT interlaced, so the buffers are arrays of planar audio : [[L0,L1,...,Ln] , [R0,R1,...,Rn]] (L=Left, R=Right)

In case of multiple audio input/output, buffer are [[aL...], [aR...], [bL...], [bR...], ...]

Parameters

input	has GetAudioInputCount() * GetChannelCount() channels
output	has GetAudioOutputCount() * GetChannelCount() channels

Definition at line 944 of file sound4.x1.cloud.hpp.

14.10.3.22 SaveState()

```
bool sound4::cloudx1::CInstance::SaveState ( )  [inline]
```

Save the current state

Needed when CClient::ProcessJson returned with need_save to true. However it can be postponed as much as wanted.

Remarks

Works only when update thread is running

Returns

true if success

Definition at line 1050 of file sound4.x1.cloud.hpp.

14.10.3.23 SetInstanceTracing()

```
void sound4::cloudx1::CInstance::SetInstanceTracing (
            TraceLoggingHProvider tracing_provider,
            GUID activity_guid = {} )  [inline]
```

Set the instance's tracing provider before creating instance

Parameters

activity_guid	the activity guid, used for creation, updates and destruction
tracing_provider	the provider as created with TRACELOGGING_DEFINE_PROVIDER

Definition at line 1064 of file sound4.x1.cloud.hpp.

14.10.3.24 SetInstanceTracingProcessActivity()

```
void sound4::cloudx1::CInstance::SetInstanceTracingProcessActivity (
            GUID activity_guid )  [inline]
```

Set the instance's process activity for tracing (optional). Should be called only in process's thread.

Parameters

activity_guid	the activity guid

Definition at line 1073 of file sound4.x1.cloud.hpp.

14.10.3.25 SetMetadata()

```
void sound4::cloudx1::CInstance::SetMetadata (
            const std::string & key,
            const char * value )  [inline]
```

Adds the specific metadata to the process.

It can come from any thread, and will be used as soon as possible. Setting a null value erase the metadata, which is different from setting an empty string.

Parameters

key	the metadata key If key contains a dot (like wm.KEY), it will be sent only to the matching plugin (ie wm here) without the prefix (ie KEY here) Use empty prefix for routing to main only.
value	the metadata value or nullptr to erase it.

Definition at line 668 of file sound4.x1.cloud.hpp.

14.10.3.26 SetMetadataMulti()

```
void sound4::cloudx1::CInstance::SetMetadataMulti (
            const std::unordered_map< std::string, const char * > & list )  [inline]
```

Adds multiple metadata to the process.

This works like SetMetadata but with multiple metadata at once.

See also

CInstance::SetMetadata

Parameters

list	a map of key/value pair.

Definition at line 686 of file sound4.x1.cloud.hpp.

14.10.3.27 SetParam()

```
void sound4::cloudx1::CInstance::SetParam (
            const std::string & name,
            const std::string & value )  [inline]
```

Set a parameter value

Must be done before Create See also Environment variables and parameters

Parameters

name	the parameter name
value	the parameter value

Definition at line 512 of file sound4.x1.cloud.hpp.

14.10.3.28 SetPresetManager()

```
void sound4::cloudx1::CInstance::SetPresetManager (
            CPresetLoader * preset_manager )  [inline]
```

Sets a custom preset manager Optional, this overrides the `save_path` in Create

To dynamically update when storage change, see PresetManager_InformChange

Must be done before Create

Parameters

preset_manager	The custom preset manager

Definition at line 557 of file sound4.x1.cloud.hpp.

14.10.3.29 SetWebServerAppHealth()

```
void sound4::cloudx1::CInstance::SetWebServerAppHealth (
            int httpcode,
            const std::string & contenttype,
            const std::string & content )  [inline]
```

Set the web server /apphealth status info

Definition at line 822 of file sound4.x1.cloud.hpp.

14.10.3.30 StartWebServer()

```
bool sound4::cloudx1::CInstance::StartWebServer (
            int http_port,
            int https_port = 0 )  [inline]
```

Starts a Web server on requested ports

For secure connection, it will use privatekey.pem and certificate.pem from current directory. Environment variables `SSL_PRIVATE_PATH` and `SSL_CERTIFICATE_PATH` can override those (see Environment variables and parameters). If none is valid, it will try also /etc/ssl/certs/server.key and /etc/ssl/certs/server.crt.

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

http_port	The port to listen for HTTP connections (0 to disable)
https_port	The port to listen for HTTPS connections (0 to disable)

Returns

true if ports were opened successfully.

Definition at line 786 of file sound4.x1.cloud.hpp.

14.10.3.31 Stop()

```
void sound4::cloudx1::CInstance::Stop ( )  [inline]
```

Stops the instance, its web server and its update thread.

Definition at line 860 of file sound4.x1.cloud.hpp.

14.10.3.32 StopWebServer()

```
void sound4::cloudx1::CInstance::StopWebServer (
            int timeout_ms = 1000 )  [inline]
```

Stop a web server started with StartWebServer

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

timeout_ms	The timeout to wait gracefull shutdown

Definition at line 811 of file sound4.x1.cloud.hpp.

14.10.3.33 Terminate()

```
int sound4::cloudx1::CInstance::Terminate ( )  [inline]
```

Terminate the processing.

This is useful only with file processing, to get the final status. For some plugins, this is mandatory

Returns

0 is success, <0 if error, >0 if some status

Definition at line 851 of file sound4.x1.cloud.hpp.

The documentation for this class was generated from the following file:

- sound4.x1.cloud.hpp

14.11 sound4::cloudx1::dyn::CInstance Class Reference

Instance handling class.

```
#include <sound4.x1.cloud_dyn.hpp>
```

Classes

- class CClient

Public Member Functions

- CInstance (CDynLib &dynlib)
- CInstance (const CInstance &)=delete
- CInstance & operator= (const CInstance &)=delete
- virtual ~CInstance ()
- bool IsOk () const
- void SetParam (const std::string &name, const std::string &value)
- std::string GetParam (const std::string &name)
- void SetPresetManager (CPresetLoader *preset_manager)
- bool Create (const std::string &LoginKey, const std::string &RadioName, const std::string &Access_Key_ID, const std::string &Access_Key_Secret, const std::filesystem::path &save_path, int json_port=0, unsigned int frames_per_chunk=64)
- unsigned int GetChunkFrames ()
- void PresetManager_InformChange (const std::filesystem::path &relative_path, PresetChange_Kind change_kind)
- void SetMetadata (const std::string &key, const char *value)
- void SetMetadataMulti (const std::unordered_map< std::string, const char * > &list)
- std::vector< std::tuple< std::string, std::string > > GetMetadataInfos ()
- virtual void OnUpdateThreadStart ()
- virtual void OnUpdateThreadStop ()
- bool StartWebServer (int http_port, int https_port=0)
- void StopWebServer (int timeout_ms=1000)
- void SetWebServerAppHealth (int httpcode, const std::string &contenttype, const std::string &content)
- void GetWebServerAppHealth (int &httpcode, std::string &contenttype, std::string &content)
- int Terminate ()
- void Stop ()
- unsigned int GetEstimatedDelay ()
- std::array< float, InputSampleSize > & GetBufferIn ()
- std::array< float, OutputSampleSize > & GetBufferOut ()
- void ProcessAudio ()
- void ProcessAudio_Planar (float const *const *input, float *const *output)
- template<typename T >
  std::vector< T > ProcessAnyAudio (const std::vector< T > input)
- std::shared_ptr< CClient > NewClient ()
- bool SaveState ()
- void SetInstanceTracing (TraceLoggingHProvider tracing_provider, GUID activity_guid={})
- void SetInstanceTracingProcessActivity (GUID activity_guid)

Protected Member Functions

- template<typename T >
  unsigned int AddAudio (const T *payload, unsigned int nFrame)
- template<typename T >
  unsigned int GetAudio (T *payload, unsigned int max_nFrame)

14.11.1 Detailed Description

Holds an instance of processing

Definition at line 944 of file sound4.x1.cloud_dyn.hpp.

14.11.2 Constructor & Destructor Documentation

14.11.2.1 CInstance() [1/2]

```
sound4::cloudx1::dyn::CInstance::CInstance (
            CDynLib & dynlib )  [inline]
```

Creates the instance, with default parameters

Definition at line 949 of file sound4.x1.cloud_dyn.hpp.

14.11.2.2 CInstance() [2/2]

```
sound4::cloudx1::dyn::CInstance::CInstance (
            const CInstance &  )  [delete]
```

14.11.2.3 ~CInstance()

```
virtual sound4::cloudx1::dyn::CInstance::~CInstance ( )  [inline], [virtual]
```

Destructor, stopping any running tasks

Definition at line 961 of file sound4.x1.cloud_dyn.hpp.

14.11.3 Member Function Documentation

14.11.3.1 AddAudio()

```
template<typename T >
unsigned int sound4::cloudx1::dyn::CInstance::AddAudio (
            const T * payload,
            unsigned int nFrame )  [inline], [protected]
```

Definition at line 1548 of file sound4.x1.cloud_dyn.hpp.

14.11.3.2 Create()

```
bool sound4::cloudx1::dyn::CInstance::Create (
            const std::string & LoginKey,
            const std::string & RadioName,
            const std::string & Access_Key_ID,
            const std::string & Access_Key_Secret,
            const std::filesystem::path & save_path,
            int json_port = 0,
            unsigned int frames_per_chunk = 64 )  [inline]
```

Creates and initialize the instance, and starts its update thread

Attention

The **save_path** must be an existing folder with R/W access, or be NULL (then it uses volatile memory storage) If the save_path is empty or the folder is empty, a default configuration with a default preset will be loaded, unless using SetPresetManager.

If used in a container, we recommend to put a volume for this path, so it will survive updates.

License access

The licenses are retrieved via Internet and access some servers. You may use an alternate server by changing `LICENSE_SERVER` in the parameters.

Parameters

LoginKey	SOUND4 Login key
RadioName	SOUND4 RadioName
Access_Key_ID	SOUND4 AWS access ID
Access_Key_Secret	SOUND4 AWS access Secret
save_path	Path where we can load/save the configuration
json_port	Optional json listening port
frames_per_chunk	The number of audio frames in each chunk of processing. Must be in the list returned by cloudx1_GetPossibleChunkSizeInFrames, or 0 to set default

Returns

false if failed

Definition at line 1066 of file sound4.x1.cloud_dyn.hpp.

14.11.3.3 GetAudio()

```
template<typename T >
unsigned int sound4::cloudx1::dyn::CInstance::GetAudio (
            T * payload,
            unsigned int max_nFrame )  [inline], [protected]
```

Definition at line 1554 of file sound4.x1.cloud_dyn.hpp.

14.11.3.4 GetBufferIn()

```
std::array< float, InputSampleSize > & sound4::cloudx1::dyn::CInstance::GetBufferIn ( )  [inline]
```

Get preallocated aligned buffer for audio input for ProcessAudio

The buffer is a big enough for all supported chunk sizes.

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are interlaced, so the buffers are [L0,R0,L1,R1,...,Ln,Rn] (L=Left, R=Right)

In case of multiple audio input/output, buffer is [aL0,aR0,bL0,bR0,...,aLn,aRn,bLn,bRn]

Returns

An audio input dedicated buffer.

Definition at line 1363 of file sound4.x1.cloud_dyn.hpp.

14.11.3.5 GetBufferOut()

```
std::array< float, OutputSampleSize > & sound4::cloudx1::dyn::CInstance::GetBufferOut ( )
[inline]
```

Get preallocated aligned buffer for audio output for ProcessAudio

The buffer is a big enough for all supported chunk sizes.

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are interlaced, so the buffers are [L0,R0,L1,R1,...,Ln,Rn] (L=Left, R=Right)

In case of multiple audio input/output, buffer is [aL0,aR0,bL0,bR0,...,aLn,aRn,bLn,bRn]

Returns

An audio output dedicated buffer.

Definition at line 1381 of file sound4.x1.cloud_dyn.hpp.

14.11.3.6 GetChunkFrames()

```
unsigned int sound4::cloudx1::dyn::CInstance::GetChunkFrames ( )  [inline]
```

Get the number of audio frames in each chunk of processing.

The value reflects the frames_per_chunk parameter passed to Create

Returns

the number of audio frames in each chunk of processing

Definition at line 1113 of file sound4.x1.cloud_dyn.hpp.

14.11.3.7 GetEstimatedDelay()

```
unsigned int sound4::cloudx1::dyn::CInstance::GetEstimatedDelay ( )  [inline]
```

Get the delay (estimated) of current processing algorithm

Remarks

This is not very accurate, it does not take into account group delays.

But it is sufficient for file processing adjustements.

Changing the preset and parameters may change the returned value.

Returns

Estimated delay in frames

Definition at line 1345 of file sound4.x1.cloud_dyn.hpp.

14.11.3.8 GetMetadataInfos()

```
std::vector< std::tuple< std::string, std::string > > sound4::cloudx1::dyn::CInstance::Get↩
MetadataInfos ( )  [inline]
```

Get information on known metadata keys.

Returns

a list of {key,description} of known metadata used in process and extensions.

Definition at line 1202 of file sound4.x1.cloud_dyn.hpp.

14.11.3.9 GetParam()

```
std::string sound4::cloudx1::dyn::CInstance::GetParam (
            const std::string & name )  [inline]
```

Gets a parameter value

Parameters

name	the parameter name

Returns

the parameter value

Definition at line 990 of file sound4.x1.cloud_dyn.hpp.

14.11.3.10 GetWebServerAppHealth()

```
void sound4::cloudx1::dyn::CInstance::GetWebServerAppHealth (
            int & httpcode,
            std::string & contenttype,
            std::string & content )  [inline]
```

Get the web server /apphealth status info

Definition at line 1291 of file sound4.x1.cloud_dyn.hpp.

14.11.3.11 IsOk()

```
bool sound4::cloudx1::dyn::CInstance::IsOk ( ) const  [inline]
```

Returns true if an instance has been created and not stopped.

Definition at line 969 of file sound4.x1.cloud_dyn.hpp.

14.11.3.12 NewClient()

```
std::shared_ptr< CClient > sound4::cloudx1::dyn::CInstance::NewClient ( )  [inline]
```

Creates a low-level JSON client

See also JSON syntax

Returns

a new client to communicate with the processing

Definition at line 1498 of file sound4.x1.cloud_dyn.hpp.

14.11.3.13 OnUpdateThreadStart()

```
virtual void sound4::cloudx1::dyn::CInstance::OnUpdateThreadStart ( )  [inline], [virtual]
```

Can be overloaded, called at start of UpdateThread in the thread

Definition at line 1226 of file sound4.x1.cloud_dyn.hpp.

14.11.3.14 OnUpdateThreadStop()

```
virtual void sound4::cloudx1::dyn::CInstance::OnUpdateThreadStop ( )  [inline], [virtual]
```

Can be overloaded to call at end of UpdateThread in the thread

Definition at line 1230 of file sound4.x1.cloud_dyn.hpp.

14.11.3.15 operator=()

```
CInstance & sound4::cloudx1::dyn::CInstance::operator= (
            const CInstance &  )  [delete]
```

14.11.3.16 PresetManager_InformChange()

```
void sound4::cloudx1::dyn::CInstance::PresetManager_InformChange (
            const std::filesystem::path & relative_path,
            PresetChange_Kind change_kind )  [inline]
```

Inform that a change happened in the storage. This must be used only in conjonction with SetPresetManager

Parameters

relative_path	The path which changed, relative to the root storage
change_kind	What happened to this path

Definition at line 1127 of file sound4.x1.cloud_dyn.hpp.

14.11.3.17 ProcessAnyAudio()

```
template<typename T >
std::vector< T > sound4::cloudx1::dyn::CInstance::ProcessAnyAudio (
            const std::vector< T > input )  [inline]
```

Process audio (different formats, less optimized)

Supports for int16_t, int32_t and float (32) in native endianness

Attention

the return count is independent from the input count due to CLOUDX1_AUDIOFRAME_COUNT

Template Parameters

T	the C type for one audio sample

Parameters

input	audio to process

Returns

processed audio

Definition at line 1424 of file sound4.x1.cloud_dyn.hpp.

14.11.3.18 ProcessAudio()

```
void sound4::cloudx1::dyn::CInstance::ProcessAudio ( )  [inline]
```

Process one audio chunk, from GetBufferIn() to GetBufferOut()

Definition at line 1390 of file sound4.x1.cloud_dyn.hpp.

14.11.3.19 ProcessAudio_Planar()

```
void sound4::cloudx1::dyn::CInstance::ProcessAudio_Planar (
            float const *const * input,
            float *const * output )  [inline]
```

Process one audio chunk, but with planar audio

Each sample is a native 32-bit floating-point number where 1.0 is full scale. Channels are NOT interlaced, so the buffers are arrays of planar audio : [[L0,L1,...,Ln] , [R0,R1,...,Rn]] (L=Left, R=Right)

In case of multiple audio input/output, buffer are [[aL...], [aR...], [bL...], [bR...], ...]

Parameters

input	has GetAudioInputCount() * GetChannelCount() channels
output	has GetAudioOutputCount() * GetChannelCount() channels

Definition at line 1406 of file sound4.x1.cloud_dyn.hpp.

14.11.3.20 SaveState()

```
bool sound4::cloudx1::dyn::CInstance::SaveState ( )  [inline]
```

Save the current state

Needed when CClient::ProcessJson returned with need_save to true. However it can be postponed as much as wanted.

Remarks

Works only when update thread is running

Returns

true if success

Definition at line 1514 of file sound4.x1.cloud_dyn.hpp.

14.11.3.21 SetInstanceTracing()

```
void sound4::cloudx1::dyn::CInstance::SetInstanceTracing (
            TraceLoggingHProvider tracing_provider,
            GUID activity_guid = {} )  [inline]
```

Set the instance's tracing provider before creating instance

Parameters

activity_guid	the activity guid, used for creation, updates and destruction
tracing_provider	the provider as created with TRACELOGGING_DEFINE_PROVIDER

Definition at line 1528 of file sound4.x1.cloud_dyn.hpp.

14.11.3.22 SetInstanceTracingProcessActivity()

```
void sound4::cloudx1::dyn::CInstance::SetInstanceTracingProcessActivity (
            GUID activity_guid )  [inline]
```

Set the instance's process activity for tracing (optional). Should be called only in process's thread.

Parameters

activity_guid	the activity guid

Definition at line 1539 of file sound4.x1.cloud_dyn.hpp.

14.11.3.23 SetMetadata()

```
void sound4::cloudx1::dyn::CInstance::SetMetadata (
            const std::string & key,
            const char * value )  [inline]
```

Adds the specific metadata to the process.

It can come from any thread, and will be used as soon as possible. Setting a null value erase the metadata, which is different from setting an empty string.

Parameters

key	the metadata key If key contains a dot (like wm.KEY), it will be sent only to the matching plugin (ie wm here) without the prefix (ie KEY here) Use empty prefix for routing to main only.
value	the metadata value or nullptr to erase it.

Definition at line 1145 of file sound4.x1.cloud_dyn.hpp.

14.11.3.24 SetMetadataMulti()

```
void sound4::cloudx1::dyn::CInstance::SetMetadataMulti (
            const std::unordered_map< std::string, const char * > & list )  [inline]
```

Adds multiple metadata to the process.

This works like SetMetadata but with multiple metadata at once.

See also

CInstance::SetMetadata

Parameters

list	a map of key/value pair.

Definition at line 1166 of file sound4.x1.cloud_dyn.hpp.

14.11.3.25 SetParam()

```
void sound4::cloudx1::dyn::CInstance::SetParam (
            const std::string & name,
            const std::string & value )  [inline]
```

Set a parameter value

Must be done before Create See also Environment variables and parameters

Parameters

name	the parameter name
value	the parameter value

Definition at line 979 of file sound4.x1.cloud_dyn.hpp.

14.11.3.26 SetPresetManager()

```
void sound4::cloudx1::dyn::CInstance::SetPresetManager (
            CPresetLoader * preset_manager )  [inline]
```

Sets a custom preset manager Optional, this overrides the `save_path` in Create

To dynamically update when storage change, see PresetManager_InformChange

Must be done before Create

Parameters

preset_manager	The custom preset manager

Definition at line 1025 of file sound4.x1.cloud_dyn.hpp.

14.11.3.27 SetWebServerAppHealth()

```
void sound4::cloudx1::dyn::CInstance::SetWebServerAppHealth (
            int httpcode,
            const std::string & contenttype,
            const std::string & content )  [inline]
```

Set the web server /apphealth status info

Definition at line 1282 of file sound4.x1.cloud_dyn.hpp.

14.11.3.28 StartWebServer()

```
bool sound4::cloudx1::dyn::CInstance::StartWebServer (
            int http_port,
            int https_port = 0 )  [inline]
```

Starts a Web server on requested ports

For secure connection, it will use privatekey.pem and certificate.pem from current directory. Environment variables `SSL_PRIVATE_PATH` and `SSL_CERTIFICATE_PATH` can override those (see Environment variables and parameters). If none is valid, it will try also /etc/ssl/certs/server.key and /etc/ssl/certs/server.crt.

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

http_port	The port to listen for HTTP connections (0 to disable)
https_port	The port to listen for HTTPS connections (0 to disable)

Returns

true if ports were opened successfully.

Definition at line 1246 of file sound4.x1.cloud_dyn.hpp.

14.11.3.29 Stop()

```
void sound4::cloudx1::dyn::CInstance::Stop ( )  [inline]
```

Stops the instance, its web server and its update thread.

Definition at line 1322 of file sound4.x1.cloud_dyn.hpp.

14.11.3.30 StopWebServer()

```
void sound4::cloudx1::dyn::CInstance::StopWebServer (
            int timeout_ms = 1000 )  [inline]
```

Stop a web server started with StartWebServer

Warning

On Windows, calling this from Go<1.20 code will crash.

Parameters

timeout_ms	The timeout to wait gracefull shutdown

Definition at line 1271 of file sound4.x1.cloud_dyn.hpp.

14.11.3.31 Terminate()

```
int sound4::cloudx1::dyn::CInstance::Terminate ( )  [inline]
```

Terminate the processing.

This is useful only with file processing, to get the final status. For some plugins, this is mandatory

Returns

0 is success, <0 if error, >0 if some status

Definition at line 1313 of file sound4.x1.cloud_dyn.hpp.

The documentation for this class was generated from the following file:

- sound4.x1.cloud_dyn.hpp

14.12 cloudx1_CClientInstance Struct Reference

`#include <sound4.x1.cloud.h>`

14.12.1 Detailed Description

Abstract pointer for a client instance

The documentation for this struct was generated from the following file:

- sound4.x1.cloud.h

14.13 cloudx1_CInstance Struct Reference

`#include <sound4.x1.cloud.h>`

14.13.1 Detailed Description

Abstract holder for a process instance

The documentation for this struct was generated from the following file:

- sound4.x1.cloud.h

14.14 cloudx1_CParameters Struct Reference

`#include <sound4.x1.cloud.h>`

14.14.1 Detailed Description

Abstract holder for a process instance parameters

The documentation for this struct was generated from the following file:

- sound4.x1.cloud.h

14.15 sound4::cloudx1::CPresetLoader Class Reference

Custom preset handler helper.

`#include <sound4.x1.cloud.hpp>`

Public Member Functions

- CPresetLoader ()=default
- virtual ~CPresetLoader ()=default
- virtual bool IsReadOnly ()=0
- virtual bool Exists (const std::filesystem::path &name)=0
- virtual bool Remove (const std::filesystem::path &name)=0
- virtual bool Rename (const std::filesystem::path &from, const std::filesystem::path &to)=0
- virtual std::vector< std::filesystem::path > GetAll ()=0
- virtual std::string Read (const std::filesystem::path &filename)=0
- virtual bool Write (const std::filesystem::path &filename, const std::string &content)=0

14.15.1 Detailed Description

Derive from this class and call CInstance::SetPresetManager

Definition at line 458 of file sound4.x1.cloud.hpp.

14.15.2 Constructor & Destructor Documentation

14.15.2.1 CPresetLoader()

```
sound4::cloudx1::CPresetLoader::CPresetLoader ( )  [default]
```

14.15.2.2 ~CPresetLoader()

```
virtual sound4::cloudx1::CPresetLoader::~CPresetLoader ( )  [virtual], [default]
```

14.15.3 Member Function Documentation

14.15.3.1 Exists()

```
virtual bool sound4::cloudx1::CPresetLoader::Exists (
            const std::filesystem::path & name )  [pure virtual]
```

14.15.3.2 GetAll()

```
virtual std::vector< std::filesystem::path > sound4::cloudx1::CPresetLoader::GetAll ( )  [pure
virtual]
```

14.15.3.3 IsReadOnly()

```
virtual bool sound4::cloudx1::CPresetLoader::IsReadOnly ( )  [pure virtual]
```

14.15.3.4 Read()

```
virtual std::string sound4::cloudx1::CPresetLoader::Read (
            const std::filesystem::path & filename )  [pure virtual]
```

14.15.3.5 Remove()

```
virtual bool sound4::cloudx1::CPresetLoader::Remove (
            const std::filesystem::path & name )  [pure virtual]
```

14.15.3.6 Rename()

```
virtual bool sound4::cloudx1::CPresetLoader::Rename (
            const std::filesystem::path & from,
            const std::filesystem::path & to )  [pure virtual]
```

14.15.3.7 Write()

```
virtual bool sound4::cloudx1::CPresetLoader::Write (
            const std::filesystem::path & filename,
            const std::string & content )  [pure virtual]
```

The documentation for this class was generated from the following file:

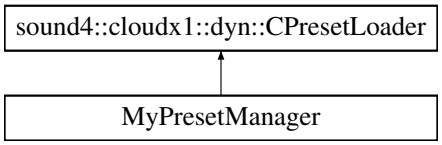
- sound4.x1.cloud.hpp

14.16 sound4::cloudx1::dyn::CPresetLoader Class Reference

Custom preset handler helper.

`#include <sound4.x1.cloud_dyn.hpp>`

Inheritance diagram for sound4::cloudx1::dyn::CPresetLoader:



Public Member Functions

- CPresetLoader ()=default
- virtual ~CPresetLoader ()=default
- virtual bool IsReadOnly ()=0
- virtual bool Exists (const std::filesystem::path &name)=0
- virtual bool Remove (const std::filesystem::path &name)=0
- virtual bool Rename (const std::filesystem::path &from, const std::filesystem::path &to)=0
- virtual std::vector< std::filesystem::path > GetAll ()=0
- virtual std::string Read (const std::filesystem::path &filename)=0
- virtual bool Write (const std::filesystem::path &filename, const std::string &content)=0

14.16.1 Detailed Description

Derive from this class and call CInstance::SetPresetManager

Definition at line 924 of file sound4.x1.cloud_dyn.hpp.

14.16.2 Constructor & Destructor Documentation

14.16.2.1 CPresetLoader()

```
sound4::cloudx1::dyn::CPresetLoader::CPresetLoader ( )  [default]
```

14.16.2.2 ~CPresetLoader()

```
virtual sound4::cloudx1::dyn::CPresetLoader::~CPresetLoader ( )  [virtual], [default]
```

14.16.3 Member Function Documentation

14.16.3.1 Exists()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::Exists (
            const std::filesystem::path & name )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.16.3.2 GetAll()

```
virtual std::vector< std::filesystem::path > sound4::cloudx1::dyn::CPresetLoader::GetAll ( )
[pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.16.3.3 IsReadOnly()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::IsReadOnly ( )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.16.3.4 Read()

```
virtual std::string sound4::cloudx1::dyn::CPresetLoader::Read (
            const std::filesystem::path & filename )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.16.3.5 Remove()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::Remove (
            const std::filesystem::path & name )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.16.3.6 Rename()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::Rename (
            const std::filesystem::path & from,
            const std::filesystem::path & to )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.16.3.7 Write()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::Write (
            const std::filesystem::path & filename,
            const std::string & content )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

The documentation for this class was generated from the following file:

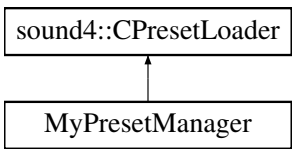
- sound4.x1.cloud_dyn.hpp

14.17 sound4::CPresetLoader Class Reference

Custom preset handler helper.

`#include <sound4cl.hpp>`

Inheritance diagram for sound4::CPresetLoader:



Public Member Functions

- CPresetLoader ()=default
- virtual ~CPresetLoader ()=default
- virtual bool IsReadOnly ()=0
- virtual bool Exists (const std::filesystem::path &name)=0
- virtual bool Remove (const std::filesystem::path &name)=0
- virtual bool Rename (const std::filesystem::path &from, const std::filesystem::path &to)=0
- virtual std::vector< std::filesystem::path > GetAll ()=0
- virtual std::string Read (const std::filesystem::path &filename)=0
- virtual bool Write (const std::filesystem::path &filename, const std::string &content)=0

14.17.1 Detailed Description

Derive from this class and call CInstance::SetPresetManager

Definition at line 877 of file sound4cl.hpp.

14.17.2 Constructor & Destructor Documentation

14.17.2.1 CPresetLoader()

```
sound4::CPresetLoader::CPresetLoader ( )  [default]
```

14.17.2.2 ~CPresetLoader()

```
virtual sound4::CPresetLoader::~CPresetLoader ( )  [virtual], [default]
```

14.17.3 Member Function Documentation

14.17.3.1 Exists()

```
virtual bool sound4::CPresetLoader::Exists (
            const std::filesystem::path & name )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.17.3.2 GetAll()

```
virtual std::vector< std::filesystem::path > sound4::CPresetLoader::GetAll ( )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.17.3.3 IsReadOnly()

```
virtual bool sound4::CPresetLoader::IsReadOnly ( )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.17.3.4 Read()

```
virtual std::string sound4::CPresetLoader::Read (
            const std::filesystem::path & filename )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.17.3.5 Remove()

```
virtual bool sound4::CPresetLoader::Remove (
            const std::filesystem::path & name )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.17.3.6 Rename()

```
virtual bool sound4::CPresetLoader::Rename (
            const std::filesystem::path & from,
            const std::filesystem::path & to )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

14.17.3.7 Write()

```
virtual bool sound4::CPresetLoader::Write (
            const std::filesystem::path & filename,
            const std::string & content )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

The documentation for this class was generated from the following file:

- sound4cl.hpp

14.18 sound4::CProcessor Class Reference

Dynamic library interface.

```
#include <sound4cl.hpp>
```

Public Member Functions

- CProcessor ()=default
- bool Load (const std::filesystem::path &filepath)

  Loads the library.
- bool IsOk () const

  Check if the library was loaded correctly.
- void AudioConvertFrom (const uint8_t *payload, float *output, size_t nSpl, SampleFormat fmt)
- void AudioConvertTo (const float *input, uint8_t *payload, size_t nSpl, SampleFormat fmt)
- void StereoToMono (const float *input, float *output, size_t nFrame)
- void MonoToStereo (const float *input, float *output, size_t nFrame)
- void StereoToMono_Planar (const float *inputL, const float *inputR, float *output, size_t nFrame)
- void MonoToStereo_Planar (const float *input, float *outputL, float *outputR, size_t nFrame)
- void AudioMonoFromLiveStereo (const uint8_t *payload, float *output)
- void AudioMonoToLiveStereo (const float *input, uint8_t *payload)
- std::string GetVersion ()

- unsigned int GetChunkSizeInFrames ()
- std::vector< unsigned int > GetPossibleChunkSizeInFrames ()
- unsigned int GetChannelCount ()
- unsigned int GetAudioInputCount ()
- unsigned int GetAudioOutputCount ()
- unsigned int GetSampleRate ()
- std::string GetFormatName (const SampleFormat fmt)
- SampleFormat GetFormatFromName (const std::string &name)
- unsigned int GetBytesFromFormat (const SampleFormat fmt)
- void SetLogSeverity (LogSeverity severity)
- void SetLoggerCallback (log_cb_t cb)

Protected Member Functions

- template<typename T >
  helper::DynFuncHolder< T > GetPrefixSymbol (const std::string &name)

Friends

- class CBus
- class CInstance

14.18.1 Detailed Description

Once you loaded the library with Load(), if it succeed you can use all the standard C functions from this library.

Definition at line 309 of file sound4cl.hpp.

14.18.2 Constructor & Destructor Documentation

14.18.2.1 CProcessor()

```
sound4::CProcessor::CProcessor ( )  [default]
```

14.18.3 Member Function Documentation

14.18.3.1 GetAudioInputCount()

```
unsigned int sound4::CProcessor::GetAudioInputCount ( )  [inline]
```

Get the number of inputs for this process

Remarks

All inputs have GetChannelCount() channels

Returns

The process input count

Definition at line 780 of file sound4cl.hpp.

14.18.3.2 GetAudioOutputCount()

```
unsigned int sound4::CProcessor::GetAudioOutputCount ( )  [inline]
```

Get the number of outputs for this process

Remarks

All outputs have GetChannelCount() channels

Returns

The process outputs count

Definition at line 790 of file sound4cl.hpp.

14.18.3.3 GetBytesFromFormat()

```
unsigned int sound4::CProcessor::GetBytesFromFormat (
            const SampleFormat fmt )  [inline]
```

Get the format byte size

Parameters

fmt	the format

Returns

the number of bytes used by this format for a single channel audio sample

Definition at line 827 of file sound4cl.hpp.

14.18.3.4 GetChannelCount()

```
unsigned int sound4::CProcessor::GetChannelCount ( )  [inline]
```

Get the number of channels needed by this process

Returns

The process channels count

Definition at line 770 of file sound4cl.hpp.

14.18.3.5 GetChunkSizeInFrames()

```
unsigned int sound4::CProcessor::GetChunkSizeInFrames ( )  [inline]
```

Get the default number of frames in a process chunk.

The output will be available only by chunks of this size.

Note

A Frame is a set of GetChannelCount samples

Returns

The process chunk size in frame

Deprecated Use GetPossibleChunkSizeInFrames

Definition at line 741 of file sound4cl.hpp.

14.18.3.6 GetFormatFromName()

```
SampleFormat sound4::CProcessor::GetFormatFromName (
            const std::string & name )  [inline]
```

Convert string to format

Parameters

name	the format string

Returns

the matching format, or INVALID_FORMAT if invalid.

Definition at line 818 of file sound4cl.hpp.

14.18.3.7 GetFormatName()

```
std::string sound4::CProcessor::GetFormatName (
            const SampleFormat fmt )  [inline]
```

Convert format to string

Parameters

fmt	the format

Returns

the string name of the format

Definition at line 809 of file sound4cl.hpp.

14.18.3.8 GetPossibleChunkSizeInFrames()

```
std::vector< unsigned int > sound4::CProcessor::GetPossibleChunkSizeInFrames ( )  [inline]
```

Get the possibles number of frames in a process chunk.

The output will be available only by chunks of this size.

Note

A Frame is a set of GetChannelCount samples

Returns

An vector of possible process chunk size in frame

Definition at line 752 of file sound4cl.hpp.

14.18.3.9 GetPrefixSymbol()

```
template<typename T >
helper::DynFuncHolder< T > sound4::CProcessor::GetPrefixSymbol (
            const std::string & name )  [inline], [protected]
```

Definition at line 409 of file sound4cl.hpp.

14.18.3.10 GetSampleRate()

```
unsigned int sound4::CProcessor::GetSampleRate ( )  [inline]
```

Get the processing sample-rate

Remarks

For now, always return 48000, but should be checked for backward compatibility

Returns

The process sample-rate in Hz

Definition at line 800 of file sound4cl.hpp.

14.18.3.11 GetVersion()

```
std::string sound4::CProcessor::GetVersion ( )  [inline]
```

Get the process version string

Returns

version string

Definition at line 728 of file sound4cl.hpp.

14.18.3.12 IsOk()

```
bool sound4::CProcessor::IsOk ( ) const  [inline]
```

Returns

true if OK.

false if not OK.

Definition at line 615 of file sound4cl.hpp.

14.18.3.13 Load()

```
bool sound4::CProcessor::Load (
            const std::filesystem::path & filepath )  [inline]
```

Parameters

filepath	the path of the library to load.

Returns

true if library was loaded correctly.

false if library load failed. Do not use in this case !

Definition at line 424 of file sound4cl.hpp.

14.18.3.14 SetLoggerCallback()

```
void sound4::CProcessor::SetLoggerCallback (
            log_cb_t cb )  [inline]
```

Sets the log callback. If not set, console output will be used.

Definition at line 839 of file sound4cl.hpp.

14.18.3.15 SetLogSeverity()

```
void sound4::CProcessor::SetLogSeverity (
            LogSeverity severity )  [inline]
```

Sets the log severity (global)

Definition at line 833 of file sound4cl.hpp.

14.18.4 Friends And Related Symbol Documentation

14.18.4.1 CBus

```
friend class CBus  [friend]
```

Definition at line 315 of file sound4cl.hpp.

14.18.4.2 CInstance

```
friend class CInstance  [friend]
```

Definition at line 316 of file sound4cl.hpp.

The documentation for this class was generated from the following file:

- sound4cl.hpp

14.19 sound4::cloudx1::dyn::helper::DynFuncHolder< T > Class Template Reference

Helper to wrap a function pointer.

```
#include <sound4.x1.cloud_dyn.hpp>
```

Public Member Functions

- DynFuncHolder ()=default
- DynFuncHolder (DynFunc_t a_ptr)
- operator bool () const
- bool IsOk () const
- operator T* () const

14.19.1 Detailed Description

template<typename T>
class sound4::cloudx1::dyn::helper::DynFuncHolder< T >

Parameters

T	is the function type, you may use decltype(fn)

Definition at line 87 of file sound4.x1.cloud_dyn.hpp.

14.19.2 Constructor & Destructor Documentation

14.19.2.1 DynFuncHolder() [1/2]

```
template<typename T >
sound4::cloudx1::dyn::helper::DynFuncHolder< T >::DynFuncHolder ( )  [default]
```

14.19.2.2 DynFuncHolder() [2/2]

```
template<typename T >
sound4::cloudx1::dyn::helper::DynFuncHolder< T >::DynFuncHolder (
            DynFunc_t a_ptr )  [inline]
```

Definition at line 98 of file sound4.x1.cloud_dyn.hpp.

14.19.3 Member Function Documentation

14.19.3.1 IsOk()

```
template<typename T >
bool sound4::cloudx1::dyn::helper::DynFuncHolder< T >::IsOk ( ) const  [inline]
```

Definition at line 100 of file sound4.x1.cloud_dyn.hpp.

14.19.3.2 operator bool()

```
template<typename T >
sound4::cloudx1::dyn::helper::DynFuncHolder< T >::operator bool ( ) const  [inline]
```

Definition at line 99 of file sound4.x1.cloud_dyn.hpp.

14.19.3.3 operator T*()

```
template<typename T >
sound4::cloudx1::dyn::helper::DynFuncHolder< T >::operator T* ( ) const  [inline]
```

Definition at line 101 of file sound4.x1.cloud_dyn.hpp.

The documentation for this class was generated from the following file:

- sound4.x1.cloud_dyn.hpp

14.20 sound4::helper::DynFuncHolder< T > Class Template Reference

Helper to wrap a function pointer.

`#include <sound4cl.hpp>`

Public Member Functions

- DynFuncHolder ()=default
- DynFuncHolder (DynFunc_t a_ptr)
- operator bool () const
- bool IsOk () const
- operator T* () const

14.20.1 Detailed Description

template<typename T>
class sound4::helper::DynFuncHolder< T >

Parameters

T	is the function type, you may use decltype(fn)

Definition at line 134 of file sound4cl.hpp.

14.20.2 Constructor & Destructor Documentation

14.20.2.1 DynFuncHolder() [1/2]

```
template<typename T >
sound4::helper::DynFuncHolder< T >::DynFuncHolder ( )  [default]
```

14.20.2.2 DynFuncHolder() [2/2]

```
template<typename T >
sound4::helper::DynFuncHolder< T >::DynFuncHolder (
            DynFunc_t a_ptr )  [inline]
```

Definition at line 145 of file sound4cl.hpp.

14.20.3 Member Function Documentation

14.20.3.1 IsOk()

```
template<typename T >
bool sound4::helper::DynFuncHolder< T >::IsOk ( ) const  [inline]
```

Definition at line 147 of file sound4cl.hpp.

14.20.3.2 operator bool()

```
template<typename T >
sound4::helper::DynFuncHolder< T >::operator bool ( ) const  [inline]
```

Definition at line 146 of file sound4cl.hpp.

14.20.3.3 operator T*()

```
template<typename T >
sound4::helper::DynFuncHolder< T >::operator T* ( ) const  [inline]
```

Definition at line 148 of file sound4cl.hpp.

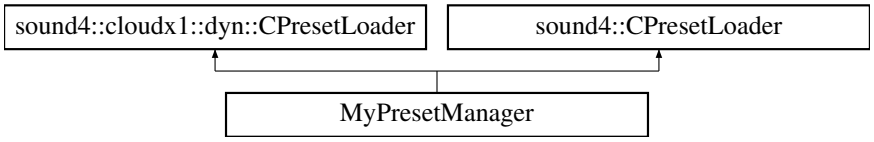
The documentation for this class was generated from the following file:

- sound4cl.hpp

14.21 MyPresetManager Class Reference

[Custom preset manager]

Inheritance diagram for MyPresetManager:



Public Member Functions

- MyPresetManager ()=default
- virtual ~MyPresetManager ()=default
- bool SetupPath (const std::filesystem::path &a_preset_path)
- virtual bool IsReadOnly () override
- virtual bool Exists (const std::filesystem::path &name) override
- virtual bool Remove (const std::filesystem::path &name) override
- virtual bool Rename (const std::filesystem::path &from, const std::filesystem::path &to) override
- virtual std::vector< std::filesystem::path > GetAll () override
- virtual std::string Read (const std::filesystem::path &filename) override
- virtual bool Write (const std::filesystem::path &filename, const std::string &content) override
- MyPresetManager ()=default
- virtual ~MyPresetManager ()=default
- bool SetupPath (const std::filesystem::path &a_preset_path)
- virtual bool IsReadOnly () override
- virtual bool Exists (const std::filesystem::path &name) override
- virtual bool Remove (const std::filesystem::path &name) override
- virtual bool Rename (const std::filesystem::path &from, const std::filesystem::path &to) override
- virtual std::vector< std::filesystem::path > GetAll () override
- virtual std::string Read (const std::filesystem::path &filename) override
- virtual bool Write (const std::filesystem::path &filename, const std::string &content) override

Public Member Functions inherited from sound4::cloudx1::dyn::CPresetLoader

- CPresetLoader ()=default
- virtual ~CPresetLoader ()=default

Public Member Functions inherited from sound4::CPresetLoader

- CPresetLoader ()=default
- virtual ~CPresetLoader ()=default

14.21.1 Detailed Description

Definition at line 120 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.2 Constructor & Destructor Documentation

14.21.2.1 MyPresetManager() [1/2]

```
MyPresetManager::MyPresetManager ( )  [default]
```

14.21.2.2 ~MyPresetManager() [1/2]

```
virtual MyPresetManager::~MyPresetManager ( )  [virtual], [default]
```

14.21.2.3 MyPresetManager() [2/2]

```
MyPresetManager::MyPresetManager ( )  [default]
```

14.21.2.4 ~MyPresetManager() [2/2]

```
virtual MyPresetManager::~MyPresetManager ( )  [virtual], [default]
```

14.21.3 Member Function Documentation

14.21.3.1 Exists() [1/2]

```
virtual bool MyPresetManager::Exists (
            const std::filesystem::path & name )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 138 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.3.2 Exists() [2/2]

```
virtual bool MyPresetManager::Exists (
            const std::filesystem::path & name )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 122 of file sound4cl-pipe.cpp.

14.21.3.3 GetAll() [1/2]

```
virtual std::vector< std::filesystem::path > MyPresetManager::GetAll ( )  [inline], [override],
[virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 154 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.3.4 GetAll() [2/2]

```
virtual std::vector< std::filesystem::path > MyPresetManager::GetAll ( )  [inline], [override],
[virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 138 of file sound4cl-pipe.cpp.

14.21.3.5 IsReadOnly() [1/2]

```
virtual bool MyPresetManager::IsReadOnly ( )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 137 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.3.6 IsReadOnly() [2/2]

```
virtual bool MyPresetManager::IsReadOnly ( )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 121 of file sound4cl-pipe.cpp.

14.21.3.7 Read() [1/2]

```
virtual std::string MyPresetManager::Read (
            const std::filesystem::path & filename )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 168 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.3.8 Read() [2/2]

```
virtual std::string MyPresetManager::Read (
            const std::filesystem::path & filename )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 152 of file sound4cl-pipe.cpp.

14.21.3.9 Remove() [1/2]

```
virtual bool MyPresetManager::Remove (
            const std::filesystem::path & name )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 143 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.3.10 Remove() [2/2]

```
virtual bool MyPresetManager::Remove (
            const std::filesystem::path & name )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 127 of file sound4cl-pipe.cpp.

14.21.3.11 Rename() [1/2]

```
virtual bool MyPresetManager::Rename (
            const std::filesystem::path & from,
            const std::filesystem::path & to )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 148 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.3.12 Rename() [2/2]

```
virtual bool MyPresetManager::Rename (
            const std::filesystem::path & from,
            const std::filesystem::path & to )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 132 of file sound4cl-pipe.cpp.

14.21.3.13 SetupPath() [1/2]

```
bool MyPresetManager::SetupPath (
            const std::filesystem::path & a_preset_path )  [inline]
```

Definition at line 125 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.3.14 SetupPath() [2/2]

```
bool MyPresetManager::SetupPath (
            const std::filesystem::path & a_preset_path )  [inline]
```

Definition at line 109 of file sound4cl-pipe.cpp.

14.21.3.15 Write() [1/2]

```
virtual bool MyPresetManager::Write (
            const std::filesystem::path & filename,
            const std::string & content )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 178 of file sound4.x1.cloud-pipe-dyn.cpp.

14.21.3.16 Write() [2/2]

```
virtual bool MyPresetManager::Write (
            const std::filesystem::path & filename,
            const std::string & content )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 162 of file sound4cl-pipe.cpp.

The documentation for this class was generated from the following files:

- sound4.x1.cloud-pipe-dyn.cpp
- sound4cl-pipe.cpp

14.22 sound4::cloudx1::dyn::helper::SampleFormat< T > Struct Template Reference

Helper for Sample format types.

```
#include <sound4.x1.cloud_dyn.hpp>
```

14.22.1 Detailed Description

template<typename T>
struct sound4::cloudx1::dyn::helper::SampleFormat< T >

Template Parameters

T	the C type for one audio sample

Definition at line 566 of file sound4.x1.cloud_dyn.hpp.

The documentation for this struct was generated from the following file:

- sound4.x1.cloud_dyn.hpp

14.23 sound4::cloudx1::helper::SampleFormat< T > Struct Template Reference

Helper for Sample format types.

`#include <sound4.x1.cloud.hpp>`

14.23.1 Detailed Description

template<typename T>
struct sound4::cloudx1::helper::SampleFormat< T >

Template Parameters

T	the C type for one audio sample

Definition at line 132 of file sound4.x1.cloud.hpp.

The documentation for this struct was generated from the following file:

- sound4.x1.cloud.hpp

14.24 sound4::helper::SampleFormat< T > Struct Template Reference

Helper for Sample format types.

`#include <sound4cl.hpp>`

14.24.1 Detailed Description

template<typename T>
struct sound4::helper::SampleFormat< T >

Template Parameters

T	the C type for one audio sample

Definition at line 113 of file sound4cl.hpp.

The documentation for this struct was generated from the following file:

- sound4cl.hpp

14.25 SOUND4_AuxiliaryOutputInfos Struct Reference

`#include <sound4.x1.cloud.h>`

Public Attributes

- char * id
  The ID of the output (fixed across versions)
- char * description
  The description of the output.
- unsigned int sample_rate
  The sampling rate of this output.
- unsigned int channel_count
  The number of channels of this output.
- const float * buffer
  The output buffer of the output. See cloudx1_ProcessAudio for format.

14.25.1 Detailed Description

Structure holding information on an auxiliary output

Definition at line 810 of file sound4.x1.cloud.h.

14.25.2 Member Data Documentation

14.25.2.1 buffer

```
const float* SOUND4_AuxiliaryOutputInfos::buffer
```

Definition at line 815 of file sound4.x1.cloud.h.

14.25.2.2 channel_count

```
unsigned int SOUND4_AuxiliaryOutputInfos::channel_count
```

Definition at line 814 of file sound4.x1.cloud.h.

14.25.2.3 description

```
char* SOUND4_AuxiliaryOutputInfos::description
```

Definition at line 812 of file sound4.x1.cloud.h.

14.25.2.4 id

```
char* SOUND4_AuxiliaryOutputInfos::id
```

Definition at line 811 of file sound4.x1.cloud.h.

14.25.2.5 sample_rate

```
unsigned int SOUND4_AuxiliaryOutputInfos::sample_rate
```

Definition at line 813 of file sound4.x1.cloud.h.

The documentation for this struct was generated from the following file:

- sound4.x1.cloud.h

14.26 SOUND4_ProcessInfo Struct Reference

```
#include <sound4.x1.cloud.h>
```

Public Attributes

- size_t struct_size
  The size of total this structure, for compatibility checking.
- const char * name
  The name of the processor.
- const char * prefix
  The prefix of this processor functions.
- const char * shortname
  A short name of the processor, single word.
- const char * version
  Library version.

14.26.1 Detailed Description

Information on this processor.

See also

SOUND4_GetProcessInfo

Definition at line 77 of file sound4.x1.cloud.h.

14.26.2 Member Data Documentation

14.26.2.1 name

```
const char* SOUND4_ProcessInfo::name
```

Definition at line 79 of file sound4.x1.cloud.h.

14.26.2.2 prefix

```
const char* SOUND4_ProcessInfo::prefix
```

Definition at line 80 of file sound4.x1.cloud.h.

14.26.2.3 shortname

```
const char* SOUND4_ProcessInfo::shortname
```

Definition at line 81 of file sound4.x1.cloud.h.

14.26.2.4 struct_size

```
size_t SOUND4_ProcessInfo::struct_size
```

Definition at line 78 of file sound4.x1.cloud.h.

14.26.2.5 version

```
const char* SOUND4_ProcessInfo::version
```

Definition at line 82 of file sound4.x1.cloud.h.

The documentation for this struct was generated from the following file:

- sound4.x1.cloud.h

Chapter 15

File Documentation

15.1 doc_examples.h File Reference

15.2 doc_examples.h

Go to the documentation of this file.

```
00001
00022 // ------------------------------------------------------------
```

15.3 doc_gencpp.h File Reference

Namespaces

- namespace sound4

15.4 doc_gencpp.h

Go to the documentation of this file.

```
00001 namespace sound4 {
00002
00059 }; // namespace sound4
```

15.5 doc_json.h File Reference

15.6 doc_json.h

Go to the documentation of this file.

```
00001
```

15.7 doc_main.h File Reference

15.8 doc_main.h

Go to the documentation of this file.

```
00001
```

15.9 doc_params.h File Reference

15.10 doc_params.h

Go to the documentation of this file.

```
00001
00002 // ------------------------------------------------------------
```

15.11 sound4.x1.cloud-pipe-cxx.cpp File Reference

C++ sample using C++ interface wrapper.

```
#include <unistd.h>
#include <iostream>
#include <strings.h>
#include <sys/types.h>
#include <filesystem>
#include <io.h>
#include <fcntl.h>
#include "sound4.x1.cloud.hpp"
```

Functions

- std::string GetEnv (const std::string &name)
- void ProcessLoop (sound4::cloudx1::CInstance &instance)
- void Usage (const char *progname)
- void MyLogger (sound4::cloudx1::LogSeverity severity, const std::string &msg)
- int main (int argc, const char **argv)

15.11.1 Function Documentation

15.11.1.1 GetEnv()

```
std::string GetEnv (
            const std::string & name )
```

Definition at line 41 of file sound4.x1.cloud-pipe-cxx.cpp.

15.11.1.2 main()

```
int main (
            int argc,
            const char ** argv )
```

[Setup and sanity checks]

[Setup and sanity checks]

[Create the processing instance]

[Create the processing instance]

[Communicating with the instance]

[Communicating with the instance]

Definition at line 106 of file sound4.x1.cloud-pipe-cxx.cpp.

15.11.1.3 MyLogger()

```
void MyLogger (
            sound4::cloudx1::LogSeverity severity,
            const std::string & msg )
```

Definition at line 101 of file sound4.x1.cloud-pipe-cxx.cpp.

15.11.1.4 ProcessLoop()

```
void ProcessLoop (
            sound4::cloudx1::CInstance & instance )
```

[Processing Loop]

[Processing Loop]

Definition at line 50 of file sound4.x1.cloud-pipe-cxx.cpp.

15.11.1.5 Usage()

```
void Usage (
            const char * progname )
```

Definition at line 81 of file sound4.x1.cloud-pipe-cxx.cpp.

15.12 sound4.x1.cloud-pipe-cxx.cpp

Go to the documentation of this file.

```
00001
00004 #include <unistd.h>
00005 #include <iostream>
00006 #include <strings.h>
00007 #include <sys/types.h>
00008 #include <filesystem>
00009 #if defined(_WIN32) || defined(WIN32)
00010     #include <io.h>
00011     #include <fcntl.h>
00012 #endif
00013
00014 #include "sound4.x1.cloud.hpp"
00015
00016 // ------------------------------------------------------------
00041 std::string GetEnv(const std::string& name)
00042 {
00043     char *data=getenv(name.c_str());
00044     if (!data) return {};
00045     return std::string(data);
00046 }
00047
00048
00049 // Reads from stdin, write to stdout
00050 void ProcessLoop(sound4::cloudx1::CInstance &instance)
00051 {
00052 bool stopthread=false;
00053
00054     #if defined(_WIN32) || defined(WIN32)
00055         // Windows: The stdin, stdout, and stderr streams always open in text mode by default
00056         _setmode(_fileno(stdin), _O_BINARY);
00057         _setmode(_fileno(stdout), _O_BINARY);
00058     #endif
00059
00061     while (!stopthread)
00062     {
00063         // Read a chunk from stdin
00064         if (std::fread(instance.GetBufferIn().data(), sizeof(float), sound4::cloudx1::InputSampleSize,
      stdin) != sound4::cloudx1::InputSampleSize) {
00065             std::cerr « "ProcessLoop: input stopped"« std::endl;
00066             stopthread=true;
00067             break;
00068         }
00069         if (stopthread) break;
00070         // Process it
00071         instance.ProcessAudio();
00072         // Write it to stdout
00073         if (fwrite(instance.GetBufferOut().data(), sizeof(float), sound4::cloudx1::OutputSampleSize,
      stdout) != sound4::cloudx1::OutputSampleSize) {
00074             std::cerr « "Failed to write audio output" « std::endl;
00075             stopthread=true;
00076         }
00077     }
00079 }
00080
00081 void Usage(const char *progname)
00082 {
00083     std::cerr « "Usage: " « progname « std::endl;;
00084     std::cerr « "  Reads audio from stdin and return processed audio in stdout" « std::endl;
00085     std::cerr « "Environment:"« std::endl;;
00086     std::cerr « " - S4STORE_PATH            : path to store config [default: (no storage)]"«
      std::endl;;
00087     std::cerr « " - S4LOGINKEY              : SOUND4 Login key (or S4USERID)"« std::endl;;
00088     std::cerr « " - RADIO_NAME              : SOUND4 Radio Name"« std::endl;;
00089     std::cerr « " - ACCESS_KEY_ID           : SOUND4 Access Key ID"« std::endl;;
00090     std::cerr « " - ACCESS_KEY_SECRET       : SOUND4 Access Key Secret"« std::endl;;
00091     std::cerr « std::endl;
00092     std::cerr « "Example:"« std::endl;
00093     std::cerr « "ffmpeg -re -i file.wav -ar "«sound4::cloudx1::GetSampleRate()«" -ac
      "«sound4::cloudx1::GetChannelCount()«" -f f32le - | "«progname«" | ffplay -f f32le -ar
      "«sound4::cloudx1::GetSampleRate()«" -ac "«sound4::cloudx1::GetChannelCount()«" -i -" « std::endl;;
00094     #if defined(_WIN32) || defined(WIN32)
00095         std::cerr « "ffmpeg -f dshow -i audio=\"Microphone\" -ar "«sound4::cloudx1::GetSampleRate()«"
      -ac "«sound4::cloudx1::GetChannelCount()«" -f f32le - | "«progname«" | ffplay -f f32le -ar
      "«sound4::cloudx1::GetSampleRate()«" -ac "«sound4::cloudx1::GetChannelCount()«" -i -" « std::endl;;
00096     #else
00097         std::cerr « "ffmpeg -f pulse -i default -ar "«sound4::cloudx1::GetSampleRate()«" -ac
      "«sound4::cloudx1::GetChannelCount()«" -f f32le - | "«progname«" | ffplay -f f32le -ar
      "«sound4::cloudx1::GetSampleRate()«" -ac "«sound4::cloudx1::GetChannelCount()«" -i -" « std::endl;;
00098     #endif
00099 }
00100
00101 void MyLogger(sound4::cloudx1::LogSeverity severity,const std::string& msg)
```

```
00102 {
00103     std::cerr « msg « std::endl;
00104 }
00105
00106 int main(int argc, const char **argv)
00107 {
00108 #if (CLOUDX1_HAS_WEBSERVER)
00109     int listen_port = 8080;
00110 #endif // (CLOUDX1_HAS_WEBSERVER)
00111     auto store_path_str=GetEnv("S4STORE_PATH");
00112
00113     // Get credentials from environment
00114     auto LoginKey=GetEnv("S4LOGINKEY");
00115     if (LoginKey.empty()) {
00116         LoginKey=GetEnv("S4USERID");
00117     }
00118     auto RadioName=GetEnv("RADIO_NAME");
00119     auto KeyId=GetEnv("ACCESS_KEY_ID");
00120     auto AccessKey=GetEnv("ACCESS_KEY_SECRET");
00121
00122     const char *progname=argv[0];
00123
00124     if (argc>1) {
00125         if ((strcasecmp(argv[1],"-h")==0) || (strcasecmp(argv[1],"--help")==0)) {
00126             Usage(progname);
00127             return 0;
00128         }
00129     }
00130     if (LoginKey.empty() || RadioName.empty() || KeyId.empty() || AccessKey.empty()) {
00131         std::cerr « "Missing credentials in environment" « std::endl;
00132         Usage(progname);
00133         return 1;
00134     }
00135     std::filesystem::path store_path;
00136     if (!store_path_str.empty()) {
00137         std::error_code ec;
00138         store_path = std::filesystem::path(store_path_str);
00139         if (!std::filesystem::exists(store_path,ec) || !std::filesystem::is_directory(store_path,ec))
      {
00140             std::cerr « "Storage folder '"«(const char*)store_path.u8string().c_str()«"' is not a
      valid directory" « std::endl;
00141             Usage(progname);
00142             return 1;
00143         }
00144     }
00145
00147     sound4::cloudx1::SetLogSeverity(verbose5);
00148     sound4::cloudx1::SetLoggerCallback(MyLogger);
00149
00150     sound4::cloudx1::CInstance instance;
00151     instance.SetParam("ADMIN_USER","admin");
00152     instance.SetParam("ADMIN_SECRET","admin");
00154
00155     std::cerr « "Creating" « std::endl;
00157     if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, store_path)) {
00158         std::cerr « "Failed to create the processing instance" « std::endl;
00159         return 1;
00160     }
00162
00163 #if (CLOUDX1_HAS_WEBSERVER)
00164     std::cerr « "Starting web server" « std::endl;
00166     if (!instance.StartWebServer(listen_port,0)) {
00167         std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
00168         return 1;
00169     }
00171 #endif // (CLOUDX1_HAS_WEBSERVER)
00172
00173     {
00175         auto client = instance.NewClient();
00176         auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
00177         std::cerr « "Request for processor name returned "«answer«std::endl;
00179     }
00180
00181     ProcessLoop(instance);
00182
00183     std::cerr « "Stopping now" « std::endl;
00184     instance.Stop();
00185
00186     std::cerr « "End" « std::endl;
00187     return 0;
00188 }
```

15.13 sound4.x1.cloud-pipe-dyn.cpp File Reference

C++ sample using C++ interface wrapper with dynamic library loading.

```
#include <unistd.h>
#include <iostream>
#include <strings.h>
#include <sys/types.h>
#include <filesystem>
#include <fstream>
#include <sstream>
#include <io.h>
#include <fcntl.h>
#include "sound4.x1.cloud_dyn.hpp"
```

Classes

- class MyPresetManager

  [Custom preset manager]

Functions

- std::string GetEnv (const std::string &name)
- void ProcessLoop (sound4::cloudx1::dyn::CInstance &instance)
- void Usage (const char *progname, sound4::cloudx1::dyn::CDynLib &dynlib)
- void MyLogger (sound4::cloudx1::dyn::LogSeverity severity, const std::string &msg)
- int main (int argc, const char **argv)

  [Custom preset manager]

15.13.1 Function Documentation

15.13.1.1 GetEnv()

```
std::string GetEnv (
            const std::string & name )
```

Definition at line 52 of file sound4.x1.cloud-pipe-dyn.cpp.

15.13.1.2 main()

```
int main (
            int argc,
            const char ** argv )
```

[Dynamic loading]

[Dynamic loading]

[Setup and sanity checks]

[Setup and sanity checks]

[Custom preset manager loading]

[Custom preset manager loading]

[Create the processing instance]

[Create the processing instance]

[Communicating with the instance]

[Communicating with the instance]

Definition at line 199 of file sound4.x1.cloud-pipe-dyn.cpp.

15.13.1.3 MyLogger()

```
void MyLogger (
            sound4::cloudx1::dyn::LogSeverity severity,
            const std::string & msg )
```

Definition at line 114 of file sound4.x1.cloud-pipe-dyn.cpp.

15.13.1.4 ProcessLoop()

```
void ProcessLoop (
            sound4::cloudx1::dyn::CInstance & instance )
```

[Processing Loop]

[Processing Loop]

Definition at line 61 of file sound4.x1.cloud-pipe-dyn.cpp.

15.13.1.5 Usage()

```
void Usage (
            const char * progname,
            sound4::cloudx1::dyn::CDynLib & dynlib )
```

Definition at line 92 of file sound4.x1.cloud-pipe-dyn.cpp.

15.14 sound4.x1.cloud-pipe-dyn.cpp

Go to the documentation of this file.

```
00001
00004 #include <unistd.h>
00005 #include <iostream>
00006 #include <strings.h>
00007 #include <sys/types.h>
00008 #include <filesystem>
00009 #include <fstream>
00010 #include <sstream>
00011 #if defined(_WIN32) || defined(WIN32)
00012     #include <io.h>
00013     #include <fcntl.h>
00014 #endif
00015
00016 #include "sound4.x1.cloud_dyn.hpp"
00017
00018 // ------------------------------------------------------------
00052 std::string GetEnv(const std::string& name)
00053 {
00054     char *data=getenv(name.c_str());
00055     if (!data) return {};
00056     return std::string(data);
00057 }
00058
00059
00060 // Reads from stdin, write to stdout
00061 void ProcessLoop(sound4::cloudx1::dyn::CInstance &instance)
00062 {
00063 bool stopthread=false;
00064
00065     #if defined(_WIN32) || defined(WIN32)
00066         // Windows: The stdin, stdout, and stderr streams always open in text mode by default
00067         _setmode(_fileno(stdin), _O_BINARY);
00068         _setmode(_fileno(stdout), _O_BINARY);
00069     #endif
00070
00072     while (!stopthread)
00073     {
00074         // Read a chunk from stdin
00075         if (std::fread(instance.GetBufferIn().data(), sizeof(float),
      sound4::cloudx1::dyn::InputSampleSize, stdin) != sound4::cloudx1::dyn::InputSampleSize) {
00076             std::cerr « "ProcessLoop: input stopped"« std::endl;
00077             stopthread=true;
00078             break;
00079         }
00080         if (stopthread) break;
00081         // Process it
00082         instance.ProcessAudio();
00083         // Write it to stdout
00084         if (fwrite(instance.GetBufferOut().data(), sizeof(float),
      sound4::cloudx1::dyn::OutputSampleSize, stdout) != sound4::cloudx1::dyn::OutputSampleSize) {
00085             std::cerr « "Failed to write audio output" « std::endl;
00086             stopthread=true;
00087         }
00088     }
00090 }
00091
00092 void Usage(const char *progname, sound4::cloudx1::dyn::CDynLib &dynlib)
00093 {
00094     std::cerr « "Usage: " « progname « std::endl;;
00095     std::cerr « "  Reads audio from stdin and return processed audio in stdout" « std::endl;
00096     std::cerr « "Environment:"« std::endl;;
00097     std::cerr « " - S4STORE_PATH            : path to store config [default: (no storage)]"«
      std::endl;;
00098     std::cerr « " - S4LOGINKEY              : SOUND4 Login key (or S4USERID)"« std::endl;;
00099     std::cerr « " - RADIO_NAME              : SOUND4 Radio Name"« std::endl;;
00100     std::cerr « " - ACCESS_KEY_ID           : SOUND4 Access Key ID"« std::endl;;
00101     std::cerr « " - ACCESS_KEY_SECRET       : SOUND4 Access Key Secret"« std::endl;;
00102     if (dynlib.IsOk()) {
00103         std::cerr « std::endl;
00104         std::cerr « "Example:"« std::endl;
00105         std::cerr « "ffmpeg -re -i file.wav -ar "«dynlib.GetSampleRate()«" -ac
      "«dynlib.GetChannelCount()«" -f f32le - | "«progname«" | ffplay -f f32le -ar
      "«dynlib.GetSampleRate()«" -ac "«dynlib.GetChannelCount()«" -i -" « std::endl;;
00106         #if defined(_WIN32) || defined(WIN32)
00107             std::cerr « "ffmpeg -f dshow -i audio=\"Microphone\" -ar "«dynlib.GetSampleRate()«" -ac
      "«dynlib.GetChannelCount()«" -f f32le - | "«progname«" | ffplay -f f32le -ar
      "«dynlib.GetSampleRate()«" -ac "«dynlib.GetChannelCount()«" -i -" « std::endl;;
00108         #else
00109             std::cerr « "ffmpeg -f pulse -i default -ar "«dynlib.GetSampleRate()«" -ac
      "«dynlib.GetChannelCount()«" -f f32le - | "«progname«" | ffplay -f f32le -ar
      "«dynlib.GetSampleRate()«" -ac "«dynlib.GetChannelCount()«" -i -" « std::endl;;
00110         #endif
```

```
00111     }
00112 }
00113
00114 void MyLogger(sound4::cloudx1::dyn::LogSeverity severity,const std::string& msg)
00115 {
00116     std::cerr « msg « std::endl;
00117 }
00118
00120 class MyPresetManager : public sound4::cloudx1::dyn::CPresetLoader {
00121 public:
00122     MyPresetManager() = default;
00123     virtual ~MyPresetManager() = default;
00124
00125     bool SetupPath(const std::filesystem::path& a_preset_path)
00126         {
00127             m_preset_path=a_preset_path;
00128             std::error_code ec;
00129             if ( !std::filesystem::exists(m_preset_path,ec ) ) {
00130                 return false;
00131             }
00132             if ( !std::filesystem::is_directory(m_preset_path, ec) ) {
00133                 return false;
00134             }
00135             return true;
00136         }
00137     virtual bool IsReadOnly() override { return false; };
00138     virtual bool Exists(const std::filesystem::path &name) override
00139         {
00140             std::error_code ec;
00141             return std::filesystem::exists(GetRealPath(name), ec);
00142         }
00143     virtual bool Remove(const std::filesystem::path &name) override
00144         {
00145             std::error_code ec;
00146             return std::filesystem::remove(GetRealPath(name), ec);
00147         }
00148     virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) override
00149         {
00150             std::error_code ec;
00151             std::filesystem::rename(GetRealPath(from), GetRealPath(to), ec);
00152             return (!ec);
00153         }
00154     virtual std::vector<std::filesystem::path> GetAll() override
00155         {
00156             std::vector<std::filesystem::path> list;
00157             std::error_code ec;
00158             for (auto it = std::filesystem::directory_iterator(m_preset_path.c_str(),
      std::filesystem::directory_options::skip_permission_denied, ec);
00159                  !ec && it != std::filesystem::directory_iterator{};
00160                   it.increment(ec) )
00161             {
00162                 if (it->is_regular_file(ec)) {
00163                     list.push_back(it->path().lexically_relative(m_preset_path));
00164                 }
00165             }
00166             return list;
00167         }
00168     virtual std::string Read(const std::filesystem::path &filename) override
00169         {
00170             std::ifstream f(GetRealPath(filename));
00171             if ( f.fail() ) {
00172                 return std::string();
00173             }
00174             std::ostringstream ss;
00175             ss « f.rdbuf();
00176             return ss.str();
00177         }
00178     virtual bool Write(const std::filesystem::path &filename, const std::string &content) override
00179         {
00180             std::ofstream f(GetRealPath(filename));
00181             if ( f.fail() ) {
00182                 return false;
00183             }
00184             f « content;
00185             if ( f.fail() ) {
00186                 return false;
00187             }
00188             return true;
00189         }
00190 private:
00191     std::filesystem::path m_preset_path;
00192     std::filesystem::path GetRealPath(const std::filesystem::path &name)
00193         {
00194             return m_preset_path / name;
00195         }
00196 };
00198
```

```
00199 int main(int argc, const char **argv)
00200 {
00201 #if (CLOUDX1_HAS_WEBSERVER)
00202     int listen_port = 8080;
00203 #endif // (CLOUDX1_HAS_WEBSERVER)
00204     auto store_path_str=GetEnv("S4STORE_PATH");
00205 
00206     // Get credentials from environment
00207     auto LoginKey=GetEnv("S4LOGINKEY");
00208     if (LoginKey.empty()) {
00209         LoginKey=GetEnv("S4USERID");
00210     }
00211     auto RadioName=GetEnv("RADIO_NAME");
00212     auto KeyId=GetEnv("ACCESS_KEY_ID");
00213     auto AccessKey=GetEnv("ACCESS_KEY_SECRET");
00214 
00215     const char *progname=argv[0];
00216 
00217 
00219     sound4::cloudx1::dyn::CDynLib dynlib;
00220     if (!dynlib.Load()) {
00221         std::cerr « "Failed to load processing library" « std::endl;
00222         return 1;
00223     }
00225 
00226     if (argc>1) {
00227         if ((strcasecmp(argv[1],"-h")==0) || (strcasecmp(argv[1],"--help")==0)) {
00228             Usage(progname,dynlib);
00229             return 0;
00230         }
00231     }
00232     if (LoginKey.empty() || RadioName.empty() || KeyId.empty() || AccessKey.empty()) {
00233         std::cerr « "Missing credentials in environment" « std::endl;
00234         Usage(progname,dynlib);
00235         return 1;
00236     }
00237     std::filesystem::path store_path;
00238     if (!store_path_str.empty()) {
00239         std::error_code ec;
00240         store_path = std::filesystem::path(store_path_str);
00241         if (!std::filesystem::exists(store_path,ec) || !std::filesystem::is_directory(store_path,ec))
    {
00242             std::cerr « "Storage folder '"«(const char*)store_path.u8string().c_str()«"' is not a
    valid directory" « std::endl;
00243             Usage(progname,dynlib);
00244             return 1;
00245         }
00246     }
00247 
00249     sound4::cloudx1::dyn::SetLogSeverity(dynlib, verbose5);
00250     sound4::cloudx1::dyn::SetLoggerCallback(dynlib, MyLogger);
00251 
00252     sound4::cloudx1::dyn::CInstance instance(dynlib);
00253     instance.SetParam("ADMIN_USER","admin");
00254     instance.SetParam("ADMIN_SECRET","admin");
00256 
00258     MyPresetManager preset_manager;
00259     if (!store_path.empty()) {
00260         if (!preset_manager.SetupPath(store_path)) {
00261             std::cerr « "Failed to setup the custom preset manager on path " « (const
    char*)store_path.u8string().c_str() « std::endl;
00262             return 1;
00263         }
00264         instance.SetPresetManager(&preset_manager);
00265     }
00267 
00268     std::cerr « "Creating" « std::endl;
00270     if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, {})) {
00271         std::cerr « "Failed to create the processing instance" « std::endl;
00272         return 1;
00273     }
00275 
00276 #if (CLOUDX1_HAS_WEBSERVER)
00277     std::cerr « "Starting web server" « std::endl;
00279     if (!instance.StartWebServer(listen_port,0)) {
00280         std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
00281         return 1;
00282     }
00284 #endif // (CLOUDX1_HAS_WEBSERVER)
00285 
00286     {
00288         auto client = instance.NewClient();
00289         auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
00290         std::cerr « "Request for processor name returned "«answer«std::endl;
00292     }
00293 
00294     ProcessLoop(instance);
```

```
00295
00296     std::cerr « "Stopping now" « std::endl;
00297     instance.Stop();
00298
00299     std::cerr « "End" « std::endl;
00300     return 0;
00301 }
```

15.15 sound4.x1.cloud-pipe.cpp File Reference

C++ sample using only C interface.

```
#include <unistd.h>
#include <iostream>
#include <strings.h>
#include <sys/types.h>
#include <thread>
#include <filesystem>
#include <io.h>
#include <fcntl.h>
#include <stringapiset.h>
#include <sound4.x1.cloud.h>
```

Macros

- #define SAMPLE_RATE 48000
- #define CHUNK_SIZE 64
- #define CHANNEL_COUNT 2

Functions

- void ProcessLoop (struct cloudx1_CInstance *pInstance)
- void Usage (const char *progname)
- void MyLogger (cloudx1_LogSeverity severe, const char *str)
- int main (int argc, char *const argv[])

15.15.1 Macro Definition Documentation

15.15.1.1 CHANNEL_COUNT

```
#define CHANNEL_COUNT 2
```

Definition at line 22 of file sound4.x1.cloud-pipe.cpp.

15.15.1.2 CHUNK_SIZE

```
#define CHUNK_SIZE 64
```

Definition at line 21 of file sound4.x1.cloud-pipe.cpp.

15.15.1.3 SAMPLE_RATE

```
#define SAMPLE_RATE 48000
```

Definition at line 20 of file sound4.x1.cloud-pipe.cpp.

15.15.2 Function Documentation

15.15.2.1 main()

```
int main (
            int argc,
            char *const argv[] )
```

[Setup and sanity checks]

[Setup and sanity checks]

[Create the processing instance]

[Create the processing instance]

[Stopping the processing instance]

[Stopping the processing instance]

Definition at line 84 of file sound4.x1.cloud-pipe.cpp.

15.15.2.2 MyLogger()

```
void MyLogger (
            cloudx1_LogSeverity severe,
            const char * str )
```

Definition at line 78 of file sound4.x1.cloud-pipe.cpp.

15.15.2.3 ProcessLoop()

```
void ProcessLoop (
            struct cloudx1_CInstance * pInstance )
```

[Processing Loop]

[Processing Loop]

Definition at line 25 of file sound4.x1.cloud-pipe.cpp.

15.15.2.4 Usage()

```
void Usage (
            const char * progname )
```

Definition at line 58 of file sound4.x1.cloud-pipe.cpp.

15.16 sound4.x1.cloud-pipe.cpp

Go to the documentation of this file.

```
00001
00004 #include <unistd.h>
00005 #include <iostream>
00006 #include <strings.h>
00007 #include <sys/types.h>
00008 #include <thread>           // NOTE: needs pthread link
00009 #if (__cplusplus<201703L)
00010     #error "Need C++17 for this example"
00011 #endif
00012 #include <filesystem>
00013 #if defined(_WIN32) || defined(WIN32)
00014     #include <io.h>
00015     #include <fcntl.h>
00016     #include <stringapiset.h>   // UTF-8 conversion
00017 #endif
00018 #include <sound4.x1.cloud.h>
00019
00020 #define SAMPLE_RATE       48000
00021 #define CHUNK_SIZE        64
00022 #define CHANNEL_COUNT     2
00023
00024 // Reads from stdin, write to stdout
00025 void ProcessLoop(struct cloudx1_CInstance *pInstance)
00026 {
00028 bool stopthread=false;
00029 alignas(64) float audio_in[CHUNK_SIZE*CHANNEL_COUNT];
00030 alignas(64) float audio_out[CHUNK_SIZE*CHANNEL_COUNT];
00031
00032     #if defined(_WIN32) || defined(WIN32)
00033         // Windows: The stdin, stdout, and stderr streams always open in text mode by default
00034         _setmode(_fileno(stdin), _O_BINARY);
00035         _setmode(_fileno(stdout), _O_BINARY);
00036     #endif
00037
00038     while (!stopthread)
00039     {
00040         // Read a chunk from stdin
00041         if (std::fread(&audio_in[0], sizeof(float), CHUNK_SIZE*CHANNEL_COUNT, stdin) !=
    CHUNK_SIZE*CHANNEL_COUNT) {
00042             std::cerr « "ProcessLoop: input stopped"« std::endl;
00043             stopthread=true;
00044             break;
00045         }
00046         if (stopthread) break;
00047         // Process it
00048         cloudx1_ProcessAudio(pInstance, audio_in, audio_out);
00049         // Write it to stdout
00050         if (fwrite(&audio_out[0], sizeof(float), CHUNK_SIZE*CHANNEL_COUNT, stdout) !=
    CHUNK_SIZE*CHANNEL_COUNT) {
00051             std::cerr « "Failed to write audio output" « std::endl;
00052             stopthread=true;
00053         }
00054     }
00056 }
00057
00058 void Usage(const char *progname)
00059 {
00060     std::cerr « "Usage: " « progname « std::endl;;
00061     std::cerr « "  Reads audio from stdin and return processed audio in stdout" « std::endl;
00062     std::cerr « "Environment:"« std::endl;;
00063     std::cerr « " - S4STORE_PATH            : path to store config [default: ./state]"« std::endl;;
00064     std::cerr « " - S4LOGINKEY              : SOUND4 Login key (or S4USERID)"« std::endl;;
00065     std::cerr « " - RADIO_NAME              : SOUND4 Radio Name"« std::endl;;
00066     std::cerr « " - ACCESS_KEY_ID           : SOUND4 Access Key ID"« std::endl;;
00067     std::cerr « " - ACCESS_KEY_SECRET       : SOUND4 Access Key Secret"« std::endl;;
00068     std::cerr « std::endl;
00069     std::cerr « "Example:"« std::endl;
00070     std::cerr « "ffmpeg -re -i file.wav -ar "«SAMPLE_RATE«" -ac "«CHANNEL_COUNT«" -f f32le - |
    "«progname«" | ffplay -f f32le -ar "«SAMPLE_RATE«" -ac "«CHANNEL_COUNT«" -i -" « std::endl;;
00071     #if defined(_WIN32) || defined(WIN32)
00072         std::cerr « "ffmpeg -f dshow -i audio=\"Microphone\" -ar "«SAMPLE_RATE«" -ac "«CHANNEL_COUNT«"
    -f f32le - | "«progname«" | ffplay -f f32le -ar "«SAMPLE_RATE«" -ac "«CHANNEL_COUNT«" -i -" «
    std::endl;;
00073     #else
00074         std::cerr « "ffmpeg -f pulse -i default -ar "«SAMPLE_RATE«" -ac "«CHANNEL_COUNT«" -f f32le - |
    "«progname«" | ffplay -f f32le -ar "«SAMPLE_RATE«" -ac "«CHANNEL_COUNT«" -i -" « std::endl;;
00075     #endif
00076 }
00077
00078 void MyLogger(cloudx1_LogSeverity severe [[maybe_unused]], const char *str)
00079 {
00080     std::cerr « str « std::endl;
```

```
00081 }
00082
00083
00084 int main(int argc, char *const argv[])
00085 {
00086     struct cloudx1_CInstance *pInstance = NULL;
00087     const char *store_path_str=getenv("S4STORE_PATH");
00088     // Get credentials from environment
00089     char *pLoginKey=getenv("S4LOGINKEY");
00090     if (!pLoginKey) {
00091         pLoginKey=getenv("S4USERID");
00092     }
00093     char *pRadioName=getenv("RADIO_NAME");
00094     char *pKeyId=getenv("ACCESS_KEY_ID");
00095     char *pAccessKey=getenv("ACCESS_KEY_SECRET");
00096
00097     const char *progname=argv[0];
00098
00099     if (argc>1) {
00100         if ((strcasecmp(argv[1],"-h")==0) || (strcasecmp(argv[1],"--help")==0)) {
00101             Usage(progname);
00102             return 0;
00103         }
00104     }
00105     if (!pLoginKey || !pRadioName || !pKeyId || !pAccessKey) {
00106         std::cerr « "Missing credentials in environment" « std::endl;
00107         Usage(progname);
00108         return 1;
00109     }
00110     std::error_code ec;
00111     std::filesystem::path fs_store_path;
00112     if (!store_path_str || store_path_str[0]==0) {
00113         fs_store_path=std::filesystem::current_path(ec) / "state";
00114     } else {
00115         fs_store_path = std::filesystem::path(store_path_str);
00116     }
00117     if (!std::filesystem::exists(fs_store_path,ec) ||
      !std::filesystem::is_directory(fs_store_path,ec)) {
00118         std::cerr « "Storage folder '"«(const char*)fs_store_path.u8string().c_str()«"' is not a valid
      directory" « std::endl;
00119         Usage(progname);
00120         return 1;
00121     }
00122     std::string store_path;
00123     #ifdef _WIN32
00124     {
00125         // Convert path to UTF-8
00126         std::wstring wstr(fs_store_path.wstring());
00127         if (wstr.empty()) return {};
00128         int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL, NULL);
00129         std::string str(size, 0);
00130         WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00131         store_path=str;
00132     }
00133     #else // !_WIN32
00134         store_path=fs_store_path;
00135     #endif // !_WIN32
00136
00138     // Optional: Use our own logging, instead of default color output to stderr.
00139     //cloudx1_SetLoggerCallback(&MyLogger);
00140
00141     //cloudx1_SetLogSeverity(cloudx1_LogSeverity::info);
00142     cloudx1_SetLogSeverity(cloudx1_LogSeverity::verbose5);
00143
00144     std::cerr « "Process version: " « cloudx1_GetVersion() « std::endl;
00145     // Do some sanity checks
00146     if (cloudx1_GetSampleRate()!=SAMPLE_RATE) {
00147       std::cerr « "Bad library sampling rate, expecting '"«SAMPLE_RATE«"' but has "«
      cloudx1_GetSampleRate() « std::endl;
00148       return 1;
00149     }
00150     if (cloudx1_GetChunkSizeInFrames()!=CHUNK_SIZE) {
00151       std::cerr « "Bad library frame size, expecting '"«CHUNK_SIZE«"' but has "«
      cloudx1_GetChunkSizeInFrames() « std::endl;
00152       return 1;
00153     }
00154     if (cloudx1_GetChannelCount()!=CHANNEL_COUNT) {
00155       std::cerr « "Bad library channel count, expecting '"«CHANNEL_COUNT«"' but has "«
      cloudx1_GetChannelCount() « std::endl;
00156       return 1;
00157     }
00159
00161     // Setup parameters
00162     struct cloudx1_CParameters *params = cloudx1_NewParameters();
00163     // Optional: activate web authentication, set admin password
00164     // This creates the authentication only for a new storage path
00165     cloudx1_SetParameter(params,"ADMIN_USER", "admin");
```

```
00166     cloudx1_SetParameter(params,"ADMIN_SECRET", "admin");
00167
00168     // Create the processing instance
00169     pInstance=cloudx1_InitProcess2(pLoginKey,pRadioName,pKeyId,pAccessKey,store_path.c_str(), params);
00170     cloudx1_FreeParameters(params);
00171     if (!pInstance) {
00172       std::cerr « "Failed to create the process instance"« std::endl;
00173       return 1;
00174     }
00175
00176     // Start the update thread, without JSON server (low priority)
00177     std::thread updater([pInstance](){
00178        // will returned when stopped or destroyed
00179        std::cerr « "cloudx1_StartUpdateThread (no json port)" « std::endl;
00180        cloudx1_StartUpdateThread(pInstance, 0);
00181        std::cerr « "cloudx1_StartUpdateThread END" « std::endl;
00182      });
00183
00184     // This is not mandatory, but better be sure we are ready right now
00185     std::cerr « "Waiting update thread" « std::endl;
00186     if (cloudx1_WaitUpdateThreadReady(pInstance, 5000)<0) {
00187         std::cerr « "Timeout to create the process instance"« std::endl;
00188     }
00189     std::cerr « "Waiting update thread DONE" « std::endl;
00190
00191 #if (CLOUDX1_HAS_WEBSERVER)
00193     // Starts a web server, listening on port http://localhost:8080, https://localhost:8443
00194     std::cerr « "Starting web server" « std::endl;
00195     int listenport= 8080;
00196     int listenport_secure= 8443;
00197     uint64_t webserver= SOUND4_INVALID_WEBSERVER_ID;
00198     if (listenport || listenport_secure) {
00199         webserver = cloudx1_Webserver(listenport,listenport_secure,pInstance);
00200         if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
00201             std::cerr « "Starting web server FAILED" « std::endl;
00202         } else {
00203             int web_status=cloudx1_Webserver_Status(webserver);
00204             if (listenport) {
00205                 if (web_status & SOUND4_WEBSERVER_HTTP_OK) {
00206                     std::cerr « "Web server listening on port " « listenport;
00207                 } else {
00208                     std::cerr « "Web server failed to listen on port " « listenport;
00209                 }
00210             }
00211             if (listenport_secure) {
00212                 if (web_status & SOUND4_WEBSERVER_HTTPS_OK) {
00213                     std::cerr « "Web server listening on secure port " « listenport_secure;
00214                 } else {
00215                     std::cerr « "Web server failed to listen on secure port " « listenport_secure;
00216                 }
00217             }
00218             std::cerr « "Starting web server DONE" « std::endl;
00219         }
00220     }
00222 #endif // (CLOUDX1_HAS_WEBSERVER)
00223
00224      // Force load a factory preset now
00225      // Could be used instead of setting a store_path
00226      /*{
00227          cloudx1_CClientInstance *pClient=cloudx1_NewClient(pInstance);
00228          const char *answer=cloudx1_ProcessJson(pClient, "{ \"factoryload\": \"All Programs\" }",
      NULL);
00229          std::cerr « "Loaded factory preset answer: " « answer« std::endl;
00230          cloudx1_FreeJsonAnswer(answer);
00231          cloudx1_DeleteClient(pClient);
00232      }*/
00234
00235     std::cerr « "Estimated delay " « ( cloudx1_GetEstimatedDelay(pInstance)*1000.0/SAMPLE_RATE ) « "
      ms" « std::endl;
00236
00237     ProcessLoop(pInstance);
00238
00240 #if (CLOUDX1_HAS_WEBSERVER)
00241     // Stopping the webserver
00242     std::cerr « "Stopping web server" « std::endl;
00243     cloudx1_Webserver_Stop(webserver, 1000);
00244     std::cerr « "Stopping web server DONE" « std::endl;
00245 #endif // (CLOUDX1_HAS_WEBSERVER)
00246
00247     // Stopping the processing instance
00248     std::cerr « "Stopping Update thread" « std::endl;
00249     cloudx1_StopUpdateThread(pInstance); // this will exit the update thread
00250     std::cerr « "Stopping Update thread DONE" « std::endl;
00251
00252     updater.join();
00253
00254     cloudx1_ExitProcess(pInstance);
```

```
00256
00257     return 0;
00258 }
```

15.17 sound4cl-pipe.cpp File Reference

C++ sample using C++ interface wrapper with dynamic library loading Works with any SOUND4 processor provided.

```
#include <unistd.h>
#include <iostream>
#include <strings.h>
#include <sys/types.h>
#include <filesystem>
#include <fstream>
#include <sstream>
#include <io.h>
#include <fcntl.h>
#include "sound4cl.hpp"
```

Classes

- class MyPresetManager

  [Custom preset manager]

Functions

- std::string GetEnv (const std::string &name)
- void ProcessLoop (sound4::CInstance &instance, sound4::CProcessor &processor)
- int main (int argc, const char **argv)

  [Custom preset manager]

15.17.1 Function Documentation

15.17.1.1 GetEnv()

```
std::string GetEnv (
            const std::string & name )
```

Definition at line 61 of file sound4cl-pipe.cpp.

15.17.1.2 main()

```
int main (
             int argc,
             const char ** argv )
```

[Dynamic loading config]

[Dynamic loading config]

[Dynamic loading]

[Dynamic loading]

[Setup and configure]

[Setup and configure]

[Custom preset manager loading]

[Custom preset manager loading]

[Create the processing instance]

[Create the processing instance]

[Starting a web-server]

[Starting a web-server]

[Communicating with the instance]

[Communicating with the instance]

Definition at line 183 of file sound4cl-pipe.cpp.

15.17.1.3 ProcessLoop()

```
void ProcessLoop (
             sound4::CInstance & instance,
             sound4::CProcessor & processor )
```

[Processing Loop]

[Processing Loop]

Definition at line 70 of file sound4cl-pipe.cpp.

15.18 sound4cl-pipe.cpp

Go to the documentation of this file.

```
00001
00006 #include <unistd.h>
00007 #include <iostream>
00008 #include <strings.h>
00009 #include <sys/types.h>
00010 #include <filesystem>
00011 #include <fstream>
00012 #include <sstream>
00013 #if defined(_WIN32) || defined(WIN32)
00014     #include <io.h>
00015     #include <fcntl.h>
00016 #endif
00017
00018 #include "sound4cl.hpp"
00019
00020 // ------------------------------------------------------------
00061 std::string GetEnv(const std::string& name)
00062 {
00063     char *data=getenv(name.c_str());
00064     if (!data) return {};
00065     return std::string(data);
00066 }
00067
00068
00069 // Reads from stdin, write to stdout
00070 void ProcessLoop(sound4::CInstance &instance, sound4::CProcessor &processor)
00071 {
00072 bool stopthread=false;
00073
00074     #if defined(_WIN32) || defined(WIN32)
00075         // Windows: The stdin, stdout, and stderr streams always open in text mode by default
00076         _setmode(_fileno(stdin), _O_BINARY);
00077         _setmode(_fileno(stdout), _O_BINARY);
00078     #endif
00079
00081     size_t input_sample_count = instance.GetChunkFrames() * processor.GetChannelCount();
00082     size_t output_sample_count = instance.GetChunkFrames() * processor.GetChannelCount();
00083     while (!stopthread)
00084     {
00085         // Read a chunk from stdin
00086         if (std::fread(instance.GetBufferIn(), sizeof(float), input_sample_count, stdin) !=
      input_sample_count) {
00087             std::cerr « "ProcessLoop: input stopped"« std::endl;
00088             stopthread=true;
00089             break;
00090         }
00091         if (stopthread) break;
00092         // Process it
00093         instance.ProcessAudio();
00094         // Write it to stdout
00095         if (fwrite(instance.GetBufferOut(), sizeof(float), output_sample_count, stdout) !=
      output_sample_count) {
00096             std::cerr « "Failed to write audio output" « std::endl;
00097             stopthread=true;
00098         }
00099     }
00101 }
00102
00104 class MyPresetManager : public sound4::CPresetLoader {
00105 public:
00106     MyPresetManager() = default;
00107     virtual ~MyPresetManager() = default;
00108
00109     bool SetupPath(const std::filesystem::path& a_preset_path)
00110         {
00111             m_preset_path=a_preset_path;
00112             std::error_code ec;
00113             if ( !std::filesystem::exists(m_preset_path,ec ) ) {
00114                 return false;
00115             }
00116             if ( !std::filesystem::is_directory(m_preset_path, ec) ) {
00117                 return false;
00118             }
00119             return true;
00120         }
00121     virtual bool IsReadOnly() override { return false; };
00122     virtual bool Exists(const std::filesystem::path &name) override
00123         {
00124             std::error_code ec;
00125             return std::filesystem::exists(GetRealPath(name), ec);
00126         }
00127     virtual bool Remove(const std::filesystem::path &name) override
```

```
00128         {
00129             std::error_code ec;
00130             return std::filesystem::remove(GetRealPath(name), ec);
00131         }
00132     virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) override
00133         {
00134             std::error_code ec;
00135             std::filesystem::rename(GetRealPath(from), GetRealPath(to), ec);
00136             return (!ec);
00137         }
00138     virtual std::vector<std::filesystem::path> GetAll() override
00139         {
00140             std::vector<std::filesystem::path> list;
00141             std::error_code ec;
00142             for (auto it = std::filesystem::directory_iterator(m_preset_path.c_str(),
      std::filesystem::directory_options::skip_permission_denied, ec);
00143                 !ec && it != std::filesystem::directory_iterator{};
00144                  it.increment(ec) )
00145             {
00146                 if (it->is_regular_file(ec)) {
00147                     list.push_back(it->path().lexically_relative(m_preset_path));
00148                 }
00149             }
00150             return list;
00151         }
00152     virtual std::string Read(const std::filesystem::path &filename) override
00153         {
00154             std::ifstream f(GetRealPath(filename));
00155             if ( f.fail() ) {
00156                 return std::string();
00157             }
00158             std::ostringstream ss;
00159             ss « f.rdbuf();
00160             return ss.str();
00161         }
00162     virtual bool Write(const std::filesystem::path &filename, const std::string &content) override
00163         {
00164             std::ofstream f(GetRealPath(filename));
00165             if ( f.fail() ) {
00166                 return false;
00167             }
00168             f « content;
00169             if ( f.fail() ) {
00170                 return false;
00171             }
00172             return true;
00173         }
00174 private:
00175     std::filesystem::path m_preset_path;
00176     std::filesystem::path GetRealPath(const std::filesystem::path &name)
00177         {
00178             return m_preset_path / name;
00179         }
00180 };
00182
00183 int main(int argc, const char **argv)
00184 {
00185     int listen_port = 8080;
00186     auto store_path_str=GetEnv("S4STORE_PATH");
00188     std::string libname =  "libsound4.x1.cloud.so";
00190
00191
00192     // Get credentials from environment
00193     auto LoginKey=GetEnv("S4LOGINKEY");
00194     if (LoginKey.empty()) {
00195         LoginKey=GetEnv("S4USERID");
00196     }
00197     auto RadioName=GetEnv("RADIO_NAME");
00198     auto KeyId=GetEnv("ACCESS_KEY_ID");
00199     auto AccessKey=GetEnv("ACCESS_KEY_SECRET");
00200
00201     const char *progname=argv[0];
00202     for (int n=1;n<argc;n++) {
00203         std::string arg = argv[n];
00204         if (arg=="-p" || arg=="--port") {
00205             if (argc<n+1) {
00206                 std::cerr « "--port needs a number"« std::endl;
00207                 return 1;
00208             }
00209             n++;
00210             listen_port=atoi(argv[n]);
00211         } else if (arg=="-l" || arg=="--lib") {
00212             if (argc<n+1) {
00213                 std::cerr « "--port needs a number"« std::endl;
00214                 return 1;
00215             }
00216             n++;
```

```
00217             libname=argv[n];
00218         } else if (arg=="-h" || arg=="--help") {
00219             std::cerr « "Usage: " « progname « " [-p port] [-l libname.so]"«std::endl;;
00220             std::cerr « "  Reads audio from stdin and return processed audio in stdout" « std::endl;
00221             std::cerr « "   -l, --lib   : library to load ["«libname«"]" « std::endl;
00222             std::cerr « "   -p, --port  : port for web server ["«listen_port«"]" « std::endl;
00223             std::cerr « std::endl;
00224             std::cerr « "Environment:"« std::endl;;
00225             std::cerr « " - S4STORE_PATH            : path to store config [default: (no storage)]"«
      std::endl;;
00226             std::cerr « " - S4LOGINKEY              : SOUND4 Login key (or S4USERID)"« std::endl;;
00227             std::cerr « " - RADIO_NAME              : SOUND4 Radio Name"« std::endl;;
00228             std::cerr « " - ACCESS_KEY_ID           : SOUND4 Access Key ID"« std::endl;;
00229             std::cerr « " - ACCESS_KEY_SECRET       : SOUND4 Access Key Secret"« std::endl;
00230             std::cerr « std::endl;
00231             std::cerr « "Example:"« std::endl;
00232             std::cerr « "  ffmpeg -re -i file.wav -ar 48000 -ac 2 -f f32le - | "«progname«" | ffplay
      -f f32le -ar 48000 -ac 2 -i -" « std::endl;;
00233             #if defined(_WIN32) || defined(WIN32)
00234             std::cerr « "  ffmpeg -f dshow -i audio=\"Microphone\" -ar 48000 -ac 2 -f f32le - |
      "«progname«" | ffplay -f f32le -ar 48000 -ac 2 -i -" « std::endl;;
00235             #else
00236             std::cerr « "  ffmpeg -f pulse -i default -ar 48000 -ac 2 -f f32le - | "«progname«" |
      ffplay -f f32le -ar 48000 -ac 2 -i -" « std::endl;;
00237             #endif
00238             return 0;
00239         } else {
00240             std::cerr « "unknown argument '"«arg«"'"« std::endl;
00241             return 1;
00242         }
00243     }
00244
00245
00247     sound4::CProcessor processor;
00248     if (!processor.Load(libname)) {
00249         std::cerr « "Failed to load processing library" « std::endl;
00250         return 1;
00251     }
00253
00254     if (LoginKey.empty() || RadioName.empty() || KeyId.empty() || AccessKey.empty()) {
00255         std::cerr « "Missing credentials in environment" « std::endl;
00256         return 1;
00257     }
00258     std::filesystem::path store_path;
00259     if (!store_path_str.empty()) {
00260         store_path = std::filesystem::path(store_path_str);
00261         std::error_code ec;
00262         if (!std::filesystem::exists(store_path,ec) || !std::filesystem::is_directory(store_path,ec))
      {
00263             std::cerr « "Storage folder '"«(const char*)store_path.u8string().c_str()«"' is not a
      valid directory" « std::endl;
00264             return 1;
00265         }
00266     }
00267
00269     processor.SetLogSeverity(sound4::verbose5);
00270     processor.SetLoggerCallback([](sound4::LogSeverity severity,const std::string& msg) {
00271             std::cerr « msg « std::endl;
00272         });
00273
00274     sound4::CInstance instance(processor);
00275     instance.SetParam("ADMIN_USER","admin");
00276     instance.SetParam("ADMIN_SECRET","admin");
00278
00280     MyPresetManager preset_manager;
00281     if (!store_path.empty()) {
00282         if (!preset_manager.SetupPath(store_path)) {
00283             std::cerr « "Failed to setup the custom preset manager on path " « (const
      char*)store_path.u8string().c_str() « std::endl;
00284             return 1;
00285         }
00286         instance.SetPresetManager(&preset_manager);
00287     }
00289
00290     std::cerr « "Creating" « std::endl;
00292     if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, {})) {
00293         std::cerr « "Failed to create the processing instance" « std::endl;
00294         return 1;
00295     }
00297
00298     std::cerr « "Starting web server" « std::endl;
00300     if (!instance.StartWebServer(listen_port,0)) {
00301         std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
00302         return 1;
00303     }
00305
00306     {
```

```
00308         auto client = instance.NewClient();
00309         auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
00310         std::cerr « "Request for processor name returned "«answer«std::endl;
00312     }
00313
00314     ProcessLoop(instance, processor);
00315
00316     std::cerr « "Stopping now" « std::endl;
00317     instance.Stop();
00318
00319     std::cerr « "End" « std::endl;
00320     return 0;
00321 }
```

15.19 sound4.x1.cloud.h File Reference

C interface for library.

```
#include <windows.h>
#include <stdint.h>
```

Classes

- struct SOUND4_ProcessInfo
- struct SOUND4_AuxiliaryOutputInfos

Macros

- #define CLOUDX1_DECL __declspec(dllimport)
- #define CLOUDX1_HAS_WEBSERVER 1
- #define CLOUDX1_HAS_CLOUDBUS 0
- #define CLOUDX1_AUDIOFRAME_COUNT 64
- #define CLOUDX1_CHANNEL_COUNT 2
- #define CLOUDX1_AUDIO_INPUT_COUNT 1
- #define CLOUDX1_AUDIO_OUTPUT_COUNT 1
- #define CLOUDX1_SAMPLE_RATE 48000
- #define SOUND4_INVALID_WEBSERVER_ID ((uint64_t)-1)
- #define SOUND4_WEBSERVER_HTTP_OK (1<<0)
- #define SOUND4_WEBSERVER_HTTPS_OK (1<<1)

Typedefs

- typedef void(* cloudx1_loggerfn) (enum cloudx1_LogSeverity, const char *)
- typedef struct _tlgProvider_t const * TraceLoggingHProvider
- typedef wchar_t fs_char
- typedef char *(* cloudx1_storage_reader) (const fs_char *filename, void *userdata)
- typedef void(* cloudx1_storage_reader_free) (char *content, void *userdata)
- typedef int(* cloudx1_storage_writer) (const fs_char *filename, const char *content, void *userdata)
- typedef int(* cloudx1_storage_exists) (const fs_char *filename, void *userdata)
- typedef fs_char **(* cloudx1_storage_getall) (void *userdata)
- typedef void(* cloudx1_storage_getall_free) (fs_char **all, void *userdata)
- typedef int(* cloudx1_storage_remove) (const fs_char *filename, void *userdata)
- typedef int(* cloudx1_storage_rename) (const fs_char *from, const fs_char *to, void *userdata)

Enumerations

- enum cloudx1_LogSeverity {
  none = 0 , fatal = 1 , error = 2 , warning = 3 ,
  info = 4 , verbose = 5 , verbose2 = 6 , verbose3 = 7 ,
  verbose4 = 8 , verbose5 = 9 }
- enum cloudx1_PresetChange_Kind { change_kind_created = 1 , change_kind_modified , change_kind_deleted }
- enum cloudx1_SampleFormat {
  INVALID_FORMAT =0 , S16_LE , S16_BE , S24_LE ,
  S24_BE , S32_LE , S32_BE , F32_LE ,
  F32_BE , S16_NATIVE =S16_LE , S24_NATIVE =S24_LE , S32_NATIVE =S32_LE ,
  F32_NATIVE =F32_LE }

Functions

- const struct SOUND4_ProcessInfo * SOUND4_GetProcessInfo ()
- const char * cloudx1_GetVersion ()
- unsigned int cloudx1_GetChunkSizeInFrames ()
- unsigned int * cloudx1_GetPossibleChunkSizeInFrames ()
- unsigned int cloudx1_GetChannelCount ()
- unsigned int cloudx1_GetAudioInputCount ()
- unsigned int cloudx1_GetAudioOutputCount ()
- unsigned int cloudx1_GetSampleRate ()
- void cloudx1_SetLoggerCallback (cloudx1_loggerfn logger)
- void cloudx1_SetLogSeverity (enum cloudx1_LogSeverity severity)
- struct cloudx1_CParameters * cloudx1_NewParameters ()
- void cloudx1_FreeParameters (struct cloudx1_CParameters *params)
- void cloudx1_SetParameter (struct cloudx1_CParameters *params, const char *name, const char *value)
- const char * cloudx1_GetParameter (struct cloudx1_CParameters *params, const char *name)
- void cloudx1_FreeParameterValue (const char *value)
- struct cloudx1_CInstance * cloudx1_InitProcess (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path)
- struct cloudx1_CInstance * cloudx1_InitProcess2 (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path, const struct cloudx1_CParameters *parameters)
- struct cloudx1_CInstance * cloudx1_InitProcess3 (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path, const struct cloudx1_CParameters *parameters, unsigned int frames_per_chunk)
- unsigned int cloudx1_GetProcessChunkFrames (struct cloudx1_CInstance *instance)
- int cloudx1_TerminateProcess (struct cloudx1_CInstance *instance)
- void cloudx1_ExitProcess (struct cloudx1_CInstance *instance)
- void cloudx1_SetInstanceTracing (struct cloudx1_CParameters *params, TraceLoggingHProvider tracing_↩ provider, GUID activity_guid)
- void cloudx1_SetInstanceTracingProcessActivity (struct cloudx1_CInstance *instance, GUID activity_guid)
- void cloudx1_SetPresetManager (struct cloudx1_CParameters *params, cloudx1_storage_reader reader, cloudx1_storage_reader_free, cloudx1_storage_writer writer, cloudx1_storage_exists exists, cloudx1_storage_getall getall, cloudx1_storage_getall_free getall_free, cloudx1_storage_remove remove, cloudx1_storage_rename rename, int IsReadOnly, void *userdata)
- void cloudx1_PresetManager_InformChange (struct cloudx1_CInstance *instance, const fs_char *relative↩ _path, enum cloudx1_PresetChange_Kind change_kind)
- void cloudx1_SetMetadata (struct cloudx1_CInstance *instance, const char *key, const char *value)
- void cloudx1_SetMetadataMulti (struct cloudx1_CInstance *instance, const char **keyvalue)
- const char ** cloudx1_GetMetadataInfos (struct cloudx1_CInstance *instance)
- void cloudx1_FreeMetadataInfos (struct cloudx1_CInstance *instance, const char **infos)

- void cloudx1_StartUpdateThread (struct cloudx1_CInstance *instance, unsigned int port)
- void cloudx1_StopUpdateThread (struct cloudx1_CInstance *instance)
- int cloudx1_WaitUpdateThreadReady (struct cloudx1_CInstance *instance, int milliseconds)
- void cloudx1_ProcessAudio (struct cloudx1_CInstance *instance, const float *input, float *output)
- void cloudx1_ProcessAudio_Planar (struct cloudx1_CInstance *instance, float const *const *input, float *const *output)
- float * cloudx1_GetBufferIn (struct cloudx1_CInstance *instance)
- float * cloudx1_GetBufferOut (struct cloudx1_CInstance *instance)
- unsigned int cloudx1_GetEstimatedDelay (struct cloudx1_CInstance *instance)
- struct SOUND4_AuxiliaryOutputInfos ** cloudx1_GetAuxiliaryAudioOutputInfos (struct cloudx1_CInstance *instance)
- void cloudx1_FreeAuxiliaryAudioInfos (struct SOUND4_AuxiliaryOutputInfos **infos)
- int cloudx1_ActivateAuxiliaryAudioID (struct cloudx1_CInstance *instance, const char *id)
- unsigned int cloudx1_GetAuxiliaryAudioEstimatedDelay (struct cloudx1_CInstance *instance, const char *id)
- const char * cloudx1_GetFormatName (const enum cloudx1_SampleFormat fmt)
- enum cloudx1_SampleFormat cloudx1_GetFormatFromName (const char *name)
- unsigned int cloudx1_GetBytesFromFormat (const enum cloudx1_SampleFormat fmt)
- unsigned int cloudx1_GetMaxPacketFrame (struct cloudx1_CInstance *instance)
- unsigned int cloudx1_AddAudio (struct cloudx1_CInstance *instance, const uint8_t *payload, unsigned int nFrame, enum cloudx1_SampleFormat fmt)
- unsigned int cloudx1_AddPadAudio (struct cloudx1_CInstance *instance)
- unsigned int cloudx1_GetOutputCount (struct cloudx1_CInstance *instance)
- unsigned int cloudx1_GetAudio (struct cloudx1_CInstance *instance, uint8_t *payload, unsigned int max_↩ nFrame, enum cloudx1_SampleFormat fmt)
- void cloudx1_AudioConvertFrom (const uint8_t *payload, float *output, size_t nSpl, enum cloudx1_SampleFormat fmt)
- void cloudx1_AudioConvertTo (const float *input, uint8_t *payload, size_t nSpl, enum cloudx1_SampleFormat fmt)
- void cloudx1_StereoToMono (const float *input, float *output, size_t nFrame)
- void cloudx1_MonoToStereo (const float *input, float *output, size_t nFrame)
- void cloudx1_StereoToMono_Planar (const float *inputL, const float *inputR, float *output, size_t nFrame)
- void cloudx1_MonoToStereo_Planar (const float *input, float *outputL, float *outputR, size_t nFrame)
- void cloudx1_AudioMonoFromLiveStereo (const uint8_t *payload, float *output)
- void cloudx1_AudioMonoToLiveStereo (const float *input, uint8_t *payload)
- struct cloudx1_CClientInstance * cloudx1_NewClient (struct cloudx1_CInstance *instance)
- void cloudx1_DeleteClient (struct cloudx1_CClientInstance *client)
- const char * cloudx1_ProcessJson (struct cloudx1_CClientInstance *client, const char *json_str, int *need↩ _save)
- void cloudx1_FreeJsonAnswer (const char *json_str)
- int cloudx1_SaveState (struct cloudx1_CInstance *instance)
- uint64_t cloudx1_Webserver_tcp (unsigned int listenport, unsigned int listenport_secure, const char *socket_ip, unsigned int socket_port)
- uint64_t cloudx1_Webserver_tcp2 (unsigned int listenport, unsigned int listenport_secure, const char *socket_ip, unsigned int socket_port, const struct cloudx1_CParameters *parameters)
- uint64_t cloudx1_Webserver (unsigned int listenport, unsigned int listenport_secure, struct cloudx1_CInstance *instance)
- int cloudx1_Webserver_Stop (uint64_t id, int timeout_ms)
- int cloudx1_Webserver_Status (uint64_t id)
- void cloudx1_Webserver_SetAppHealth (struct cloudx1_CInstance *instance, int httpcode, const char *contenttype, const char *content)
- void cloudx1_Webserver_GetAppHealth (struct cloudx1_CInstance *instance, int *httpcode, char **contenttype, char **content)
- void cloudx1_Webserver_FreeString (char *str)

15.19.1 Macro Definition Documentation

15.19.1.1 CLOUDX1_DECL

```
#define CLOUDX1_DECL __declspec(dllimport)
```

Definition at line 14 of file sound4.x1.cloud.h.

15.19.1.2 CLOUDX1_HAS_CLOUDBUS

```
#define CLOUDX1_HAS_CLOUDBUS 0
```

Definition at line 26 of file sound4.x1.cloud.h.

15.19.1.3 CLOUDX1_HAS_WEBSERVER

```
#define CLOUDX1_HAS_WEBSERVER 1
```

Definition at line 25 of file sound4.x1.cloud.h.

15.19.2 Typedef Documentation

15.19.2.1 TraceLoggingHProvider

```
typedef struct _tlgProvider_t const* TraceLoggingHProvider
```

Definition at line 418 of file sound4.x1.cloud.h.

15.20 sound4.x1.cloud.h

Go to the documentation of this file.

```
00001
00004 #pragma once
00005
00006 #ifdef __unix__
00007     #include <sys/types.h>
00008     #define CLOUDX1_DECL        __attribute__ ((visibility ("default")))
00009 #elif defined(_WIN32) || defined(WIN32)
00010     #include <windows.h>
00011     #ifdef BUILDING_CLOUDX1_DLL
00012         #define CLOUDX1_DECL    __declspec(dllexport)
00013     #else
00014         #define CLOUDX1_DECL    __declspec(dllimport)
00015     #endif
00016     #ifdef _MSC_VER
00017         #pragma warning(disable : 4996)
00018     #endif
00019 #elif defined(__APPLE__)
00020     #include <sys/types.h>
00021     #define CLOUDX1_DECL        __attribute__ ((visibility ("default")))
00022 #endif
00023 #include <stdint.h>
00024
00025 #define CLOUDX1_HAS_WEBSERVER 1
00026 #define CLOUDX1_HAS_CLOUDBUS 0
00027
00028 #ifdef __cplusplus
00029 extern "C" {
```

```
00030 #endif // __cplusplus
00031
00032 // ------------------------------------------------------------
00046 #define CLOUDX1_AUDIOFRAME_COUNT      64
00052 #define CLOUDX1_CHANNEL_COUNT          2
00058 #define CLOUDX1_AUDIO_INPUT_COUNT      1
00064 #define CLOUDX1_AUDIO_OUTPUT_COUNT     1
00070 #define CLOUDX1_SAMPLE_RATE            48000
00071
00077 struct SOUND4_ProcessInfo {
00078     size_t struct_size;
00079     const char *name;
00080     const char *prefix;
00081     const char *shortname;
00082     const char *version;
00083 };
00084
00092 CLOUDX1_DECL const struct SOUND4_ProcessInfo* SOUND4_GetProcessInfo();
00093
00099 CLOUDX1_DECL const char *cloudx1_GetVersion();
00100
00113 CLOUDX1_DECL unsigned int cloudx1_GetChunkSizeInFrames();
00114
00123 CLOUDX1_DECL unsigned int* cloudx1_GetPossibleChunkSizeInFrames();
00124
00132 CLOUDX1_DECL unsigned int cloudx1_GetChannelCount();
00133
00142 CLOUDX1_DECL unsigned int cloudx1_GetAudioInputCount();
00143
00152 CLOUDX1_DECL unsigned int cloudx1_GetAudioOutputCount();
00153
00161 CLOUDX1_DECL unsigned int cloudx1_GetSampleRate();
00162
00166 enum cloudx1_LogSeverity {
00167     none     = 0,
00168     fatal    = 1,
00169     error    = 2,
00170     warning  = 3,
00171     info     = 4,
00172     verbose  = 5,
00173     verbose2 = 6,
00174     verbose3 = 7,
00175     verbose4 = 8,
00176     verbose5 = 9,
00177 };
00178
00185 typedef void (*cloudx1_loggerfn) (enum cloudx1_LogSeverity, const char *);
00186
00196 CLOUDX1_DECL void cloudx1_SetLoggerCallback( cloudx1_loggerfn logger );
00197
00205 CLOUDX1_DECL void cloudx1_SetLogSeverity( enum cloudx1_LogSeverity severity );
00206
00209 // ------------------------------------------------------------
00217 // ------------------------------------------------------------
00221 struct cloudx1_CInstance;
00222
00226 struct cloudx1_CParameters;
00227
00235 CLOUDX1_DECL struct cloudx1_CParameters *cloudx1_NewParameters();
00236
00240 CLOUDX1_DECL void cloudx1_FreeParameters(struct cloudx1_CParameters *params);
00241
00253 CLOUDX1_DECL void cloudx1_SetParameter(struct cloudx1_CParameters *params, const char *name, const
      char *value);
00254
00260 CLOUDX1_DECL const char *cloudx1_GetParameter(struct cloudx1_CParameters *params, const char *name);
00261
00267 CLOUDX1_DECL void cloudx1_FreeParameterValue(const char *value);
00268
00276 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess(
00277         const char *LoginKey,
00278         const char *RadioName,
00279         const char *Access_Key_ID,
00280         const char *Access_Key_Secret,
00281         const char *save_path
00282     );
00283
00291 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess2(
00292         const char *LoginKey,
00293         const char *RadioName,
00294         const char *Access_Key_ID,
00295         const char *Access_Key_Secret,
00296         const char *save_path,
00297         const struct cloudx1_CParameters *parameters
00298     );
00299
00327 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess3(
```

```
00328         const char *LoginKey,
00329         const char *RadioName,
00330         const char *Access_Key_ID,
00331         const char *Access_Key_Secret,
00332         const char *save_path,
00333         const struct cloudx1_CParameters *parameters,
00334         unsigned int frames_per_chunk
00335     );
00336
00348 CLOUDX1_DECL unsigned int cloudx1_GetProcessChunkFrames(struct cloudx1_CInstance *instance);
00349
00359 CLOUDX1_DECL int cloudx1_TerminateProcess(struct cloudx1_CInstance *instance);
00360
00366 CLOUDX1_DECL void cloudx1_ExitProcess(struct cloudx1_CInstance *instance);
00367
00370 #if CLOUDX1_HAS_CLOUDBUS
00371 // ------------------------------------------------------------
00381 struct cloudx1_CBus;
00382
00388 CLOUDX1_DECL struct cloudx1_CBus* cloudx1_NewBus();
00389
00395 CLOUDX1_DECL void cloudx1_FreeBus(struct cloudx1_CBus *bus);
00396
00406 CLOUDX1_DECL void cloudx1_SetInstanceBus(struct cloudx1_CParameters *params, struct cloudx1_CBus
      *bus);
00407
00408
00410 #endif // CLOUDX1_HAS_CLOUDBUS
00411
00412 // ------------------------------------------------------------
00413 //   Tracing (Windows only)
00414 // ------------------------------------------------------------
00415 #ifdef _WIN32
00416 #ifndef TLG_HAVE_EVENT_SET_INFORMATION // TraceLoggingProvider.h has not been included
00417     struct _tlgProvider_t;
00418     typedef struct _tlgProvider_t const* TraceLoggingHProvider;
00419 #endif // !TLG_HAVE_EVENT_SET_INFORMATION
00420 // ------------------------------------------------------------
00435 CLOUDX1_DECL void cloudx1_SetInstanceTracing(struct cloudx1_CParameters *params, TraceLoggingHProvider
      tracing_provider, GUID activity_guid);
00436
00444 CLOUDX1_DECL void cloudx1_SetInstanceTracingProcessActivity(struct cloudx1_CInstance *instance, GUID
      activity_guid);
00445
00447 #endif // _WIN32
00448
00449 // ------------------------------------------------------------
00472 // ------------------------------------------------------------
00473
00474 // OS dependent filesystem path char type
00475 #ifdef _WIN32
00476     typedef wchar_t fs_char;
00477 #else // !_WIN32
00478     typedef char fs_char;
00479 #endif // !_WIN32
00480
00488 typedef char * (*cloudx1_storage_reader) (const fs_char *filename, void* userdata);
00489
00496 typedef void (*cloudx1_storage_reader_free) (char *content, void* userdata);
00497
00506 typedef int (*cloudx1_storage_writer) (const fs_char *filename, const char *content, void* userdata);
00507
00515 typedef int (*cloudx1_storage_exists) (const fs_char *filename, void* userdata);
00516
00524 typedef fs_char** (*cloudx1_storage_getall) (void* userdata);
00525
00532 typedef void (*cloudx1_storage_getall_free) (fs_char**all, void* userdata);
00533
00541 typedef int (*cloudx1_storage_remove) (const fs_char *filename, void* userdata);
00542
00551 typedef int (*cloudx1_storage_rename) (const fs_char *from, const fs_char *to, void* userdata);
00552
00570 CLOUDX1_DECL void cloudx1_SetPresetManager(struct cloudx1_CParameters *params
00571     , cloudx1_storage_reader reader, cloudx1_storage_reader_free
00572     , cloudx1_storage_writer writer
00573     , cloudx1_storage_exists exists
00574     , cloudx1_storage_getall getall, cloudx1_storage_getall_free getall_free
00575     , cloudx1_storage_remove remove
00576     , cloudx1_storage_rename rename
00577     , int IsReadOnly
00578     , void* userdata
00579     );
00580
00584 enum cloudx1_PresetChange_Kind {
00585     change_kind_created = 1,
00586     change_kind_modified   ,
00587     change_kind_deleted    ,
```

```
00588 };
00589
00598 CLOUDX1_DECL void cloudx1_PresetManager_InformChange(struct cloudx1_CInstance *instance, const fs_char
      *relative_path, enum cloudx1_PresetChange_Kind change_kind);
00599
00602 // ------------------------------------------------------------------
00610 // ------------------------------------------------------------------
00611
00628 CLOUDX1_DECL void cloudx1_SetMetadata(struct cloudx1_CInstance *instance, const char* key, const char*
      value);
00629
00640 CLOUDX1_DECL void cloudx1_SetMetadataMulti(struct cloudx1_CInstance *instance, const char** keyvalue);
00641
00649 CLOUDX1_DECL const char** cloudx1_GetMetadataInfos(struct cloudx1_CInstance *instance);
00650
00657 CLOUDX1_DECL void cloudx1_FreeMetadataInfos(struct cloudx1_CInstance *instance, const char** infos);
00658
00661 // ------------------------------------------------------------------
00668 // ------------------------------------------------------------------
00669
00682 CLOUDX1_DECL void cloudx1_StartUpdateThread(struct cloudx1_CInstance *instance, unsigned int port);
00683
00689 CLOUDX1_DECL void cloudx1_StopUpdateThread(struct cloudx1_CInstance *instance);
00690
00698 CLOUDX1_DECL int cloudx1_WaitUpdateThreadReady(struct cloudx1_CInstance *instance, int milliseconds);
00699
00702 // ------------------------------------------------------------------
00709 // ------------------------------------------------------------------
00731 CLOUDX1_DECL void cloudx1_ProcessAudio(struct cloudx1_CInstance *instance, const float *input, float
      *output );
00732
00751 CLOUDX1_DECL void cloudx1_ProcessAudio_Planar(struct cloudx1_CInstance *instance
00752     , float const * const *input
00753     , float * const *output);
00754
00767 CLOUDX1_DECL float *cloudx1_GetBufferIn(struct cloudx1_CInstance *instance);
00768
00781 CLOUDX1_DECL float *cloudx1_GetBufferOut(struct cloudx1_CInstance *instance);
00782
00792 CLOUDX1_DECL unsigned int cloudx1_GetEstimatedDelay(struct cloudx1_CInstance *instance);
00793
00796 // ------------------------------------------------------------------
00806 // ------------------------------------------------------------------
00810 struct SOUND4_AuxiliaryOutputInfos {
00811     char *id;
00812     char *description;
00813     unsigned int sample_rate;
00814     unsigned int channel_count;
00815     const float *buffer;
00816 };
00817
00825 CLOUDX1_DECL struct SOUND4_AuxiliaryOutputInfos** cloudx1_GetAuxiliaryAudioOutputInfos(struct
      cloudx1_CInstance *instance);
00826
00832 CLOUDX1_DECL void cloudx1_FreeAuxiliaryAudioInfos(struct SOUND4_AuxiliaryOutputInfos** infos);
00833
00843 CLOUDX1_DECL int cloudx1_ActivateAuxiliaryAudioID(struct cloudx1_CInstance *instance, const char* id);
00844
00856 CLOUDX1_DECL unsigned int cloudx1_GetAuxiliaryAudioEstimatedDelay(struct cloudx1_CInstance *instance,
      const char* id);
00857
00860 // ------------------------------------------------------------------
00869 // ------------------------------------------------------------------
00870     #ifdef _MSC_VER
00871         #define __BYTE_ORDER__  REG_DWORD
00872         #define __ORDER_LITTLE_ENDIAN__ REG_DWORD_LITTLE_ENDIAN
00873         #define __ORDER_BIG_ENDIAN__    REG_DWORD_BIG_ENDIAN
00874     #endif
00875
00879 enum cloudx1_SampleFormat {
00880     INVALID_FORMAT=0,
00881     S16_LE,
00882     S16_BE,
00883     S24_LE,
00884     S24_BE,
00885     S32_LE,
00886     S32_BE,
00887     F32_LE,
00888     F32_BE,
00889
00890     // Native definitions, only links to the physical ones
00891     #if __BYTE_ORDER__ == __ORDER_LITTLE_ENDIAN__
00892         S16_NATIVE=S16_LE,
00893         S24_NATIVE=S24_LE,
00894         S32_NATIVE=S32_LE,
00895         F32_NATIVE=F32_LE,
00896     #else
```

```
00897         S16_NATIVE=S16_BE,
00898         S24_NATIVE=S24_BE,
00899         S32_NATIVE=S32_BE,
00900         F32_NATIVE=F32_BE,
00901     #endif
00902 };
00903
00910 CLOUDX1_DECL const char *cloudx1_GetFormatName(const enum cloudx1_SampleFormat fmt);
00911
00918 CLOUDX1_DECL enum cloudx1_SampleFormat cloudx1_GetFormatFromName(const char *name);
00919
00926 CLOUDX1_DECL unsigned int cloudx1_GetBytesFromFormat(const enum cloudx1_SampleFormat fmt);
00927
00928
00935 CLOUDX1_DECL unsigned int cloudx1_GetMaxPacketFrame(struct cloudx1_CInstance *instance);
00936
00947 CLOUDX1_DECL unsigned int cloudx1_AddAudio(struct cloudx1_CInstance *instance, const uint8_t *payload,
      unsigned int nFrame, enum cloudx1_SampleFormat fmt );
00948
00955 CLOUDX1_DECL unsigned int cloudx1_AddPadAudio(struct cloudx1_CInstance *instance);
00956
00963 CLOUDX1_DECL unsigned int cloudx1_GetOutputCount(struct cloudx1_CInstance *instance);
00964
00974 CLOUDX1_DECL unsigned int cloudx1_GetAudio(struct cloudx1_CInstance *instance, uint8_t *payload,
      unsigned int max_nFrame, enum cloudx1_SampleFormat fmt );
00975
00979 // ------------------------------------------------------------------
00986 // ------------------------------------------------------------------
00997 CLOUDX1_DECL void cloudx1_AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl, enum
      cloudx1_SampleFormat fmt);
00998
01009 CLOUDX1_DECL void cloudx1_AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl, enum
      cloudx1_SampleFormat fmt);
01010
01020 CLOUDX1_DECL void cloudx1_StereoToMono(const float *input, float *output, size_t nFrame);
01021
01031 CLOUDX1_DECL void cloudx1_MonoToStereo(const float *input, float *output, size_t nFrame);
01032
01043 CLOUDX1_DECL void cloudx1_StereoToMono_Planar(const float *inputL, const float *inputR, float *output,
      size_t nFrame);
01044
01055 CLOUDX1_DECL void cloudx1_MonoToStereo_Planar(const float *input, float *outputL, float *outputR,
      size_t nFrame);
01056
01063 CLOUDX1_DECL void cloudx1_AudioMonoFromLiveStereo(const uint8_t *payload, float *output);
01064
01071 CLOUDX1_DECL void cloudx1_AudioMonoToLiveStereo(const float *input, uint8_t *payload);
01072
01075 // ------------------------------------------------------------------
01082 // ------------------------------------------------------------------
01086 struct cloudx1_CClientInstance;
01087
01096 CLOUDX1_DECL struct cloudx1_CClientInstance *cloudx1_NewClient(struct cloudx1_CInstance *instance);
01097
01103 CLOUDX1_DECL void cloudx1_DeleteClient(struct cloudx1_CClientInstance *client);
01104
01118 CLOUDX1_DECL const char *cloudx1_ProcessJson(struct cloudx1_CClientInstance *client, const char
      *json_str, int *need_save);
01119
01125 CLOUDX1_DECL void cloudx1_FreeJsonAnswer(const char *json_str);
01126
01138 CLOUDX1_DECL int cloudx1_SaveState(struct cloudx1_CInstance *instance);
01139
01142 #if CLOUDX1_HAS_WEBSERVER
01143 // ------------------------------------------------------------------
01161 // ------------------------------------------------------------------
01169 CLOUDX1_DECL uint64_t cloudx1_Webserver_tcp(unsigned int listenport, unsigned int listenport_secure,
      const char *socket_ip, unsigned int socket_port);
01170
01171 // ------------------------------------------------------------------
01191 CLOUDX1_DECL uint64_t cloudx1_Webserver_tcp2(unsigned int listenport, unsigned int listenport_secure,
      const char *socket_ip, unsigned int socket_port, const struct cloudx1_CParameters *parameters);
01192
01210 CLOUDX1_DECL uint64_t cloudx1_Webserver(unsigned int listenport, unsigned int listenport_secure,
      struct cloudx1_CInstance *instance);
01211
01221 CLOUDX1_DECL int cloudx1_Webserver_Stop(uint64_t id, int timeout_ms);
01222
01231 CLOUDX1_DECL int cloudx1_Webserver_Status(uint64_t id);
01232
01243 CLOUDX1_DECL void cloudx1_Webserver_SetAppHealth(struct cloudx1_CInstance *instance, int httpcode,
      const char *contenttype, const char *content);
01244
01253 CLOUDX1_DECL void cloudx1_Webserver_GetAppHealth(struct cloudx1_CInstance *instance, int* httpcode,
      char** contenttype, char** content);
01254
01260 CLOUDX1_DECL void cloudx1_Webserver_FreeString(char *str);
```

```
01261
01266 #define SOUND4_INVALID_WEBSERVER_ID            ((uint64_t)-1)
01267
01271 #define SOUND4_WEBSERVER_HTTP_OK               (1<<0)
01275 #define SOUND4_WEBSERVER_HTTPS_OK              (1<<1)
01276
01278 #endif // CLOUDX1_HAS_WEBSERVER
01279
01280 #ifdef __cplusplus
01281 } // extern "C"
01282 #endif // __cplusplus
```

15.21 sound4.x1.cloud.hpp File Reference

C++ wrapper for library.

```
#include <string>
#include <exception>
#include <thread>
#include <functional>
#include <memory>
#include <array>
#include <assert.h>
#include <stdexcept>
#include <filesystem>
#include <string.h>
#include "sound4.x1.cloud.h"
#include <stringapiset.h>
#include <wchar.h>
```

Classes

- struct sound4::AuxiliaryOutputInfos
- struct sound4::cloudx1::helper::SampleFormat< T >

  Helper for Sample format types.
- class sound4::cloudx1::CPresetLoader

  Custom preset handler helper.
- class sound4::cloudx1::CInstance

  Instance handling class.
- class sound4::cloudx1::CInstance::CClient

Namespaces

- namespace sound4
- namespace sound4::cloudx1
- namespace sound4::cloudx1::helper

Typedefs

- using sound4::cloudx1::SampleFormat = cloudx1_SampleFormat
- using sound4::cloudx1::LogSeverity = cloudx1_LogSeverity
- using sound4::cloudx1::log_cb_t = std::function< void(LogSeverity, const std::string &)>
- using sound4::cloudx1::PresetChange_Kind = cloudx1_PresetChange_Kind

Functions

- static char * cloudx1_custom_reader (const fs_char *filename, void *userdata)
- static void cloudx1_custom_reader_free (char *content, void *userdata)
- static int cloudx1_custom_writer (const fs_char *filename, const char *content, void *userdata)
- static int cloudx1_custom_exists (const fs_char *filename, void *userdata)
- static fs_char ** cloudx1_custom_getall (void *userdata)
- static void cloudx1_custom_getall_free (fs_char **all, void *userdata)
- static int cloudx1_custom_remove (const fs_char *filename, void *userdata)
- static int cloudx1_custom_rename (const fs_char *from, const fs_char *to, void *userdata)
- static std::string sound4::cloudx1::helper::WStringToUTF8 (const std::wstring &wstr)
- static std::wstring sound4::cloudx1::helper::UTF8ToWString (const std::string &str)
- static void sound4::cloudx1::helper::AudioConvertFrom (const uint8_t *payload, float *output, size_t nSpl, cloudx1_SampleFormat fmt)
- static void sound4::cloudx1::helper::AudioConvertTo (const float *input, uint8_t *payload, size_t nSpl, cloudx1_SampleFormat fmt)
- static void sound4::cloudx1::helper::StereoToMono (const float *input, float *output, size_t nFrame)
- static void sound4::cloudx1::helper::MonoToStereo (const float *input, float *output, size_t nFrame)
- static void sound4::cloudx1::helper::StereoToMono_Planar (const float *inputL, const float *inputR, float *output, size_t nFrame)
- static void sound4::cloudx1::helper::MonoToStereo_Planar (const float *input, float *outputL, float *outputR, size_t nFrame)
- static void sound4::cloudx1::helper::AudioMonoFromLiveStereo (const uint8_t *payload, float *output)
- static void sound4::cloudx1::helper::AudioMonoToLiveStereo (const float *input, uint8_t *payload)
- static std::string sound4::cloudx1::GetVersion ()
- static unsigned int sound4::cloudx1::GetChunkSizeInFrames ()
- static std::vector< unsigned int > sound4::cloudx1::GetPossibleChunkSizeInFrames ()
- static unsigned int sound4::cloudx1::GetChannelCount ()
- static unsigned int sound4::cloudx1::GetAudioInputCount ()
- static unsigned int sound4::cloudx1::GetAudioOutputCount ()
- static unsigned int sound4::cloudx1::GetSampleRate ()
- static void sound4::cloudx1::SanityCheck (bool a_bCheckFrames=true)
- static std::string sound4::cloudx1::GetFormatName (const SampleFormat fmt)
- static SampleFormat sound4::cloudx1::GetFormatFromName (const std::string &name)
- static unsigned int sound4::cloudx1::GetBytesFromFormat (const SampleFormat fmt)
- static void sound4::cloudx1::_log_cb_c (cloudx1_LogSeverity severity, const char *c_msg)
- static void sound4::cloudx1::SetLogSeverity (LogSeverity severity)
- static void sound4::cloudx1::SetLoggerCallback (log_cb_t cb)

Variables

- static constexpr const char * sound4::cloudx1::process_name = "SOUND4 x1.CL"
- static constexpr const char * sound4::cloudx1::process_shortname = "x1"
- const size_t sound4::cloudx1::ChunkFrames = 64
- const size_t sound4::cloudx1::InputChannels = 2 * 1
- const size_t sound4::cloudx1::OutputChannels = 2 * 1
- const size_t sound4::cloudx1::InputSampleSize =ChunkFrames*InputChannels
- const size_t sound4::cloudx1::OutputSampleSize =ChunkFrames*OutputChannels
- const size_t sound4::cloudx1::SampleRate = 48000
- static log_cb_t sound4::cloudx1::_log_cb

15.21.1 Function Documentation

15.21.1.1 cloudx1_custom_exists()

```
static int cloudx1_custom_exists (
            const fs_char * filename,
            void * userdata )  [static]
```

Definition at line 1121 of file sound4.x1.cloud.hpp.

15.21.1.2 cloudx1_custom_getall()

```
static fs_char ** cloudx1_custom_getall (
            void * userdata )  [static]
```

Definition at line 1126 of file sound4.x1.cloud.hpp.

15.21.1.3 cloudx1_custom_getall_free()

```
static void cloudx1_custom_getall_free (
            fs_char ** all,
            void * userdata )  [static]
```

Definition at line 1136 of file sound4.x1.cloud.hpp.

15.21.1.4 cloudx1_custom_reader()

```
static char * cloudx1_custom_reader (
            const fs_char * filename,
            void * userdata )  [static]
```

Definition at line 1107 of file sound4.x1.cloud.hpp.

15.21.1.5 cloudx1_custom_reader_free()

```
static void cloudx1_custom_reader_free (
            char * content,
            void * userdata )  [static]
```

Definition at line 1112 of file sound4.x1.cloud.hpp.

15.21.1.6 cloudx1_custom_remove()

```
static int cloudx1_custom_remove (
            const fs_char * filename,
            void * userdata )  [static]
```

Definition at line 1143 of file sound4.x1.cloud.hpp.

15.21.1.7 cloudx1_custom_rename()

```
static int cloudx1_custom_rename (
            const fs_char * from,
            const fs_char * to,
            void * userdata )  [static]
```

Definition at line 1148 of file sound4.x1.cloud.hpp.

15.21.1.8 cloudx1_custom_writer()

```
static int cloudx1_custom_writer (
            const fs_char * filename,
            const char * content,
            void * userdata )  [static]
```

Definition at line 1116 of file sound4.x1.cloud.hpp.

15.22 sound4.x1.cloud.hpp

Go to the documentation of this file.

```
00001
00004 #pragma once
00005
00006 #include <string>
00007 #include <exception>
00008 #include <thread>
00009 #include <functional>
00010 #include <memory>
00011 #include <array>
00012 #include <assert.h>
00013 #include <stdexcept>
00014 #include <filesystem>
00015 #include <string.h>
00016
00017 #include "sound4.x1.cloud.h"
00018
00019
00020 // Filesystem path char type
00021 #ifdef _WIN32
00022     #include <stringapiset.h>
00023     #include <wchar.h>
00025     #define fs_strdup wcsdup
00026     #ifdef _MSC_VER
00027         #pragma warning(disable : 4996)
00028     #endif
00029 #else // !_WIN32
00031     #define fs_strdup strdup
00032 #endif // !_WIN32
00033
00034 // bridge C callbacks to CPresetLoader
00035 extern "C" {
00036     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata);
00037     static void cloudx1_custom_reader_free(char *content, void* userdata);
00038     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata);
00039     static int cloudx1_custom_exists(const fs_char *filename, void* userdata);
00040     static fs_char** cloudx1_custom_getall(void* userdata);
00041     static void cloudx1_custom_getall_free(fs_char** all, void* userdata);
00042     static int cloudx1_custom_remove(const fs_char *filename, void* userdata);
00043     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00044 };
00045
00049 namespace sound4 {
00050     struct AuxiliaryOutputInfos {
00051         std::string id;
00052         std::string description;
00053         unsigned int sample_rate;
00054         unsigned int channel_count;
00055         const float *buffer;
00056     };
```

```
00060 namespace cloudx1 {
00061     static constexpr const char *process_name = "SOUND4 x1.CL";
00062     static constexpr const char *process_shortname = "x1";
00063     using SampleFormat = cloudx1_SampleFormat;
00068     const size_t ChunkFrames=CLOUDX1_AUDIOFRAME_COUNT;
00073     const size_t InputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_INPUT_COUNT;
00078     const size_t OutputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_OUTPUT_COUNT;
00083     const size_t InputSampleSize=ChunkFrames*InputChannels;
00088     const size_t OutputSampleSize=ChunkFrames*OutputChannels;
00093     const size_t SampleRate=CLOUDX1_SAMPLE_RATE;
00094
00098     namespace helper {
00099         #ifdef _WIN32
00105         static inline std::string WStringToUTF8(const std::wstring& wstr) {
00106             if (wstr.empty()) return {};
00107             int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL,
      NULL);
00108             std::string str(size, 0);
00109             WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00110             return str;
00111         }
00117         static inline std::wstring UTF8ToWString(const std::string& str) {
00118             if (str.empty()) return std::wstring();
00119             int size = MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), NULL, 0);
00120             std::wstring wstr(size, 0);
00121             MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), &wstr[0], size);
00122             return wstr;
00123         }
00124         #endif // _WIN32
00125
00131             template<typename T>
00132         struct SampleFormat {
00133         };
00134             template<>
00135         struct SampleFormat<int16_t> {
00136             const cloudx1_SampleFormat format = S16_NATIVE;
00137         };
00138             template<>
00139         struct SampleFormat<int32_t> {
00140             const cloudx1_SampleFormat format = S32_NATIVE;
00141         };
00142             template<>
00143         struct SampleFormat<float> {
00144             const cloudx1_SampleFormat format = F32_NATIVE;
00145         };
00146
00147         // ----------------------------------------------------------------
00158         static inline void AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl,
      cloudx1_SampleFormat fmt) {
00159             cloudx1_AudioConvertFrom(payload, output, nSpl, fmt);
00160         }
00161
00172         static inline void AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl,
      cloudx1_SampleFormat fmt) {
00173             cloudx1_AudioConvertTo(input, payload, nSpl, fmt);
00174         }
00175
00185         static inline void StereoToMono(const float *input, float *output, size_t nFrame) {
00186             cloudx1_StereoToMono(input, output, nFrame);
00187         }
00188
00198         static inline void MonoToStereo(const float *input, float *output, size_t nFrame) {
00199             cloudx1_MonoToStereo(input, output, nFrame);
00200         }
00201
00212         static inline void StereoToMono_Planar(const float *inputL, const float *inputR, float
      *output, size_t nFrame) {
00213             cloudx1_StereoToMono_Planar(inputL, inputR, output, nFrame);
00214         }
00215
00226         static inline void MonoToStereo_Planar(const float *input, float *outputL, float *outputR,
      size_t nFrame) {
00227             cloudx1_MonoToStereo_Planar(input, outputL, outputR, nFrame);
00228         }
00229
00236         static inline void AudioMonoFromLiveStereo(const uint8_t *payload, float *output) {
00237             cloudx1_AudioMonoFromLiveStereo(payload, output);
00238         }
00239
00246         static inline void AudioMonoToLiveStereo(const float *input, uint8_t *payload) {
00247             cloudx1_AudioMonoToLiveStereo(input, payload);
00248         }
00249
00250     }; // namespace helper
00251
00257     static inline std::string GetVersion()
00258         {
```

```
00259             return std::string(cloudx1_GetVersion());
00260         }
00261
00272     static inline unsigned int GetChunkSizeInFrames()
00273         {
00274             return cloudx1_GetChunkSizeInFrames();
00275         }
00276
00285     static inline std::vector<unsigned int> GetPossibleChunkSizeInFrames()
00286         {
00287             std::vector<unsigned int> list;
00288             for (unsigned int* src=cloudx1_GetPossibleChunkSizeInFrames();*src;src++) {
00289                 list.push_back(*src);
00290             }
00291             return list;
00292         }
00293
00299     static inline unsigned int GetChannelCount()
00300         {
00301             return cloudx1_GetChannelCount();
00302         }
00303
00311     static inline unsigned int GetAudioInputCount()
00312         {
00313             return cloudx1_GetAudioInputCount();
00314         }
00315
00323     static inline unsigned int GetAudioOutputCount()
00324         {
00325             return cloudx1_GetAudioOutputCount();
00326         }
00327
00335     static inline unsigned int GetSampleRate()
00336         {
00337             return cloudx1_GetSampleRate();
00338         }
00339
00345     static inline void SanityCheck(bool a_bCheckFrames = true)
00346     {
00347         // Do some sanity checks
00348         if (cloudx1_GetSampleRate()!=CLOUDX1_SAMPLE_RATE) {
00349             throw std::runtime_error("Bad library sampling rate");
00350         }
00351         if (a_bCheckFrames && cloudx1_GetChunkSizeInFrames()!=ChunkFrames) {
00352             throw std::runtime_error("Bad library frame size");
00353         }
00354         if (cloudx1_GetChannelCount()!=CLOUDX1_CHANNEL_COUNT) {
00355             throw std::runtime_error("Bad library channel count");
00356         }
00357         if (cloudx1_GetAudioInputCount()!=CLOUDX1_AUDIO_INPUT_COUNT) {
00358             throw std::runtime_error("Bad library input count");
00359         }
00360         if (cloudx1_GetAudioOutputCount()!=CLOUDX1_AUDIO_OUTPUT_COUNT) {
00361             throw std::runtime_error("Bad library output count");
00362         }
00363     }
00364
00371     static inline std::string GetFormatName(const SampleFormat fmt)
00372         {
00373             return std::string(cloudx1_GetFormatName(fmt));
00374         }
00375
00382     static inline SampleFormat GetFormatFromName(const std::string& name)
00383         {
00384             return cloudx1_GetFormatFromName(name.c_str());
00385         }
00386
00393     static inline unsigned int GetBytesFromFormat(const SampleFormat fmt)
00394         {
00395             return cloudx1_GetBytesFromFormat(fmt);
00396         }
00397
00401     using LogSeverity = cloudx1_LogSeverity;
00405     using log_cb_t = std::function<void(LogSeverity,const std::string&)>;
00406
00410     static log_cb_t _log_cb;
00411     extern "C" {
00412         static inline void _log_cb_c(cloudx1_LogSeverity severity, const char *c_msg) {
00413             _log_cb(severity, std::string(c_msg));
00414         }
00415     }
00419     static inline void SetLogSeverity(LogSeverity severity)
00420         {
00421             cloudx1_SetLogSeverity(severity);
00422         }
00426     static inline void SetLoggerCallback(log_cb_t cb)
00427         {
```

```
00428             _log_cb=cb;
00429             cloudx1_SetLoggerCallback(&_log_cb_c);
00430         }
00431
00432 #if CLOUDX1_HAS_CLOUDBUS
00438     class CBus {
00439         public:
00440             CBus()
00441                 : m_bus(cloudx1_NewBus()) {}
00442             ~CBus()
00443                 {
00444                     cloudx1_FreeBus(m_bus);
00445                     m_bus = nullptr;
00446                 }
00447             cloudx1_CBus *Get() const { return m_bus; }
00448         private:
00449             cloudx1_CBus *m_bus;
00450     };
00451 #endif // CLOUDX1_HAS_CLOUDBUS
00452
00458     class CPresetLoader {
00459     public:
00460         CPresetLoader() = default;
00461         virtual ~CPresetLoader() = default;
00462
00463         virtual bool IsReadOnly() = 0;
00464         virtual bool Exists(const std::filesystem::path &name) = 0;
00465         virtual bool Remove(const std::filesystem::path &name) = 0;
00466         virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) = 0;
00467         virtual std::vector<std::filesystem::path> GetAll() = 0;
00468         virtual std::string Read(const std::filesystem::path &filename) = 0;
00469         virtual bool Write(const std::filesystem::path &filename, const std::string &content) =0;
00470     };
00471     using PresetChange_Kind = cloudx1_PresetChange_Kind;
00472
00478     class CInstance {
00479     public:
00483         CInstance()
00484             {
00485                 params = cloudx1_NewParameters();
00486                 if (!params) throw std::bad_alloc();
00487             }
00488         // non-copyable
00489         CInstance( const CInstance& ) = delete;
00490         CInstance& operator=( const CInstance& ) = delete;
00494         virtual ~CInstance()
00495             {
00496                 Stop();
00497                 if (params) cloudx1_FreeParameters(params);
00498             }
00502        bool IsOk() const { return instance!=nullptr; }
00512         void SetParam(const std::string& name, const std::string& value)
00513             {
00514                 assert(params);
00515                 cloudx1_SetParameter(params, name.c_str(), value.c_str());
00516             }
00523         std::string GetParam(const std::string& name)
00524             {
00525                 assert(params);
00526                 auto c_value=cloudx1_GetParameter(params, name.c_str());
00527                 std::string ret(c_value);
00528                 cloudx1_FreeParameterValue(c_value);
00529                 return ret;
00530             }
00531
00532 #if CLOUDX1_HAS_CLOUDBUS
00541             void SetBus(const CBus& bus) {
00542                 assert(params);
00543                 cloudx1_SetInstanceBus(params,bus.Get());
00544             }
00545 #endif // CLOUDX1_HAS_CLOUDBUS
00546
00557         void SetPresetManager(CPresetLoader *preset_manager)
00558             {
00559                 if (!preset_manager) return;
00560                 assert(params);
00561                 cloudx1_SetPresetManager(params,
00562                     cloudx1_custom_reader,
00563                     cloudx1_custom_reader_free,
00564                     cloudx1_custom_writer,
00565                     cloudx1_custom_exists,
00566                     cloudx1_custom_getall,
00567                     cloudx1_custom_getall_free,
00568                     cloudx1_custom_remove,
00569                     cloudx1_custom_rename,
00570                     preset_manager->IsReadOnly(),
00571                     preset_manager
```

```
00572                 );
00573             }
00574
00597         bool Create(const std::string& LoginKey, const std::string& RadioName, const std::string&
      Access_Key_ID, const std::string& Access_Key_Secret, const std::filesystem::path& save_path, int
      json_port = 0, unsigned int frames_per_chunk=64)
00598             {
00599                 assert(!instance);
00600                 std::string l_save_path;
00601                 if (!save_path.empty()) {
00602                     #if (__cplusplus<202002L)
00603                     l_save_path = save_path.u8string();
00604                     #else // C++20
00605                     l_save_path = (const char*)save_path.u8string().c_str();
00606                     #endif // C++20
00607                 }
00608                 instance = cloudx1_InitProcess3(LoginKey.c_str(), RadioName.c_str(),
      Access_Key_ID.c_str(), Access_Key_Secret.c_str(), l_save_path.c_str(), params, frames_per_chunk);
00609                 if (!instance) return false;
00610                 if (!init_metadata.empty()) {
00611                     for (auto&& [key,value]: init_metadata) {
00612                         cloudx1_SetMetadata(instance, key.c_str(), value.c_str());
00613                     }
00614                     init_metadata.clear();
00615                 }
00616                 update_thread = std::thread([this, json_port](){
00617                     OnUpdateThreadStart();
00618                     cloudx1_StartUpdateThread(instance, json_port);
00619                     OnUpdateThreadStop();
00620                 });
00621                 int timeout=5000;
00622                 #ifdef DEBUG
00623                     timeout=60*1000; // For debugger pauses
00624                 #endif
00625                 if (cloudx1_WaitUpdateThreadReady(instance, timeout)<0) {
00626                     return false;
00627                 }
00628                 return true;
00629             }
00630
00638         unsigned int GetChunkFrames() {
00639             if (instance) {
00640                 return cloudx1_GetProcessChunkFrames(instance);
00641             }
00642             return 0;
00643         }
00644
00652         void PresetManager_InformChange(const std::filesystem::path& relative_path, PresetChange_Kind
      change_kind)
00653             {
00654                 cloudx1_PresetManager_InformChange(instance, relative_path.c_str(),
      (cloudx1_PresetChange_Kind) change_kind);
00655             }
00656
00668         void SetMetadata(const std::string& key, const char* value)
00669             {
00670                 if (instance) {
00671                     cloudx1_SetMetadata(instance, key.c_str(), value);
00672                 } else {
00673                     init_metadata.push_back( {key, value} );
00674                 }
00675             }
00676
00686         void SetMetadataMulti(const std::unordered_map<std::string, const char*>& list)
00687             {
00688                 if (instance) {
00689                     typedef const char* pchar;
00690                     pchar* keyvalue=new pchar[2*list.size()+1];
00691                     size_t n=0;
00692                     for (auto&& [key,value]: list) {
00693                         keyvalue[2*n+0]=key.c_str();
00694                         keyvalue[2*n+1]=value;
00695                         n++;
00696                     }
00697                     keyvalue[2*n+0]=nullptr;
00698
00699                     cloudx1_SetMetadataMulti(instance, keyvalue);
00700
00701                     delete[] keyvalue;
00702                 } else {
00703                     for (auto&& [key,value]: list) {
00704                         if (value) {
00705                             init_metadata.push_back( {key, value} );
00706                         }
00707                     }
00708                 }
00709             }
```

```
00710
00716         std::vector< std::tuple<std::string,std::string> > GetMetadataInfos()
00717             {
00718                 std::vector< std::tuple<std::string,std::string> > values;
00719                 const char** c_values = cloudx1_GetMetadataInfos(instance);
00720                 if (c_values) {
00721                     for (const char** c_value=c_values; *c_value; ) {
00722                         std::string key(*c_value);
00723                         c_value++;
00724                         if (*c_value) {
00725                             std::string descr(*c_value);
00726                             c_value++;
00727                             values.push_back( {key,descr} );
00728                         }
00729                     }
00730                     cloudx1_FreeMetadataInfos(instance, c_values);
00731                 }
00732                 return values;
00733             }
00734
00740         std::vector<AuxiliaryOutputInfos> GetAuxiliaryAudioOutputInfos()
00741             {
00742                 std::vector<AuxiliaryOutputInfos> values;
00743                 SOUND4_AuxiliaryOutputInfos** c_values =
    cloudx1_GetAuxiliaryAudioOutputInfos(instance);
00744                 if (c_values) {
00745                     for (SOUND4_AuxiliaryOutputInfos** c_value=c_values; *c_value; c_value++) {
00746                         auto c_info=*c_value;
00747                         values.emplace_back( AuxiliaryOutputInfos{
00748                             .id            = c_info->id           ,
00749                             .description   = c_info->description  ,
00750                             .sample_rate   = c_info->sample_rate  ,
00751                             .channel_count = c_info->channel_count,
00752                             .buffer        = c_info->buffer       ,
00753                         });
00754                     }
00755                     cloudx1_FreeAuxiliaryAudioInfos(c_values);
00756                 }
00757                 return values;
00758             }
00759         void ActivateAuxiliaryAudioID(const std::string& id)
00760             {
00761                 cloudx1_ActivateAuxiliaryAudioID(instance, id.c_str());
00762             }
00766         virtual void OnUpdateThreadStart() {}
00770         virtual void OnUpdateThreadStop() {}
00771
00772 #if CLOUDX1_HAS_WEBSERVER
00786         bool StartWebServer(int http_port, int https_port=0)
00787             {
00788                 assert(instance);
00789                 assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
00790                 webserver = cloudx1_Webserver(http_port,https_port,instance);
00791                 if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
00792                     return false;
00793                 }
00794                 int web_status=cloudx1_Webserver_Status(webserver);
00795                 if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
00796                     return false;
00797                 }
00798                 if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
00799                     return false;
00800                 }
00801                 return true;
00802             }
00803
00811             void StopWebServer(int timeout_ms = 1000)
00812             {
00813                 if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
00814                     cloudx1_Webserver_Stop(webserver, timeout_ms);
00815                     webserver = SOUND4_INVALID_WEBSERVER_ID;
00816                 }
00817             }
00818
00822         void SetWebServerAppHealth(int httpcode, const std::string& contenttype, const std::string&
    content)
00823             {
00824                 assert(instance);
00825                 cloudx1_Webserver_SetAppHealth(instance, httpcode, contenttype.c_str(),
    content.c_str());
00826             }
00830         void GetWebServerAppHealth(int &httpcode, std::string& contenttype, std::string& content)
00831             {
00832                 assert(instance);
00833                 char* c_contenttype=nullptr;
00834                 char* c_content=nullptr;
00835                 cloudx1_Webserver_GetAppHealth(instance, &httpcode, &c_contenttype, &c_content);
```

```
00836                 contenttype=c_contenttype;
00837                 content=c_content;
00838                 cloudx1_Webserver_FreeString(c_contenttype);
00839                 cloudx1_Webserver_FreeString(c_content);
00840         }
00841 #endif // CLOUDX1_HAS_WEBSERVER
00842
00851         int Terminate()
00852             {
00853                 if (!instance) return 0;
00854                 return cloudx1_TerminateProcess(instance);
00855             }
00856
00860         void Stop()
00861             {
00862                 if (!instance) return;
00863 #if CLOUDX1_HAS_WEBSERVER
00864                 StopWebServer();
00865 #endif // CLOUDX1_HAS_WEBSERVER
00866                 if (update_thread.joinable()) {
00867                     cloudx1_StopUpdateThread(instance); // this will exit the update thread
00868                     update_thread.join();
00869                 }
00870                 cloudx1_ExitProcess(instance);
00871                 instance=nullptr;
00872             }
00873
00883         unsigned int GetEstimatedDelay()
00884             {
00885                 assert(instance);
00886                 return cloudx1_GetEstimatedDelay(instance);
00887             }
00888
00901         std::array<float,InputSampleSize>& GetBufferIn()
00902             {
00903                 assert(instance);
00904                 float *buf=cloudx1_GetBufferIn(instance);
00905                 return reinterpret_cast< std::array<float,InputSampleSize>& >(*buf);
00906
00907             }
00919         std::array<float,OutputSampleSize>& GetBufferOut()
00920             {
00921                 assert(instance);
00922                 float *buf= cloudx1_GetBufferOut(instance);
00923                 return reinterpret_cast< std::array<float,OutputSampleSize>& >(*buf);
00924             }
00928         void ProcessAudio()
00929             {
00930                 assert(instance);
00931                 cloudx1_ProcessAudio(instance, cloudx1_GetBufferIn(instance),
    cloudx1_GetBufferOut(instance));
00932             }
00944         void ProcessAudio_Planar(float const * const *input, float * const *output)
00945             {
00946                 assert(instance);
00947                 cloudx1_ProcessAudio_Planar(instance, input, output);
00948             }
00949
00961             template<typename T>
00962         std::vector<T> ProcessAnyAudio(const std::vector<T> input)
00963             {
00964                 assert(instance);
00965                 std::vector<T> output;
00966                 unsigned int out_offset=0;
00967                 unsigned int in_offset=0;
00968                 unsigned int todo = input.size();
00969                 while (todo>0) {
00970                     unsigned int left = AddAudio(&input[in_offset], todo);
00971                     unsigned int out_avail = cloudx1_GetOutputCount(instance);
00972                     output.resize(out_offset + out_avail);
00973                     GetAudio(&output[out_offset], out_avail);
00974                     out_offset+=out_avail;
00975                     in_offset += todo-left;
00976                     todo=left;
00977                 }
00978                 return output;
00979             }
00980
00986         class CClient {
00987             public:
00988                 CClient(cloudx1_CInstance* instance)
00989                     {
00990                         assert(instance);
00991                         client=cloudx1_NewClient(instance);
00992                         if (!client) throw std::bad_alloc();
00993                     }
00994                 // non-copyable
```

```
00995                 CClient( const CInstance& ) = delete;
00996                 CClient& operator=( const CInstance& ) = delete;
00997                 ~CClient()
00998                     {
00999                         if (client) {
01000                             cloudx1_DeleteClient(client);
01001                             client=nullptr;
01002                         }
01003                     }
01011                 std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
01012                     {
01013                         assert(client);
01014                         int need_save=0;
01015                         const char *canswer = cloudx1_ProcessJson(client, request.c_str(),
      &need_save);
01016                         if (!canswer) return {};
01017                         std::string answer(canswer);
01018                         cloudx1_FreeJsonAnswer (canswer);
01019                         if (NeedSave) {
01020                             *NeedSave=(need_save!=0);
01021                         }
01022                         return answer;
01023                     }
01024             private:
01025                 cloudx1_CClientInstance *client = nullptr;
01026         };
01034         std::shared_ptr<CClient> NewClient()
01035             {
01036                 assert(instance);
01037                 return std::make_shared<CClient>(instance);
01038             }
01039
01050         bool SaveState() {
01051             assert(instance);
01052             if (cloudx1_SaveState(instance)!=0) {
01053                 return false;
01054             }
01055             return true;
01056         }
01057 #ifdef _WIN32
01064         void SetInstanceTracing(TraceLoggingHProvider tracing_provider, GUID activity_guid = {}) {
01065             cloudx1_SetInstanceTracing(params, tracing_provider, activity_guid);
01066         }
01073         void SetInstanceTracingProcessActivity(GUID activity_guid) {
01074             assert(instance);
01075             cloudx1_SetInstanceTracingProcessActivity(instance, activity_guid);
01076         }
01077 #endif // _WIN32
01078     protected:
01079             template<typename T>
01080         unsigned int AddAudio(const T* payload, unsigned int nFrame)
01081             {
01082                 assert(instance);
01083                 return cloudx1_AddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
      helper::SampleFormat<T>::format);
01084             }
01085             template<typename T>
01086         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
01087             {
01088                 assert(instance);
01089                 return cloudx1_GetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
      helper::SampleFormat<T>::format);
01090             }
01091
01092     private:
01093         cloudx1_CParameters* params = nullptr;
01094         cloudx1_CInstance* instance = nullptr;
01095         std::thread update_thread;
01096         std::vector< std::pair<std::string,std::string> > init_metadata;
01097 #if CLOUDX1_HAS_WEBSERVER
01098         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
01099 #endif // CLOUDX1_HAS_WEBSERVER
01100     };
01101
01102 }; // namespace cloudx1
01103 }; // namespace sound4
01104
01105 // bridge C callbacks to CPresetLoader
01106 extern "C" {
01107     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata) {
01108         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
01109         std::string content=preset_loader->Read(filename);
01110         return strdup(content.c_str());
01111     }
01112     static void cloudx1_custom_reader_free(char *content, void* userdata) {
01113         if (!content) return;
```

```
01114         free(content);
01115     }
01116     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata) {
01117         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
01118         auto res=preset_loader->Write(filename,content);
01119         return res?0:-1;
01120     }
01121     static int cloudx1_custom_exists(const fs_char *filename, void* userdata) {
01122         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
01123         auto res=preset_loader->Exists(filename);
01124         return res?0:-1;
01125     }
01126     static fs_char** cloudx1_custom_getall(void* userdata) {
01127         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
01128         auto res=preset_loader->GetAll();
01129         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
01130         for (size_t n=0;n<res.size();n++) {
01131             all[n]=fs_strdup(res[n].c_str());
01132         }
01133         all[res.size()]=nullptr;
01134         return all;
01135     }
01136     static void cloudx1_custom_getall_free(fs_char** all, void* userdata) {
01137         if (!all) return;
01138         for (fs_char** one=all;*one;one++) {
01139             free(*one);
01140         }
01141         free(all);
01142     }
01143     static int cloudx1_custom_remove(const fs_char *filename, void* userdata) {
01144         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
01145         auto res=preset_loader->Remove(filename);
01146         return res?0:-1;
01147     }
01148     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
01149         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
01150         auto res=preset_loader->Rename(from,to);
01151         return res?0:-1;
01152     }
01153
01154 };
```

15.23 sound4.x1.cloud_dyn.hpp File Reference

C++ wrapper for dynamic loading library.

```
#include <string>
#include <exception>
#include <thread>
#include <functional>
#include <memory>
#include <array>
#include <assert.h>
#include <stdexcept>
#include <filesystem>
#include <string.h>
#include <libloaderapi.h>
#include "sound4.x1.cloud.h"
#include <stringapiset.h>
#include <wchar.h>
```

Classes

- class sound4::cloudx1::dyn::helper::DynFuncHolder< T >

Helper to wrap a function pointer.

- class sound4::cloudx1::dyn::helper::CDynLoader

  Helper to load dynamic library.
- class sound4::cloudx1::dyn::CDynLib

  Dynamic library interface.
- struct sound4::cloudx1::dyn::helper::SampleFormat< T >

  Helper for Sample format types.
- class sound4::cloudx1::dyn::CPresetLoader

  Custom preset handler helper.
- class sound4::cloudx1::dyn::CInstance

  Instance handling class.
- class sound4::cloudx1::dyn::CInstance::CClient

Namespaces

- namespace sound4
- namespace sound4::cloudx1
- namespace sound4::cloudx1::dyn
- namespace sound4::cloudx1::dyn::helper

Macros

- #define UNIXLIKE 0

Typedefs

- using sound4::cloudx1::dyn::SampleFormat = cloudx1_SampleFormat
- using sound4::cloudx1::dyn::LogSeverity = cloudx1_LogSeverity
- using sound4::cloudx1::dyn::log_cb_t = std::function< void(LogSeverity, const std::string &)>
- using sound4::cloudx1::dyn::PresetChange_Kind = cloudx1_PresetChange_Kind

Functions

- static char * cloudx1_custom_reader (const fs_char *filename, void *userdata)
- static void cloudx1_custom_reader_free (char *content, void *userdata)
- static int cloudx1_custom_writer (const fs_char *filename, const char *content, void *userdata)
- static int cloudx1_custom_exists (const fs_char *filename, void *userdata)
- static fs_char ** cloudx1_custom_getall (void *userdata)
- static void cloudx1_custom_getall_free (fs_char **all, void *userdata)
- static int cloudx1_custom_remove (const fs_char *filename, void *userdata)
- static int cloudx1_custom_rename (const fs_char *from, const fs_char *to, void *userdata)
- static std::string sound4::cloudx1::dyn::helper::WStringToUTF8 (const std::wstring &wstr)
- static std::wstring sound4::cloudx1::dyn::helper::UTF8ToWString (const std::string &str)
- static void sound4::cloudx1::dyn::helper::AudioConvertFrom (CDynLib &dynlib, const uint8_t *payload, float *output, size_t nSpl, cloudx1_SampleFormat fmt)
- static void sound4::cloudx1::dyn::helper::AudioConvertTo (CDynLib &dynlib, const float *input, uint8_t *payload, size_t nSpl, cloudx1_SampleFormat fmt)
- static void sound4::cloudx1::dyn::helper::StereoToMono (CDynLib &dynlib, const float *input, float *output, size_t nFrame)
- static void sound4::cloudx1::dyn::helper::MonoToStereo (CDynLib &dynlib, const float *input, float *output, size_t nFrame)

- static void sound4::cloudx1::dyn::helper::StereoToMono_Planar (CDynLib &dynlib, const float *inputL, const float *inputR, float *output, size_t nFrame)
- static void sound4::cloudx1::dyn::helper::MonoToStereo_Planar (CDynLib &dynlib, const float *input, float *outputL, float *outputR, size_t nFrame)
- static void sound4::cloudx1::dyn::helper::AudioMonoFromLiveStereo (CDynLib &dynlib, const uint8_t *payload, float *output)
- static void sound4::cloudx1::dyn::helper::AudioMonoToLiveStereo (CDynLib &dynlib, const float *input, uint8_t *payload)
- static std::string sound4::cloudx1::dyn::GetVersion (CDynLib &dynlib)
- static unsigned int sound4::cloudx1::dyn::GetChunkSizeInFrames (CDynLib &dynlib)
- static std::vector< unsigned int > sound4::cloudx1::dyn::GetPossibleChunkSizeInFrames (CDynLib &dynlib)
- static unsigned int sound4::cloudx1::dyn::GetChannelCount (CDynLib &dynlib)
- static unsigned int sound4::cloudx1::dyn::GetAudioInputCount (CDynLib &dynlib)
- static unsigned int sound4::cloudx1::dyn::GetAudioOutputCount (CDynLib &dynlib)
- static unsigned int sound4::cloudx1::dyn::GetSampleRate (CDynLib &dynlib)
- static void sound4::cloudx1::dyn::SanityCheck (CDynLib &dynlib, bool a_bCheckFrames=true)
- static std::string sound4::cloudx1::dyn::GetFormatName (CDynLib &dynlib, const SampleFormat fmt)
- static SampleFormat sound4::cloudx1::dyn::GetFormatFromName (CDynLib &dynlib, const std::string &name)
- static unsigned int sound4::cloudx1::dyn::GetBytesFromFormat (CDynLib &dynlib, const SampleFormat fmt)
- static void sound4::cloudx1::dyn::_log_cb_c (cloudx1_LogSeverity severity, const char *c_msg)
- static void sound4::cloudx1::dyn::SetLogSeverity (CDynLib &dynlib, LogSeverity severity)
- static void sound4::cloudx1::dyn::SetLoggerCallback (CDynLib &dynlib, log_cb_t cb)

Variables

- static constexpr const char * sound4::cloudx1::dyn::process_name = "SOUND4 x1.CL"
- static constexpr const char * sound4::cloudx1::dyn::process_shortname = "x1"
- const size_t sound4::cloudx1::dyn::ChunkFrames = 64
- const size_t sound4::cloudx1::dyn::InputChannels = 2 * 1
- const size_t sound4::cloudx1::dyn::OutputChannels = 2 * 1
- const size_t sound4::cloudx1::dyn::InputSampleSize =ChunkFrames*InputChannels
- const size_t sound4::cloudx1::dyn::OutputSampleSize =ChunkFrames*OutputChannels
- const size_t sound4::cloudx1::dyn::SampleRate = 48000
- static log_cb_t sound4::cloudx1::dyn::_log_cb

15.23.1 Detailed Description

You need to load the dynamic library, and if it succeed you can use it.

Definition in file sound4.x1.cloud_dyn.hpp.

15.23.2 Macro Definition Documentation

15.23.2.1 UNIXLIKE

```
#define UNIXLIKE 0
```

Definition at line 23 of file sound4.x1.cloud_dyn.hpp.

15.23.3 Function Documentation

15.23.3.1 cloudx1_custom_exists()

```
static int cloudx1_custom_exists (
            const fs_char * filename,
            void * userdata )  [static]
```

Definition at line 1591 of file sound4.x1.cloud_dyn.hpp.

15.23.3.2 cloudx1_custom_getall()

```
static fs_char ** cloudx1_custom_getall (
            void * userdata )  [static]
```

Definition at line 1596 of file sound4.x1.cloud_dyn.hpp.

15.23.3.3 cloudx1_custom_getall_free()

```
static void cloudx1_custom_getall_free (
            fs_char ** all,
            void * userdata )  [static]
```

Definition at line 1606 of file sound4.x1.cloud_dyn.hpp.

15.23.3.4 cloudx1_custom_reader()

```
static char * cloudx1_custom_reader (
            const fs_char * filename,
            void * userdata )  [static]
```

Definition at line 1577 of file sound4.x1.cloud_dyn.hpp.

15.23.3.5 cloudx1_custom_reader_free()

```
static void cloudx1_custom_reader_free (
            char * content,
            void * userdata )  [static]
```

Definition at line 1582 of file sound4.x1.cloud_dyn.hpp.

15.23.3.6 cloudx1_custom_remove()

```
static int cloudx1_custom_remove (
            const fs_char * filename,
            void * userdata )  [static]
```

Definition at line 1613 of file sound4.x1.cloud_dyn.hpp.

15.23.3.7 cloudx1_custom_rename()

```
static int cloudx1_custom_rename (
            const fs_char * from,
            const fs_char * to,
            void * userdata )  [static]
```

Definition at line 1618 of file sound4.x1.cloud_dyn.hpp.

15.23.3.8 cloudx1_custom_writer()

```
static int cloudx1_custom_writer (
            const fs_char * filename,
            const char * content,
            void * userdata )  [static]
```

Definition at line 1586 of file sound4.x1.cloud_dyn.hpp.

15.24 sound4.x1.cloud_dyn.hpp

Go to the documentation of this file.

```
00001
00007 #pragma once
00008
00009 #include <string>
00010 #include <exception>
00011 #include <thread>
00012 #include <functional>
00013 #include <memory>
00014 #include <array>
00015 #include <assert.h>
00016 #include <stdexcept>
00017 #include <filesystem>
00018 #include <string.h>
00019
00020 #if defined(__unix__) || defined(__APPLE__)
00021     #define UNIXLIKE 1
00022 #else
00023     #define UNIXLIKE 0
00024 #endif
00025
00026 #if UNIXLIKE
00027     #include <dlfcn.h>
00028 #elif defined(_WIN32)
00029     #include <libloaderapi.h>
00030 #else
00031     #error "Unsupported OS"
00032 #endif
00033
00034 // Needed to have function declarations
00035 #include "sound4.x1.cloud.h"
00036
00037
00038 #ifdef _WIN32
00039     #include <stringapiset.h>
00040     #include <wchar.h>
00042     #define fs_strdup wcsdup
00043     #ifdef _MSC_VER
00044         #pragma warning(disable : 4996)
00045     #endif
00046 #else // !_WIN32
00048     #define fs_strdup strdup
00049 #endif // !_WIN32
00050
00051 // bridge C callbacks to CPresetLoader
00052 extern "C" {
00053     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata);
00054     static void cloudx1_custom_reader_free(char *content, void* userdata);
00055     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata);
00056     static int cloudx1_custom_exists(const fs_char *filename, void* userdata);
```

```
00057     static fs_char** cloudx1_custom_getall(void* userdata);
00058     static void cloudx1_custom_getall_free(fs_char** all, void* userdata);
00059     static int cloudx1_custom_remove(const fs_char *filename, void* userdata);
00060     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00061 };
00062
00066 namespace sound4 {
00070 namespace cloudx1 {
00074 namespace dyn {
00075
00079     namespace helper {
00080
00086             template <typename T>
00087         class DynFuncHolder {
00088             // Storage definition, depending on OS
00089             #if UNIXLIKE
00090                 using DynFunc_t = void *;
00091             #else
00092                 using DynFunc_t = FARPROC;
00093             #endif
00094         private:
00095             DynFunc_t m_ptr = NULL;
00096         public:
00097             DynFuncHolder() = default;
00098             DynFuncHolder(DynFunc_t a_ptr) : m_ptr(a_ptr) {}
00099             operator bool() const { return (m_ptr!=NULL); }
00100             bool IsOk() const { return m_ptr!=NULL; }
00101             operator T* () const { return reinterpret_cast<T*>(m_ptr); }
00102         };
00103
00108         class CDynLoader {
00109             // Storage definition, depending on OS
00110             #if UNIXLIKE
00111                 using DynLib_t = void *;
00112             #else
00113                 using DynLib_t = HMODULE;
00114             #endif
00115             private:
00116                 DynLib_t m_lib {};
00117             public:
00118                 CDynLoader() = default;
00119                 CDynLoader(CDynLoader&&) = default;
00120                 // No copy allowed
00121                 CDynLoader(const CDynLoader&) = delete;
00122                 CDynLoader& operator=(CDynLoader const&) = delete;
00123                 operator bool() const {
00124                     return (m_lib!=NULL);
00125                 }
00126                 bool IsOk() const {
00127                     return (m_lib!=NULL);
00128                 }
00129                 #if UNIXLIKE
00130                     void Close() {
00131                         if (IsOk()) {
00132                             #ifndef __SANITIZE_ADDRESS__ // avoid unloading to keep call stack
00133                             dlclose(m_lib);
00134                             #endif // __SANITIZE_ADDRESS__
00135                             m_lib=NULL;
00136                         }
00137                     }
00138                     bool Load(const std::filesystem::path& dynlib)
00139                     {
00140                         Close();
00141                         m_lib=dlopen(dynlib.c_str(), RTLD_NOW|RTLD_LOCAL);
00142                         return IsOk();
00143                     }
00144                         template <typename T>
00145                     DynFuncHolder<T> GetSymbol(const std::string& name) {
00146                         auto ptr=dlsym(m_lib, name.c_str());
00147                         if (!ptr) {
00148                             throw std::runtime_error("Missing function in library");
00149                         }
00150                         return DynFuncHolder<T>(ptr);
00151                     }
00152                         template <typename T>
00153                     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00154                         auto ptr=dlsym(m_lib, name.c_str());
00155                         return DynFuncHolder<T>(ptr);
00156                     }
00157                     static std::filesystem::path GetThisLibraryPath(void) {
00158                         static Dl_info info;
00159                         if (! dladdr((void *) GetThisLibraryPath, & info)) return {};
00160                         auto rp=realpath(info.dli_fname, NULL);
00161                         if (!rp) {
00162                             #if defined(__unix__)
00163                                 rp=realpath("/proc/self/exe", NULL);
00164                             #elif defined(__APPLE__)
```

```
00165                                 // How to solve this for Apple ?
00166                             #endif
00167                         }
00168                         std::filesystem::path p(rp);
00169                         free(rp);
00170                         return p;
00171                     }
00172                 #else
00173                     bool Load(const std::filesystem::path& dynlib, uint32_t loadflags =
      LOAD_LIBRARY_SEARCH_DLL_LOAD_DIR|LOAD_LIBRARY_SEARCH_APPLICATION_DIR|LOAD_LIBRARY_SEARCH_USER_DIRS|LOAD_LIBRARY_SEARCH_S
00174                     {
00175                         Close();
00176                         m_lib=LoadLibraryExW(dynlib.c_str(), NULL, loadflags);
00177                         return IsOk();
00178                     }
00179                     void Close() {
00180                         if (IsOk()) {
00181                             // NOTE: On Windows, FreeLibrary may create a lot of troubles, should use
      FreeLibraryAndExitThread but...
00182                             // So define SOUND4_CALL_FREELIBRARY before including this file if you
      really want to unload the library dynamically
00183                             #if defined(SOUND4_CALL_FREELIBRARYANDEXITTHREAD)
00184                                 FreeLibraryAndExitThread(m_lib, 0);
00185                             #elif defined(SOUND4_CALL_FREELIBRARY)
00186                                 FreeLibrary(m_lib);
00187                             #endif // SOUND4_CALL_FREELIBRARY
00188                             m_lib=NULL;
00189                         }
00190                     }
00191                         template <typename T>
00192                     DynFuncHolder<T> GetSymbol(const std::string& name) {
00193                         auto ptr=GetProcAddress(m_lib, name.c_str());
00194                         if (!ptr) {
00195                             throw std::runtime_error("Missing function in library");
00196                         }
00197                         return DynFuncHolder<T>(ptr);
00198                     }
00199                         template <typename T>
00200                     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00201                         auto ptr=GetProcAddress(m_lib, name.c_str());
00202                         return DynFuncHolder<T>(ptr);
00203                     }
00204                     static std::filesystem::path GetThisLibraryPath(void) {
00205                         static wchar_t path[MAX_PATH]={};
00206                         HMODULE hm = NULL;
00207                         if (GetModuleHandleExW(GET_MODULE_HANDLE_EX_FLAG_FROM_ADDRESS |
00208                                 GET_MODULE_HANDLE_EX_FLAG_UNCHANGED_REFCOUNT,
00209                                 (LPCWSTR) &GetThisLibraryPath, &hm))
00210                         {
00211                             if (GetModuleFileNameW(hm, path, MAX_PATH) > 0) {
00212                                 return std::filesystem::path(path);
00213                             }
00214                         }
00215                         return {};
00216                     }
00217                 #endif
00218                 virtual ~CDynLoader() {
00219                     Close();
00220                 }
00221         }; // class CDynLoader
00222     }; // namespace helper
00223
00230     class CDynLib {
00231     private:
00232         helper::CDynLoader m_lib;
00233         bool m_bOK = false;
00234     public:
00235         CDynLib() = default;
00236
00237         // All those wrapped functions have the same signature as there C cloudx1_XXX
00238         helper::DynFuncHolder< decltype(cloudx1_GetVersion             ) > GetVersion             ;
00239         helper::DynFuncHolder< decltype(cloudx1_GetChunkSizeInFrames   ) > GetChunkSizeInFrames   ;
00240         helper::DynFuncHolder< decltype(cloudx1_GetChannelCount        ) > GetChannelCount        ;
00241         helper::DynFuncHolder< decltype(cloudx1_GetAudioInputCount     ) > GetAudioInputCount     ;
00242         helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount    ) > GetAudioOutputCount    ;
00243         helper::DynFuncHolder< decltype(cloudx1_GetSampleRate          ) > GetSampleRate          ;
00244         helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback      ) > SetLoggerCallback      ;
00245         helper::DynFuncHolder< decltype(cloudx1_SetLogSeverity         ) > SetLogSeverity         ;
00246         helper::DynFuncHolder< decltype(cloudx1_NewParameters          ) > NewParameters          ;
00247         helper::DynFuncHolder< decltype(cloudx1_FreeParameters         ) > FreeParameters         ;
00248         helper::DynFuncHolder< decltype(cloudx1_SetParameter           ) > SetParameter           ;
00249         helper::DynFuncHolder< decltype(cloudx1_GetParameter           ) > GetParameter           ;
00250         helper::DynFuncHolder< decltype(cloudx1_FreeParameterValue     ) > FreeParameterValue     ;
00251         helper::DynFuncHolder< decltype(cloudx1_InitProcess            ) > InitProcess            ;
00252         helper::DynFuncHolder< decltype(cloudx1_InitProcess2           ) > InitProcess2           ;
00253         helper::DynFuncHolder< decltype(cloudx1_TerminateProcess       ) > TerminateProcess       ;
00254         helper::DynFuncHolder< decltype(cloudx1_ExitProcess            ) > ExitProcess            ;
```

```
00255         helper::DynFuncHolder< decltype(cloudx1_StartUpdateThread      ) > StartUpdateThread      ;
00256         helper::DynFuncHolder< decltype(cloudx1_StopUpdateThread       ) > StopUpdateThread       ;
00257         helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady  ) > WaitUpdateThreadReady  ;
00258         helper::DynFuncHolder< decltype(cloudx1_ProcessAudio           ) > ProcessAudio           ;
00259         helper::DynFuncHolder< decltype(cloudx1_ProcessAudio_Planar    ) > ProcessAudio_Planar    ;
00260         helper::DynFuncHolder< decltype(cloudx1_GetBufferIn            ) > GetBufferIn            ;
00261         helper::DynFuncHolder< decltype(cloudx1_GetBufferOut           ) > GetBufferOut           ;
00262         helper::DynFuncHolder< decltype(cloudx1_GetEstimatedDelay      ) > GetEstimatedDelay      ;
00263         helper::DynFuncHolder< decltype(cloudx1_GetFormatName          ) > GetFormatName          ;
00264         helper::DynFuncHolder< decltype(cloudx1_GetFormatFromName      ) > GetFormatFromName      ;
00265         helper::DynFuncHolder< decltype(cloudx1_GetBytesFromFormat     ) > GetBytesFromFormat     ;
00266         helper::DynFuncHolder< decltype(cloudx1_GetMaxPacketFrame      ) > GetMaxPacketFrame      ;
00267         helper::DynFuncHolder< decltype(cloudx1_AddAudio               ) > AddAudio               ;
00268         helper::DynFuncHolder< decltype(cloudx1_AddPadAudio            ) > AddPadAudio            ;
00269         helper::DynFuncHolder< decltype(cloudx1_GetOutputCount         ) > GetOutputCount         ;
00270         helper::DynFuncHolder< decltype(cloudx1_GetAudio               ) > GetAudio               ;
00271         helper::DynFuncHolder< decltype(cloudx1_AudioConvertFrom       ) > AudioConvertFrom       ;
00272         helper::DynFuncHolder< decltype(cloudx1_AudioConvertTo         ) > AudioConvertTo         ;
00273         helper::DynFuncHolder< decltype(cloudx1_StereoToMono           ) > StereoToMono           ;
00274         helper::DynFuncHolder< decltype(cloudx1_MonoToStereo           ) > MonoToStereo           ;
00275         helper::DynFuncHolder< decltype(cloudx1_AudioMonoFromLiveStereo) > AudioMonoFromLiveStereo;
00276         helper::DynFuncHolder< decltype(cloudx1_AudioMonoToLiveStereo  ) > AudioMonoToLiveStereo  ;
00277         helper::DynFuncHolder< decltype(cloudx1_NewClient              ) > NewClient              ;
00278         helper::DynFuncHolder< decltype(cloudx1_DeleteClient           ) > DeleteClient           ;
00279         helper::DynFuncHolder< decltype(cloudx1_ProcessJson            ) > ProcessJson            ;
00280         helper::DynFuncHolder< decltype(cloudx1_FreeJsonAnswer         ) > FreeJsonAnswer         ;
00281         helper::DynFuncHolder< decltype(cloudx1_SaveState              ) > SaveState              ;
00282 #if CLOUDX1_HAS_WEBSERVER
00283         helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp          ) > Webserver_tcp          ;
00284         helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp2         ) > Webserver_tcp2         ;
00285         helper::DynFuncHolder< decltype(cloudx1_Webserver              ) > Webserver              ;
00286         helper::DynFuncHolder< decltype(cloudx1_Webserver_Stop         ) > Webserver_Stop         ;
00287         helper::DynFuncHolder< decltype(cloudx1_Webserver_Status       ) > Webserver_Status       ;
00288 #endif // CLOUDX1_HAS_WEBSERVER
00289
00290         // added 2023-03-22
00291         helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar    ) > StereoToMono_Planar    ;
00292         helper::DynFuncHolder< decltype(cloudx1_MonoToStereo_Planar    ) > MonoToStereo_Planar    ;
00293
00294         // added 2023-05-22
00295         helper::DynFuncHolder< decltype(cloudx1_SetMetadata            ) > SetMetadata            ;
00296         helper::DynFuncHolder< decltype(cloudx1_GetMetadataInfos       ) > GetMetadataInfos       ;
00297         helper::DynFuncHolder< decltype(cloudx1_FreeMetadataInfos      ) > FreeMetadataInfos      ;
00298
00299         // added 2023-06-20
00300         helper::DynFuncHolder< decltype(cloudx1_SetPresetManager               ) > SetPresetManager
    ;
00301         helper::DynFuncHolder< decltype(cloudx1_PresetManager_InformChange     ) >
    PresetManager_InformChange     ;
00302
00303         // added 2023-09-21
00304         helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames   ) >
    GetPossibleChunkSizeInFrames   ;
00305         helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames          ) >
    GetProcessChunkFrames   ;
00306         helper::DynFuncHolder< decltype(cloudx1_InitProcess3                   ) > InitProcess3
    ;
00307
00308 #if CLOUDX1_HAS_CLOUDBUS
00309         // added 2023-06-26
00310         helper::DynFuncHolder< decltype(cloudx1_NewBus                 ) > NewBus      ;
00311         helper::DynFuncHolder< decltype(cloudx1_FreeBus                ) > FreeBus     ;
00312         helper::DynFuncHolder< decltype(cloudx1_SetInstanceBus         ) > SetInstanceBus      ;
00313 #endif // CLOUDX1_HAS_CLOUDBUS
00314
00315         // added 2024-02-19
00316         helper::DynFuncHolder< decltype(cloudx1_SetMetadataMulti       ) > SetMetadataMulti        ;
00317
00318 #if CLOUDX1_HAS_WEBSERVER
00319         // added 2024-05-23
00320         helper::DynFuncHolder< decltype(cloudx1_Webserver_SetAppHealth    ) > Webserver_SetAppHealth
    ;
00321         helper::DynFuncHolder< decltype(cloudx1_Webserver_GetAppHealth    ) > Webserver_GetAppHealth
    ;
00322         helper::DynFuncHolder< decltype(cloudx1_Webserver_FreeString      ) > Webserver_FreeString
    ;
00323 #endif // CLOUDX1_HAS_WEBSERVER
00324
00325 #ifdef _WIN32
00326         // added 2025-05-28
00327         helper::DynFuncHolder< decltype(cloudx1_SetInstanceTracing               ) >
    SetInstanceTracing               ;
00328         helper::DynFuncHolder< decltype(cloudx1_SetInstanceTracingProcessActivity ) >
    SetInstanceTracingProcessActivity ;
00329 #endif // _WIN32
00330
00338         bool Load(const std::filesystem::path& path = {}) {
```

```
00339             std::string filename;
00340             #if defined(__APPLE__)
00341                 filename="libsound4.x1.cloud.dylib";
00342             #elif defined(__unix__)
00343                 filename="libsound4.x1.cloud.so";
00344             #else
00345                 filename="sound4.x1.cloud.dll";
00346             #endif
00347             m_lib.Close();
00348             // If a path is given, use it directly and do not try other path
00349             if (!path.empty() && !m_lib.Load(path / filename)) {
00350                 return false;
00351             } else if (!m_lib.IsOk()) {
00352                 auto thisdir=helper::CDynLoader::GetThisLibraryPath().parent_path();
00353                 #ifndef _WIN32
00354                 // Linux: if in a bin directory, try ../lib first
00355                 if (!m_lib.IsOk() && thisdir.filename()=="bin") {
00356                     auto libdir = thisdir.parent_path() / "lib";
00357                     m_lib.Load(libdir / filename);
00358                 }
00359                 #endif // !_WIN32
00360                 if (!m_lib.IsOk()) {
00361                     // Search in the same directory this code is in
00362                     m_lib.Load(thisdir / filename);
00363                 }
00364                 if (!m_lib.IsOk()) {
00365                     // Try current path
00366                     std::error_code ec;
00367                     auto p = std::filesystem::current_path(ec);
00368                     if (!ec) {
00369                         m_lib.Load(p / filename);
00370                     }
00371                 }
00372                 if (!m_lib.IsOk()) {
00373                     return false;
00374                 }
00375             }
00376             // Load all C functions
00377             try {
00378                 GetVersion              = m_lib.GetSymbol< decltype(cloudx1_GetVersion             )
      >("cloudx1_GetVersion"             );
00379                 GetChunkSizeInFrames    = m_lib.GetSymbol< decltype(cloudx1_GetChunkSizeInFrames   )
      >("cloudx1_GetChunkSizeInFrames"   );
00380                 GetChannelCount         = m_lib.GetSymbol< decltype(cloudx1_GetChannelCount        )
      >("cloudx1_GetChannelCount"        );
00381                 GetAudioInputCount      = m_lib.GetSymbol< decltype(cloudx1_GetAudioInputCount     )
      >("cloudx1_GetAudioInputCount"     );
00382                 GetAudioOutputCount     = m_lib.GetSymbol< decltype(cloudx1_GetAudioOutputCount    )
      >("cloudx1_GetAudioOutputCount"    );
00383                 GetSampleRate           = m_lib.GetSymbol< decltype(cloudx1_GetSampleRate          )
      >("cloudx1_GetSampleRate"          );
00384                 SetLoggerCallback       = m_lib.GetSymbol< decltype(cloudx1_SetLoggerCallback      )
      >("cloudx1_SetLoggerCallback"      );
00385                 SetLogSeverity          = m_lib.GetSymbol< decltype(cloudx1_SetLogSeverity         )
      >("cloudx1_SetLogSeverity"         );
00386                 NewParameters           = m_lib.GetSymbol< decltype(cloudx1_NewParameters          )
      >("cloudx1_NewParameters"          );
00387                 FreeParameters          = m_lib.GetSymbol< decltype(cloudx1_FreeParameters         )
      >("cloudx1_FreeParameters"         );
00388                 SetParameter            = m_lib.GetSymbol< decltype(cloudx1_SetParameter           )
      >("cloudx1_SetParameter"           );
00389                 GetParameter            = m_lib.GetSymbol< decltype(cloudx1_GetParameter           )
      >("cloudx1_GetParameter"           );
00390                 FreeParameterValue      = m_lib.GetSymbol< decltype(cloudx1_FreeParameterValue     )
      >("cloudx1_FreeParameterValue"     );
00391                 InitProcess             = m_lib.GetSymbol< decltype(cloudx1_InitProcess            )
      >("cloudx1_InitProcess"            );
00392                 InitProcess2            = m_lib.GetSymbol< decltype(cloudx1_InitProcess2           )
      >("cloudx1_InitProcess2"           );
00393                 TerminateProcess        = m_lib.GetSymbol< decltype(cloudx1_TerminateProcess       )
      >("cloudx1_TerminateProcess"       );
00394                 ExitProcess             = m_lib.GetSymbol< decltype(cloudx1_ExitProcess            )
      >("cloudx1_ExitProcess"            );
00395                 StartUpdateThread       = m_lib.GetSymbol< decltype(cloudx1_StartUpdateThread      )
      >("cloudx1_StartUpdateThread"      );
00396                 StopUpdateThread        = m_lib.GetSymbol< decltype(cloudx1_StopUpdateThread       )
      >("cloudx1_StopUpdateThread"       );
00397                 WaitUpdateThreadReady   = m_lib.GetSymbol< decltype(cloudx1_WaitUpdateThreadReady  )
      >("cloudx1_WaitUpdateThreadReady"  );
00398                 ProcessAudio            = m_lib.GetSymbol< decltype(cloudx1_ProcessAudio           )
      >("cloudx1_ProcessAudio"           );
00399                 ProcessAudio_Planar     = m_lib.GetSymbol< decltype(cloudx1_ProcessAudio_Planar    )
      >("cloudx1_ProcessAudio_Planar"    );
00400                 GetBufferIn             = m_lib.GetSymbol< decltype(cloudx1_GetBufferIn            )
      >("cloudx1_GetBufferIn"            );
00401                 GetBufferOut            = m_lib.GetSymbol< decltype(cloudx1_GetBufferOut           )
      >("cloudx1_GetBufferOut"           );
```

```
00402                 GetEstimatedDelay       = m_lib.GetSymbol< decltype(cloudx1_GetEstimatedDelay      )
      >("cloudx1_GetEstimatedDelay"      );
00403                 GetFormatName           = m_lib.GetSymbol< decltype(cloudx1_GetFormatName          )
      >("cloudx1_GetFormatName"          );
00404                 GetFormatFromName       = m_lib.GetSymbol< decltype(cloudx1_GetFormatFromName      )
      >("cloudx1_GetFormatFromName"      );
00405                 GetBytesFromFormat      = m_lib.GetSymbol< decltype(cloudx1_GetBytesFromFormat     )
      >("cloudx1_GetBytesFromFormat"     );
00406                 GetMaxPacketFrame       = m_lib.GetSymbol< decltype(cloudx1_GetMaxPacketFrame      )
      >("cloudx1_GetMaxPacketFrame"      );
00407                 AddAudio                = m_lib.GetSymbol< decltype(cloudx1_AddAudio               )
      >("cloudx1_AddAudio"               );
00408                 AddPadAudio             = m_lib.GetSymbol< decltype(cloudx1_AddPadAudio            )
      >("cloudx1_AddPadAudio"            );
00409                 GetOutputCount          = m_lib.GetSymbol< decltype(cloudx1_GetOutputCount         )
      >("cloudx1_GetOutputCount"         );
00410                 GetAudio                = m_lib.GetSymbol< decltype(cloudx1_GetAudio               )
      >("cloudx1_GetAudio"               );
00411                 AudioConvertFrom        = m_lib.GetSymbol< decltype(cloudx1_AudioConvertFrom       )
      >("cloudx1_AudioConvertFrom"       );
00412                 AudioConvertTo          = m_lib.GetSymbol< decltype(cloudx1_AudioConvertTo         )
      >("cloudx1_AudioConvertTo"         );
00413                 StereoToMono            = m_lib.GetSymbol< decltype(cloudx1_StereoToMono           )
      >("cloudx1_StereoToMono"           );
00414                 MonoToStereo            = m_lib.GetSymbol< decltype(cloudx1_MonoToStereo           )
      >("cloudx1_MonoToStereo"           );
00415                 AudioMonoFromLiveStereo = m_lib.GetSymbol< decltype(cloudx1_AudioMonoFromLiveStereo)
      >("cloudx1_AudioMonoFromLiveStereo");
00416                 AudioMonoToLiveStereo   = m_lib.GetSymbol< decltype(cloudx1_AudioMonoToLiveStereo  )
      >("cloudx1_AudioMonoToLiveStereo"  );
00417                 NewClient               = m_lib.GetSymbol< decltype(cloudx1_NewClient              )
      >("cloudx1_NewClient"              );
00418                 DeleteClient            = m_lib.GetSymbol< decltype(cloudx1_DeleteClient           )
      >("cloudx1_DeleteClient"           );
00419                 ProcessJson             = m_lib.GetSymbol< decltype(cloudx1_ProcessJson            )
      >("cloudx1_ProcessJson"            );
00420                 FreeJsonAnswer          = m_lib.GetSymbol< decltype(cloudx1_FreeJsonAnswer         )
      >("cloudx1_FreeJsonAnswer"         );
00421                 SaveState               = m_lib.GetSymbol< decltype(cloudx1_SaveState              )
      >("cloudx1_SaveState"              );
00422 #if CLOUDX1_HAS_WEBSERVER
00423                 Webserver_tcp           = m_lib.GetSymbol< decltype(cloudx1_Webserver_tcp          )
      >("cloudx1_Webserver_tcp"          );
00424                 Webserver_tcp2          = m_lib.GetSymbol< decltype(cloudx1_Webserver_tcp2         )
      >("cloudx1_Webserver_tcp2"         );
00425                 Webserver               = m_lib.GetSymbol< decltype(cloudx1_Webserver              )
      >("cloudx1_Webserver"              );
00426                 Webserver_Stop          = m_lib.GetSymbol< decltype(cloudx1_Webserver_Stop         )
      >("cloudx1_Webserver_Stop"         );
00427                 Webserver_Status        = m_lib.GetSymbol< decltype(cloudx1_Webserver_Status       )
      >("cloudx1_Webserver_Status"       );
00428 #endif // CLOUDX1_HAS_WEBSERVER
00429
00430                 // added 2023-03-22
00431                 StereoToMono_Planar     = m_lib.GetSymbol< decltype(cloudx1_StereoToMono_Planar    )
      >("cloudx1_StereoToMono_Planar"    );
00432                 MonoToStereo_Planar     = m_lib.GetSymbol< decltype(cloudx1_MonoToStereo_Planar    )
      >("cloudx1_MonoToStereo_Planar"    );
00433
00434             } catch (std::runtime_error& ) {
00435                 return false;
00436             }
00437             // C functions allowed to be missing
00438             try {
00439                 // added 2023-05-22
00440                 SetMetadata             = m_lib.GetSymbol< decltype(cloudx1_SetMetadata            )
      >("cloudx1_SetMetadata"            );
00441                 GetMetadataInfos        = m_lib.GetSymbol< decltype(cloudx1_GetMetadataInfos       )
      >("cloudx1_GetMetadataInfos"       );
00442                 FreeMetadataInfos       = m_lib.GetSymbol< decltype(cloudx1_FreeMetadataInfos      )
      >("cloudx1_FreeMetadataInfos"      );
00443                 // added 2023-06-20
00444                 SetPresetManager            = m_lib.GetSymbol< decltype(cloudx1_SetPresetManager
      ) >("cloudx1_SetPresetManager"             );
00445                 PresetManager_InformChange  = m_lib.GetSymbol<
      decltype(cloudx1_PresetManager_InformChange     ) >("cloudx1_PresetManager_InformChange"    );
00446
00447                 // added 2023-09-21
00448                 GetPossibleChunkSizeInFrames = m_lib.GetSymbol<
      decltype(cloudx1_GetPossibleChunkSizeInFrames  ) >("cloudx1_GetPossibleChunkSizeInFrames"  );
00449                 GetProcessChunkFrames        = m_lib.GetSymbol< decltype(cloudx1_GetProcessChunkFrames
      ) >("cloudx1_GetProcessChunkFrames"        );
00450                 InitProcess3                 = m_lib.GetSymbol< decltype(cloudx1_InitProcess3
      ) >("cloudx1_InitProcess3"                 );
00451
00452 #if CLOUDX1_HAS_CLOUDBUS
00453                 // added 2023-06-26
```

```
00454                 NewBus                  = m_lib.GetSymbol< decltype(cloudx1_NewBus                 )
      >("cloudx1_NewBus"                );
00455                 FreeBus                 = m_lib.GetSymbol< decltype(cloudx1_FreeBus                )
      >("cloudx1_FreeBus"               );
00456                 SetInstanceBus          = m_lib.GetSymbol< decltype(cloudx1_SetInstanceBus         )
      >("cloudx1_SetInstanceBus"        );
00457 #endif // CLOUDX1_HAS_CLOUDBUS
00458
00459                 // added 2024-02-19
00460                 SetMetadataMulti        = m_lib.GetSymbol< decltype(cloudx1_SetMetadataMulti       )
      >("cloudx1_SetMetadataMulti"      );
00461
00462 #if CLOUDX1_HAS_WEBSERVER
00463                 // added 2024-05-23
00464                 Webserver_SetAppHealth      = m_lib.GetSymbol< decltype(cloudx1_Webserver_SetAppHealth
      ) >("Webserver_SetAppHealth"    );
00465                 Webserver_GetAppHealth      = m_lib.GetSymbol< decltype(cloudx1_Webserver_GetAppHealth
      ) >("Webserver_GetAppHealth"    );
00466                 Webserver_FreeString        = m_lib.GetSymbol< decltype(cloudx1_Webserver_FreeString
      ) >("Webserver_FreeString"      );
00467                 #endif // CLOUDX1_HAS_WEBSERVER
00468
00469 #ifdef _WIN32
00470                 // added 2025-05-28
00471                 SetInstanceTracing                = m_lib.GetSymbol<
      decltype(cloudx1_SetInstanceTracing               ) >("SetInstanceTracing"               );
00472                 SetInstanceTracingProcessActivity = m_lib.GetSymbol<
      decltype(cloudx1_SetInstanceTracingProcessActivity) >("SetInstanceTracingProcessActivity");
00473 #endif // _WIN32
00474             }  catch (std::runtime_error& ) {
00475                 // Ignored, handler will take care
00476             }
00477
00478             m_bOK=true;
00479             return true;
00480         }
00487         bool IsOk() const {
00488             return m_bOK;
00489         }
00490
00491     };
00492
00493
00494
00495     static constexpr const char *process_name = "SOUND4 x1.CL";
00496     static constexpr const char *process_shortname = "x1";
00497     using SampleFormat = cloudx1_SampleFormat;
00502     const size_t ChunkFrames=CLOUDX1_AUDIOFRAME_COUNT;
00507     const size_t InputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_INPUT_COUNT;
00512     const size_t OutputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_OUTPUT_COUNT;
00517     const size_t InputSampleSize=ChunkFrames*InputChannels;
00522     const size_t OutputSampleSize=ChunkFrames*OutputChannels;
00527     const size_t SampleRate=CLOUDX1_SAMPLE_RATE;
00528
00532     namespace helper {
00533         #ifdef _WIN32
00539         static inline std::string WStringToUTF8(const std::wstring& wstr) {
00540             if (wstr.empty()) return {};
00541             int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL,
      NULL);
00542             std::string str(size, 0);
00543             WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00544             return str;
00545         }
00551         static inline std::wstring UTF8ToWString(const std::string& str) {
00552             if (str.empty()) return std::wstring();
00553             int size = MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), NULL, 0);
00554             std::wstring wstr(size, 0);
00555             MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), &wstr[0], size);
00556             return wstr;
00557         }
00558         #endif // _WIN32
00559
00565             template<typename T>
00566         struct SampleFormat {
00567         };
00568             template<>
00569         struct SampleFormat<int16_t> {
00570             const cloudx1_SampleFormat format = S16_NATIVE;
00571         };
00572             template<>
00573         struct SampleFormat<int32_t> {
00574             const cloudx1_SampleFormat format = S32_NATIVE;
00575         };
00576             template<>
00577         struct SampleFormat<float> {
00578             const cloudx1_SampleFormat format = F32_NATIVE;
```

```
00579         };
00580
00581         // ------------------------------------------------------------
00593         static inline void AudioConvertFrom(CDynLib& dynlib, const uint8_t *payload, float *output,
      size_t nSpl, cloudx1_SampleFormat fmt) {
00594             dynlib.AudioConvertFrom(payload, output, nSpl, fmt);
00595         }
00596
00608         static inline void AudioConvertTo(CDynLib& dynlib, const float *input, uint8_t *payload,
      size_t nSpl, cloudx1_SampleFormat fmt) {
00609             dynlib.AudioConvertTo(input, payload, nSpl, fmt);
00610         }
00611
00622         static inline void StereoToMono(CDynLib& dynlib, const float *input, float *output, size_t
      nFrame) {
00623             dynlib.StereoToMono(input, output, nFrame);
00624         }
00625
00636         static inline void MonoToStereo(CDynLib& dynlib, const float *input, float *output, size_t
      nFrame) {
00637             dynlib.MonoToStereo(input, output, nFrame);
00638         }
00639
00651         static inline void StereoToMono_Planar(CDynLib& dynlib, const float *inputL, const float
      *inputR, float *output, size_t nFrame) {
00652             dynlib.StereoToMono_Planar(inputL, inputR, output, nFrame);
00653         }
00654
00666         static inline void MonoToStereo_Planar(CDynLib& dynlib, const float *input, float *outputL,
      float *outputR, size_t nFrame) {
00667             dynlib.MonoToStereo_Planar(input, outputL, outputR, nFrame);
00668         }
00669
00677         static inline void AudioMonoFromLiveStereo(CDynLib& dynlib, const uint8_t *payload, float
      *output) {
00678             dynlib.AudioMonoFromLiveStereo(payload, output);
00679         }
00680
00688         static inline void AudioMonoToLiveStereo(CDynLib& dynlib, const float *input, uint8_t
      *payload) {
00689             dynlib.AudioMonoToLiveStereo(input, payload);
00690         }
00691
00692     }; // namespace helper
00693
00700     static inline std::string GetVersion(CDynLib& dynlib)
00701         {
00702             return std::string(dynlib.GetVersion());
00703         }
00704
00716     static inline unsigned int GetChunkSizeInFrames(CDynLib& dynlib)
00717         {
00718             return dynlib.GetChunkSizeInFrames();
00719         }
00720
00730     static inline std::vector<unsigned int> GetPossibleChunkSizeInFrames(CDynLib& dynlib)
00731         {
00732             std::vector<unsigned int> list;
00733             if (dynlib.GetPossibleChunkSizeInFrames) {
00734                 for (unsigned int* src=dynlib.GetPossibleChunkSizeInFrames();*src;src++) {
00735                     list.push_back(*src);
00736                 }
00737             } else {
00738                 list.push_back(64);
00739             }
00740             return list;
00741         }
00742
00749     static inline unsigned int GetChannelCount(CDynLib& dynlib)
00750         {
00751             return dynlib.GetChannelCount();
00752         }
00753
00762     static inline unsigned int GetAudioInputCount(CDynLib& dynlib)
00763         {
00764             return dynlib.GetAudioInputCount();
00765         }
00766
00775     static inline unsigned int GetAudioOutputCount(CDynLib& dynlib)
00776         {
00777             return dynlib.GetAudioOutputCount();
00778         }
00779
00788     static inline unsigned int GetSampleRate(CDynLib& dynlib)
00789         {
00790             return dynlib.GetSampleRate();
00791         }
```

```
00792
00800     static inline void SanityCheck(CDynLib& dynlib, bool a_bCheckFrames = true)
00801     {
00802         // Do some sanity checks
00803         if (dynlib.GetSampleRate()!=CLOUDX1_SAMPLE_RATE) {
00804             throw std::runtime_error("Bad library sampling rate");
00805         }
00806         if (a_bCheckFrames && dynlib.GetChunkSizeInFrames()!=ChunkFrames) {
00807             throw std::runtime_error("Bad library frame size");
00808         }
00809         if (dynlib.GetChannelCount()!=CLOUDX1_CHANNEL_COUNT) {
00810             throw std::runtime_error("Bad library channel count");
00811         }
00812         if (dynlib.GetAudioInputCount()!=CLOUDX1_AUDIO_INPUT_COUNT) {
00813             throw std::runtime_error("Bad library input count");
00814         }
00815         if (dynlib.GetAudioOutputCount()!=CLOUDX1_AUDIO_OUTPUT_COUNT) {
00816             throw std::runtime_error("Bad library output count");
00817         }
00818     }
00819
00827     static inline std::string GetFormatName(CDynLib& dynlib, const SampleFormat fmt)
00828         {
00829             return std::string(dynlib.GetFormatName(fmt));
00830         }
00831
00839     static inline SampleFormat GetFormatFromName(CDynLib& dynlib, const std::string& name)
00840         {
00841             return dynlib.GetFormatFromName(name.c_str());
00842         }
00843
00851     static inline unsigned int GetBytesFromFormat(CDynLib& dynlib, const SampleFormat fmt)
00852         {
00853             return dynlib.GetBytesFromFormat(fmt);
00854         }
00855
00859     using LogSeverity = cloudx1_LogSeverity;
00863     using log_cb_t = std::function<void(LogSeverity,const std::string&)>;
00864
00868     static log_cb_t _log_cb;
00869     extern "C" {
00870         static inline void _log_cb_c(cloudx1_LogSeverity severity, const char *c_msg) {
00871             _log_cb(severity, std::string(c_msg));
00872         }
00873     }
00877     static inline void SetLogSeverity(CDynLib& dynlib, LogSeverity severity)
00878         {
00879             dynlib.SetLogSeverity(severity);
00880         }
00884     static inline void SetLoggerCallback(CDynLib& dynlib, log_cb_t cb)
00885         {
00886             _log_cb=cb;
00887             dynlib.SetLoggerCallback(&_log_cb_c);
00888         }
00889
00890 #if CLOUDX1_HAS_CLOUDBUS
00896     class CBus {
00897         public:
00898             CBus(CDynLib& dynlib)
00899                 : m_dynlib(dynlib)
00900                 {
00901                     if (m_dynlib.NewBus) {
00902                         m_bus=m_dynlib.NewBus();
00903                     }
00904                 }
00905             ~CBus()
00906                 {
00907                     if (m_bus && m_dynlib.FreeBus) {
00908                         m_dynlib.FreeBus(m_bus);
00909                     }
00910                     m_bus = nullptr;
00911                 }
00912             cloudx1_CBus *Get() const { return m_bus; }
00913         private:
00914             CDynLib& m_dynlib;
00915             cloudx1_CBus *m_bus;
00916     };
00917 #endif // CLOUDX1_HAS_CLOUDBUS
00918
00924     class CPresetLoader {
00925     public:
00926         CPresetLoader() = default;
00927         virtual ~CPresetLoader() = default;
00928
00929         virtual bool IsReadOnly() = 0;
00930         virtual bool Exists(const std::filesystem::path &name) = 0;
00931         virtual bool Remove(const std::filesystem::path &name) = 0;
```

```
00932         virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) = 0;
00933         virtual std::vector<std::filesystem::path> GetAll() = 0;
00934         virtual std::string Read(const std::filesystem::path &filename) = 0;
00935         virtual bool Write(const std::filesystem::path &filename, const std::string &content) =0;
00936     };
00937     using PresetChange_Kind = cloudx1_PresetChange_Kind;
00938
00944     class CInstance {
00945     public:
00949         CInstance(CDynLib& dynlib)
00950         : m_dynlib(dynlib)
00951             {
00952                 params = m_dynlib.NewParameters();
00953                 if (!params) throw std::bad_alloc();
00954             }
00955         // non-copyable
00956         CInstance( const CInstance& ) = delete;
00957         CInstance& operator=( const CInstance& ) = delete;
00961         virtual ~CInstance()
00962             {
00963                 Stop();
00964                 if (params) m_dynlib.FreeParameters(params);
00965             }
00969        bool IsOk() const { return instance!=nullptr; }
00979         void SetParam(const std::string& name, const std::string& value)
00980             {
00981                 assert(params);
00982                 m_dynlib.SetParameter(params, name.c_str(), value.c_str());
00983             }
00990         std::string GetParam(const std::string& name)
00991             {
00992                 assert(params);
00993                 auto c_value=m_dynlib.GetParameter(params, name.c_str());
00994                 std::string ret(c_value);
00995                 m_dynlib.FreeParameterValue(c_value);
00996                 return ret;
00997             }
00998 #if CLOUDX1_HAS_CLOUDBUS
01007             void SetBus(const CBus& bus) {
01008                 assert(params);
01009                 if (m_dynlib.SetInstanceBus) {
01010                     m_dynlib.SetInstanceBus(params,bus.Get());
01011                 }
01012             }
01013 #endif // CLOUDX1_HAS_CLOUDBUS
01014
01025         void SetPresetManager(CPresetLoader *preset_manager)
01026             {
01027                 if (!preset_manager) return;
01028                 if (!m_dynlib.SetPresetManager) return;
01029                 assert(params);
01030                 m_dynlib.SetPresetManager(params,
01031                     cloudx1_custom_reader,
01032                     cloudx1_custom_reader_free,
01033                     cloudx1_custom_writer,
01034                     cloudx1_custom_exists,
01035                     cloudx1_custom_getall,
01036                     cloudx1_custom_getall_free,
01037                     cloudx1_custom_remove,
01038                     cloudx1_custom_rename,
01039                     preset_manager->IsReadOnly(),
01040                     preset_manager
01041                 );
01042             }
01043
01066         bool Create(const std::string& LoginKey, const std::string& RadioName, const std::string&
      Access_Key_ID, const std::string& Access_Key_Secret, const std::filesystem::path& save_path, int
      json_port = 0, unsigned int frames_per_chunk=64)
01067             {
01068                 assert(!instance);
01069                 std::string l_save_path;
01070                 if (!save_path.empty()) {
01071                     #if (__cplusplus<202002L)
01072                     l_save_path = save_path.u8string();
01073                     #else // C++20
01074                     l_save_path = (const char*)save_path.u8string().c_str();
01075                     #endif // C++20
01076                 }
01077                 if (m_dynlib.InitProcess3) {
01078                     instance = m_dynlib.InitProcess3(LoginKey.c_str(), RadioName.c_str(),
      Access_Key_ID.c_str(), Access_Key_Secret.c_str(), l_save_path.c_str(), params, frames_per_chunk);
01079                 } else if (frames_per_chunk!=64) {
01080                     return false;
01081                 } else {
01082                     instance = m_dynlib.InitProcess2(LoginKey.c_str(), RadioName.c_str(),
      Access_Key_ID.c_str(), Access_Key_Secret.c_str(), l_save_path.c_str(), params);
01083                 }
```

```
01084                 if (!instance) return false;
01085                 if (!init_metadata.empty()) {
01086                     for (auto&& [key,value]: init_metadata) {
01087                         m_dynlib.SetMetadata(instance, key.c_str(), value.c_str());
01088                     }
01089                     init_metadata.clear();
01090                 }
01091                 update_thread = std::thread([this, json_port](){
01092                     OnUpdateThreadStart();
01093                     m_dynlib.StartUpdateThread(instance, json_port);
01094                     OnUpdateThreadStop();
01095                 });
01096                 int timeout=5000;
01097                 #ifdef DEBUG
01098                     timeout=60*1000; // For debugger pauses
01099                 #endif
01100                 if (m_dynlib.WaitUpdateThreadReady(instance, timeout)<0) {
01101                     return false;
01102                 }
01103                 return true;
01104             }
01105
01113         unsigned int GetChunkFrames() {
01114             if (instance && m_dynlib.GetProcessChunkFrames) {
01115                 return m_dynlib.GetProcessChunkFrames(instance);
01116             }
01117             return 64;
01118         }
01119
01127         void PresetManager_InformChange(const std::filesystem::path& relative_path, PresetChange_Kind
      change_kind)
01128             {
01129                 if (m_dynlib.PresetManager_InformChange) {
01130                     m_dynlib.PresetManager_InformChange(instance, relative_path.c_str(),
      (cloudx1_PresetChange_Kind) change_kind);
01131                 }
01132             }
01133
01145         void SetMetadata(const std::string& key, const char* value)
01146             {
01147                 if (m_dynlib.SetMetadata) {
01148                     if (instance) {
01149                         m_dynlib.SetMetadata(instance, key.c_str(), value);
01150                     } else {
01151                         init_metadata.push_back( {key, value} );
01152                     }
01153                 }
01154             }
01155
01156
01166         void SetMetadataMulti(const std::unordered_map<std::string, const char*>& list)
01167             {
01168                 if (instance) {
01169                     if (m_dynlib.SetMetadataMulti) {
01170                         typedef const char* pchar;
01171                         pchar* keyvalue=new pchar[2*list.size()+1];
01172                         size_t n=0;
01173                         for (auto&& [key,value]: list) {
01174                             keyvalue[2*n+0]=key.c_str();
01175                             keyvalue[2*n+1]=value;
01176                             n++;
01177                         }
01178                         keyvalue[2*n+0]=nullptr;
01179
01180                         cloudx1_SetMetadataMulti(instance, keyvalue);
01181
01182                         delete[] keyvalue;
01183                     } else {
01184                         for (auto&& [key,value]: list) {
01185                             SetMetadata(key, value);
01186                         }
01187                     }
01188                 } else {
01189                     for (auto&& [key,value]: list) {
01190                         if (value) {
01191                             init_metadata.push_back( {key, value} );
01192                         }
01193                     }
01194                 }
01195             }
01196
01202         std::vector< std::tuple<std::string,std::string> > GetMetadataInfos()
01203             {
01204                 std::vector< std::tuple<std::string,std::string> > values;
01205                 if (m_dynlib.GetMetadataInfos) {
01206                     const char** c_values = m_dynlib.GetMetadataInfos(instance);
01207                     if (c_values) {
```

```
01208                         for (const char** c_value=c_values; *c_value; ) {
01209                             std::string key(*c_value);
01210                             c_value++;
01211                             if (*c_value) {
01212                                 std::string descr(*c_value);
01213                                 c_value++;
01214                                 values.push_back( {key,descr} );
01215                             }
01216                         }
01217                         m_dynlib.FreeMetadataInfos(instance, c_values);
01218                     }
01219                 }
01220                 return values;
01221             }
01222
01226         virtual void OnUpdateThreadStart() {}
01230         virtual void OnUpdateThreadStop() {}
01231
01232 #if CLOUDX1_HAS_WEBSERVER
01246         bool StartWebServer(int http_port, int https_port=0)
01247             {
01248                 assert(instance);
01249                 assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
01250                 webserver = m_dynlib.Webserver(http_port,https_port,instance);
01251                 if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
01252                     return false;
01253                 }
01254                 int web_status=m_dynlib.Webserver_Status(webserver);
01255                 if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
01256                     return false;
01257                 }
01258                 if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
01259                     return false;
01260                 }
01261                 return true;
01262             }
01263
01271         void StopWebServer(int timeout_ms = 1000)
01272             {
01273                 if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
01274                     m_dynlib.Webserver_Stop(webserver, timeout_ms);
01275                     webserver = SOUND4_INVALID_WEBSERVER_ID;
01276                 }
01277             }
01278
01282         void SetWebServerAppHealth(int httpcode, const std::string& contenttype, const std::string&
    content)
01283             {
01284                 assert(instance);
01285                 if (!m_dynlib.Webserver_SetAppHealth) return;
01286                 m_dynlib.Webserver_SetAppHealth(instance, httpcode, contenttype.c_str(),
    content.c_str());
01287             }
01291         void GetWebServerAppHealth(int &httpcode, std::string& contenttype, std::string& content)
01292             {
01293                 assert(instance);
01294                 if (!m_dynlib.Webserver_GetAppHealth) return;
01295                 char* c_contenttype=nullptr;
01296                 char* c_content=nullptr;
01297                 m_dynlib.Webserver_GetAppHealth(instance, &httpcode, &c_contenttype, &c_content);
01298                 contenttype=c_contenttype;
01299                 content=c_content;
01300                 m_dynlib.Webserver_FreeString(c_contenttype);
01301                 m_dynlib.Webserver_FreeString(c_content);
01302             }
01303 #endif // CLOUDX1_HAS_WEBSERVER
01304
01313         int Terminate()
01314             {
01315                 if (!instance) return 0;
01316                 return m_dynlib.TerminateProcess(instance);
01317             }
01318
01322         void Stop()
01323             {
01324                 if (!instance) return;
01325 #if CLOUDX1_HAS_WEBSERVER
01326                 StopWebServer();
01327 #endif // CLOUDX1_HAS_WEBSERVER
01328                 if (update_thread.joinable()) {
01329                     m_dynlib.StopUpdateThread(instance); // this will exit the update thread
01330                     update_thread.join();
01331                 }
01332                 m_dynlib.ExitProcess(instance);
01333                 instance=nullptr;
01334             }
01335
```

```
01345         unsigned int GetEstimatedDelay()
01346             {
01347                 assert(instance);
01348                 return m_dynlib.GetEstimatedDelay(instance);
01349             }
01350
01363         std::array<float,InputSampleSize>& GetBufferIn()
01364             {
01365                 assert(instance);
01366                 float *buf=m_dynlib.GetBufferIn(instance);
01367                 return reinterpret_cast< std::array<float,InputSampleSize>& >(*buf);
01368
01369             }
01381         std::array<float,OutputSampleSize>& GetBufferOut()
01382             {
01383                 assert(instance);
01384                 float *buf= m_dynlib.GetBufferOut(instance);
01385                 return reinterpret_cast< std::array<float,OutputSampleSize>& >(*buf);
01386             }
01390         void ProcessAudio()
01391             {
01392                 assert(instance);
01393                 m_dynlib.ProcessAudio(instance, m_dynlib.GetBufferIn(instance),
    m_dynlib.GetBufferOut(instance));
01394             }
01406         void ProcessAudio_Planar(float const * const *input, float * const *output)
01407             {
01408                 assert(instance);
01409                 m_dynlib.ProcessAudio_Planar(instance, input, output);
01410             }
01411
01423             template<typename T>
01424         std::vector<T> ProcessAnyAudio(const std::vector<T> input)
01425             {
01426                 assert(instance);
01427                 std::vector<T> output;
01428                 unsigned int out_offset=0;
01429                 unsigned int in_offset=0;
01430                 unsigned int todo = input.size();
01431                 while (todo>0) {
01432                     unsigned int left = AddAudio(&input[in_offset], todo);
01433                     unsigned int out_avail = m_dynlib.GetOutputCount(instance);
01434                     output.resize(out_offset + out_avail);
01435                     GetAudio(&output[out_offset], out_avail);
01436                     out_offset+=out_avail;
01437                     in_offset += todo-left;
01438                     todo=left;
01439                 }
01440                 return output;
01441             }
01442
01448         class CClient {
01449             public:
01450                 CClient(cloudx1_CInstance* instance, CDynLib& dynlib)
01451                 : m_dynlib(dynlib)
01452                     {
01453                         assert(instance);
01454                         client=m_dynlib.NewClient(instance);
01455                         if (!client) throw std::bad_alloc();
01456                     }
01457                 // non-copyable
01458                 CClient( const CInstance& ) = delete;
01459                 CClient& operator=( const CInstance& ) = delete;
01460                 ~CClient()
01461                     {
01462                         if (client) {
01463                             m_dynlib.DeleteClient(client);
01464                             client=nullptr;
01465                         }
01466                     }
01474                 std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
01475                     {
01476                         assert(client);
01477                         int need_save=0;
01478                         const char *canswer = m_dynlib.ProcessJson(client, request.c_str(),
    &need_save);
01479                         if (!canswer) return {};
01480                         std::string answer(canswer);
01481                         m_dynlib.FreeJsonAnswer (canswer);
01482                         if (NeedSave) {
01483                             *NeedSave=(need_save!=0);
01484                         }
01485                         return answer;
01486                     }
01487             private:
01488                 CDynLib& m_dynlib;
01489                 cloudx1_CClientInstance *client = nullptr;
```

```
01490         };
01498         std::shared_ptr<CClient> NewClient()
01499             {
01500                 assert(instance);
01501                 return std::make_shared<CClient>(instance, m_dynlib);
01502             }
01503 
01514         bool SaveState() {
01515             assert(instance);
01516             if (m_dynlib.SaveState(instance)!=0) {
01517                 return false;
01518             }
01519             return true;
01520         }
01521 #ifdef _WIN32
01528         void SetInstanceTracing(TraceLoggingHProvider tracing_provider, GUID activity_guid = {}) {
01529             if (m_dynlib.SetInstanceTracing) {
01530                 m_dynlib.SetInstanceTracing(params, tracing_provider, activity_guid);
01531             }
01532         }
01539         void SetInstanceTracingProcessActivity(GUID activity_guid) {
01540             assert(instance);
01541             if (m_dynlib.SetInstanceTracingProcessActivity) {
01542                 m_dynlib.SetInstanceTracingProcessActivity(instance, activity_guid);
01543             }
01544         }
01545 #endif // _WIN32
01546     protected:
01547             template<typename T>
01548         unsigned int AddAudio(const T* payload, unsigned int nFrame)
01549             {
01550                 assert(instance);
01551                 return m_dynlib.AddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
      helper::SampleFormat<T>::format);
01552             }
01553             template<typename T>
01554         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
01555             {
01556                 assert(instance);
01557                 return m_dynlib.GetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
      helper::SampleFormat<T>::format);
01558             }
01559 
01560     private:
01561         CDynLib& m_dynlib;
01562         cloudx1_CParameters* params = nullptr;
01563         cloudx1_CInstance* instance = nullptr;
01564         std::thread update_thread;
01565         std::vector< std::pair<std::string,std::string> > init_metadata;
01566 #if CLOUDX1_HAS_WEBSERVER
01567         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
01568 #endif // CLOUDX1_HAS_WEBSERVER
01569     };
01570 
01571 }; // namespace dyn
01572 }; // namespace cloudx1
01573 }; // namespace sound4
01574 
01575 // bridge C callbacks to CPresetLoader
01576 extern "C" {
01577     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata) {
01578         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01579         std::string content=preset_loader->Read(filename);
01580         return strdup(content.c_str());
01581     }
01582     static void cloudx1_custom_reader_free(char *content, void* userdata) {
01583         if (!content) return;
01584         free(content);
01585     }
01586     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata) {
01587         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01588         auto res=preset_loader->Write(filename,content);
01589         return res?0:-1;
01590     }
01591     static int cloudx1_custom_exists(const fs_char *filename, void* userdata) {
01592         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01593         auto res=preset_loader->Exists(filename);
01594         return res?0:-1;
01595     }
01596     static fs_char** cloudx1_custom_getall(void* userdata) {
01597         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01598         auto res=preset_loader->GetAll();
01599         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
```

```
01600         for (size_t n=0;n<res.size();n++) {
01601             all[n]=fs_strdup(res[n].c_str());
01602         }
01603         all[res.size()]=nullptr;
01604         return all;
01605     }
01606     static void cloudx1_custom_getall_free(fs_char** all, void* userdata) {
01607         if (!all) return;
01608         for (fs_char** one=all;*one;one++) {
01609             free(*one);
01610         }
01611         free(all);
01612     }
01613     static int cloudx1_custom_remove(const fs_char *filename, void* userdata) {
01614         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01615         auto res=preset_loader->Remove(filename);
01616         return res?0:-1;
01617     }
01618     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
01619         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01620         auto res=preset_loader->Rename(from,to);
01621         return res?0:-1;
01622     }
01623
01624 };
```

15.25 sound4cl.hpp File Reference

C++ wrapper for dynamic loading library.

```
#include <string>
#include <exception>
#include <thread>
#include <functional>
#include <memory>
#include <array>
#include <assert.h>
#include <stdexcept>
#include <filesystem>
#include <string.h>
#include <libloaderapi.h>
#include "sound4cl_cdef.h"
```

Classes

- struct sound4::helper::SampleFormat< T >

  Helper for Sample format types.
- class sound4::helper::DynFuncHolder< T >

  Helper to wrap a function pointer.
- class sound4::helper::CDynLoader

  Helper to load dynamic library.
- class sound4::CProcessor

  Dynamic library interface.
- class sound4::CBus

  Shared Bus.
- class sound4::CPresetLoader

  Custom preset handler helper.
- class sound4::CInstance

  Instance handling class.
- class sound4::CInstance::CClient

Namespaces

- namespace sound4
- namespace sound4::helper

Macros

- #define UNIXLIKE

Typedefs

- using sound4::log_cb_t = std::function< void(LogSeverity, const std::string &)>

Enumerations

- enum sound4::SampleFormat {
  sound4::INVALID_FORMAT , sound4::S16_LE , sound4::S16_BE , sound4::S24_LE ,
  sound4::S24_BE , sound4::S32_LE , sound4::S32_BE , sound4::F32_LE ,
  sound4::F32_BE , sound4::S16_NATIVE , sound4::S24_NATIVE , sound4::S32_NATIVE ,
  sound4::F32_NATIVE }
- enum sound4::LogSeverity {
  sound4::none , sound4::fatal , sound4::error , sound4::warning ,
  sound4::info , sound4::verbose , sound4::verbose2 , sound4::verbose3 ,
  sound4::verbose4 , sound4::verbose5 }
- enum sound4::PresetChange_Kind { sound4::change_kind_created , sound4::change_kind_modified ,
  sound4::change_kind_deleted }

Functions

- static std::string sound4::helper::WStringToUTF8 (const std::wstring &wstr)
- static std::wstring sound4::helper::UTF8ToWString (const std::string &str)
- static void sound4::_log_cb_c (sound4cl_LogSeverity severity, const char *c_msg)

Variables

- static log_cb_t sound4::_log_cb

15.25.1 Detailed Description

You need to load the dynamic library, and if it succeed you can use it.

Definition in file sound4cl.hpp.

15.25.2 Macro Definition Documentation

15.25.2.1 UNIXLIKE

```
#define UNIXLIKE
```

Definition at line 24 of file sound4cl.hpp.

15.26 sound4cl.hpp

Go to the documentation of this file.

```
00001
00008 #pragma once
00009
00010 #include <string>
00011 #include <exception>
00012 #include <thread>
00013 #include <functional>
00014 #include <memory>
00015 #include <array>
00016 #include <assert.h>
00017 #include <stdexcept>
00018 #include <filesystem>
00019 #include <string.h>
00020
00021 #if defined(__unix__) || defined(__APPLE__)
00022     #define UNIXLIKE 1
00023 #else
00024     #define UNIXLIKE 0
00025 #endif
00026
00027 #if UNIXLIKE
00028     #include <dlfcn.h>
00029 #elif defined(_WIN32)
00030     #include <libloaderapi.h>
00031     #ifdef _MSC_VER
00032         #pragma warning(disable : 4996)
00033     #endif
00034 #else
00035     #error "Unsupported OS"
00036 #endif
00037
00038 #include "sound4cl_cdef.h"
00039
00040     // bridge C callbacks to CPresetLoader
00041     extern "C" {
00042         static char *sound4cl_custom_reader(const fs_char *filename, void* userdata);
00043         static void sound4cl_custom_reader_free(char *content, void* userdata);
00044         static int sound4cl_custom_writer(const fs_char *filename, const char *content, void*
    userdata);
00045         static int sound4cl_custom_exists(const fs_char *filename, void* userdata);
00046         static fs_char** sound4cl_custom_getall(void* userdata);
00047         static void sound4cl_custom_getall_free(fs_char** all, void* userdata);
00048         static int sound4cl_custom_remove(const fs_char *filename, void* userdata);
00049         static int sound4cl_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00050     };
00051
00055 namespace sound4 {
00056
00060     enum SampleFormat {
00061         INVALID_FORMAT=sound4cl_SampleFormat::INVALID_FORMAT,
00062         S16_LE        =sound4cl_SampleFormat::S16_LE,
00063         S16_BE        =sound4cl_SampleFormat::S16_BE,
00064         S24_LE        =sound4cl_SampleFormat::S24_LE,
00065         S24_BE        =sound4cl_SampleFormat::S24_BE,
00066         S32_LE        =sound4cl_SampleFormat::S32_LE,
00067         S32_BE        =sound4cl_SampleFormat::S32_BE,
00068         F32_LE        =sound4cl_SampleFormat::F32_LE,
00069         F32_BE        =sound4cl_SampleFormat::F32_BE,
00070         S16_NATIVE    =sound4cl_SampleFormat::S16_NATIVE,
00071         S24_NATIVE    =sound4cl_SampleFormat::S24_NATIVE,
00072         S32_NATIVE    =sound4cl_SampleFormat::S32_NATIVE,
00073         F32_NATIVE    =sound4cl_SampleFormat::F32_NATIVE,
00074     };
00075
00079     namespace helper {
00080         #ifdef _WIN32
00086         static inline std::string WStringToUTF8(const std::wstring& wstr) {
00087             if (wstr.empty()) return {};
00088             int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL,
    NULL);
00089             std::string str(size, 0);
00090             WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00091             return str;
00092         }
00098         static inline std::wstring UTF8ToWString(const std::string& str) {
00099             if (str.empty()) return std::wstring();
00100             int size = MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), NULL, 0);
00101             std::wstring wstr(size, 0);
00102             MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), &wstr[0], size);
00103             return wstr;
00104         }
00105         #endif // _WIN32
```

```
00106
00112             template<typename T>
00113         struct SampleFormat {
00114         };
00115             template<>
00116         struct SampleFormat<int16_t> {
00117             const sound4::SampleFormat format = S16_NATIVE;
00118         };
00119             template<>
00120         struct SampleFormat<int32_t> {
00121             const sound4::SampleFormat format = S32_NATIVE;
00122         };
00123             template<>
00124         struct SampleFormat<float> {
00125             const sound4::SampleFormat format = F32_NATIVE;
00126         };
00127
00133             template <typename T>
00134         class DynFuncHolder {
00135             // Storage definition, depending on OS
00136             #if UNIXLIKE
00137                 using DynFunc_t = void *;
00138             #else
00139                 using DynFunc_t = FARPROC;
00140             #endif
00141         private:
00142             DynFunc_t m_ptr = NULL;
00143         public:
00144             DynFuncHolder() = default;
00145             DynFuncHolder(DynFunc_t a_ptr) : m_ptr(a_ptr) {}
00146             operator bool() const { return (m_ptr!=NULL); }
00147             bool IsOk() const { return m_ptr!=NULL; }
00148             operator T* () const { return reinterpret_cast<T*>(m_ptr); }
00149         };
00150
00155         class CDynLoader {
00156             // Storage definition, depending on OS
00157             #if UNIXLIKE
00158                 using DynLib_t = void *;
00159             #else
00160                 using DynLib_t = HMODULE;
00161             #endif
00162             private:
00163                 DynLib_t m_lib {};
00164             public:
00165                 CDynLoader() = default;
00166                 CDynLoader(CDynLoader&&) = default;
00167                 // No copy allowed
00168                 CDynLoader(const CDynLoader&) = delete;
00169                 CDynLoader& operator=(CDynLoader const&) = delete;
00170                 operator bool() const {
00171                     return (m_lib!=NULL);
00172                 }
00173                 bool IsOk() const {
00174                     return (m_lib!=NULL);
00175                 }
00176                 #if UNIXLIKE
00177                     void Close() {
00178                         if (IsOk()) {
00179                             #ifndef __SANITIZE_ADDRESS__ // avoid unloading to keep call stack
00180                             dlclose(m_lib);
00181                             #endif // __SANITIZE_ADDRESS__
00182                             m_lib=NULL;
00183                         }
00184                     }
00185                     bool Load(const std::filesystem::path& dynlib)
00186                     {
00187                         Close();
00188                         m_lib=dlopen(dynlib.c_str(), RTLD_NOW|RTLD_LOCAL);
00189                         return IsOk();
00190                     }
00191                         template <typename T>
00192                     DynFuncHolder<T> GetSymbol(const std::string& name) {
00193                         auto ptr=dlsym(m_lib, name.c_str());
00194                         if (!ptr) {
00195                             throw std::runtime_error("Missing function in library");
00196                         }
00197                         return DynFuncHolder<T>(ptr);
00198                     }
00199                         template <typename T>
00200                     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00201                         auto ptr=dlsym(m_lib, name.c_str());
00202                         return DynFuncHolder<T>(ptr);
00203                     }
00204                     static std::filesystem::path GetThisLibraryPath(void) {
00205                         static Dl_info info;
00206                         if (! dladdr((void *) GetThisLibraryPath, & info)) return {};
```

```
00207                         auto rp=realpath(info.dli_fname, NULL);
00208                         if (!rp) {
00209                             #if defined(__unix__)
00210                                 rp=realpath("/proc/self/exe", NULL);
00211                             #elif defined(__APPLE__)
00212                                 // How to solve this for Apple ?
00213                             #endif
00214                         }
00215                         std::filesystem::path p(rp);
00216                         free(rp);
00217                         return p;
00218                     }
00219                 #else
00220                     bool Load(const std::filesystem::path& dynlib, uint32_t loadflags =
    LOAD_LIBRARY_SEARCH_DLL_LOAD_DIR|LOAD_LIBRARY_SEARCH_APPLICATION_DIR|LOAD_LIBRARY_SEARCH_USER_DIRS|LOAD_LIBRARY_SEARCH_S
00221                     {
00222                         Close();
00223                         m_lib=LoadLibraryExW(dynlib.c_str(), NULL, loadflags);
00224                         return IsOk();
00225                     }
00226                     void Close() {
00227                         if (IsOk()) {
00228                             // NOTE: On Windows, FreeLibrary may create a lot of troubles, should use
    FreeLibraryAndExitThread but...
00229                             // So define SOUND4_CALL_FREELIBRARY before including this file if you
    really want to unload the library dynamically
00230                             #if defined(SOUND4_CALL_FREELIBRARYANDEXITTHREAD)
00231                                 FreeLibraryAndExitThread(m_lib, 0);
00232                             #elif defined(SOUND4_CALL_FREELIBRARY)
00233                                 FreeLibrary(m_lib);
00234                             #endif // SOUND4_CALL_FREELIBRARY
00235                             m_lib=NULL;
00236                         }
00237                     }
00238                         template <typename T>
00239                     DynFuncHolder<T> GetSymbol(const std::string& name) {
00240                         auto ptr=GetProcAddress(m_lib, name.c_str());
00241                         if (!ptr) {
00242                             throw std::runtime_error("Missing function in library");
00243                         }
00244                         return DynFuncHolder<T>(ptr);
00245                     }
00246                         template <typename T>
00247                     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00248                         auto ptr=GetProcAddress(m_lib, name.c_str());
00249                         return DynFuncHolder<T>(ptr);
00250                     }
00251                     static std::filesystem::path GetThisLibraryPath(void) {
00252                         static wchar_t path[MAX_PATH]={};
00253                         HMODULE hm = NULL;
00254                         if (GetModuleHandleExW(GET_MODULE_HANDLE_EX_FLAG_FROM_ADDRESS |
00255                                 GET_MODULE_HANDLE_EX_FLAG_UNCHANGED_REFCOUNT,
00256                                 (LPCWSTR) &GetThisLibraryPath, &hm))
00257                         {
00258                             if (GetModuleFileNameW(hm, path, MAX_PATH) > 0) {
00259                                 return std::filesystem::path(path);
00260                             }
00261                         }
00262                         return {};
00263                     }
00264                 #endif
00265                 virtual ~CDynLoader() {
00266                     Close();
00267                 }
00268         }; // class CDynLoader
00269     }; // namespace helper
00270
00271
00275     enum LogSeverity {
00276        none     = sound4cl_none,
00277        fatal    = sound4cl_fatal,
00278        error    = sound4cl_error,
00279        warning  = sound4cl_warning,
00280        info     = sound4cl_info,
00281        verbose  = sound4cl_verbose,
00282        verbose2 = sound4cl_verbose2,
00283        verbose3 = sound4cl_verbose3,
00284        verbose4 = sound4cl_verbose4,
00285        verbose5 = sound4cl_verbose5,
00286     };
00287
00291     using log_cb_t = std::function<void(LogSeverity,const std::string&)>;
00292
00296     static log_cb_t _log_cb;
00297     extern "C" {
00298         static inline void _log_cb_c(sound4cl_LogSeverity severity, const char *c_msg) {
00299             _log_cb((LogSeverity)severity, std::string(c_msg));
```

```
00300         }
00301     }
00302
00309     class CProcessor {
00310     private:
00311         helper::CDynLoader m_lib;
00312         bool m_bOK = false;
00313         std::string m_prefix; // The prefix of functions, depends on the library (cloud_, impact_...)
00314     protected:
00315         friend class CBus;
00316         friend class CInstance;
00317
00318         // All those wrapped functions have the same signature as there C sound4cl_XXX
00319         helper::DynFuncHolder< decltype(sound4cl_GetVersion              ) > fnGetVersion              ;
00320         helper::DynFuncHolder< decltype(sound4cl_GetChunkSizeInFrames    ) > fnGetChunkSizeInFrames    ;
00321         helper::DynFuncHolder< decltype(sound4cl_GetChannelCount         ) > fnGetChannelCount         ;
00322         helper::DynFuncHolder< decltype(sound4cl_GetAudioInputCount      ) > fnGetAudioInputCount      ;
00323         helper::DynFuncHolder< decltype(sound4cl_GetAudioOutputCount     ) > fnGetAudioOutputCount     ;
00324         helper::DynFuncHolder< decltype(sound4cl_GetSampleRate           ) > fnGetSampleRate           ;
00325         helper::DynFuncHolder< decltype(sound4cl_SetLoggerCallback       ) > fnSetLoggerCallback       ;
00326         helper::DynFuncHolder< decltype(sound4cl_SetLogSeverity          ) > fnSetLogSeverity          ;
00327         helper::DynFuncHolder< decltype(sound4cl_NewParameters           ) > fnNewParameters           ;
00328         helper::DynFuncHolder< decltype(sound4cl_FreeParameters          ) > fnFreeParameters          ;
00329         helper::DynFuncHolder< decltype(sound4cl_SetParameter            ) > fnSetParameter            ;
00330         helper::DynFuncHolder< decltype(sound4cl_GetParameter            ) > fnGetParameter            ;
00331         helper::DynFuncHolder< decltype(sound4cl_FreeParameterValue      ) > fnFreeParameterValue      ;
00332         helper::DynFuncHolder< decltype(sound4cl_InitProcess             ) > fnInitProcess             ;
00333         helper::DynFuncHolder< decltype(sound4cl_InitProcess2            ) > fnInitProcess2            ;
00334         helper::DynFuncHolder< decltype(sound4cl_TerminateProcess        ) > fnTerminateProcess        ;
00335         helper::DynFuncHolder< decltype(sound4cl_ExitProcess             ) > fnExitProcess             ;
00336         helper::DynFuncHolder< decltype(sound4cl_StartUpdateThread       ) > fnStartUpdateThread       ;
00337         helper::DynFuncHolder< decltype(sound4cl_StopUpdateThread        ) > fnStopUpdateThread        ;
00338         helper::DynFuncHolder< decltype(sound4cl_WaitUpdateThreadReady   ) > fnWaitUpdateThreadReady   ;
00339         helper::DynFuncHolder< decltype(sound4cl_ProcessAudio            ) > fnProcessAudio            ;
00340         helper::DynFuncHolder< decltype(sound4cl_ProcessAudio_Planar     ) > fnProcessAudio_Planar     ;
00341         helper::DynFuncHolder< decltype(sound4cl_GetBufferIn             ) > fnGetBufferIn             ;
00342         helper::DynFuncHolder< decltype(sound4cl_GetBufferOut            ) > fnGetBufferOut            ;
00343         helper::DynFuncHolder< decltype(sound4cl_GetEstimatedDelay       ) > fnGetEstimatedDelay       ;
00344         helper::DynFuncHolder< decltype(sound4cl_GetFormatName           ) > fnGetFormatName           ;
00345         helper::DynFuncHolder< decltype(sound4cl_GetFormatFromName       ) > fnGetFormatFromName       ;
00346         helper::DynFuncHolder< decltype(sound4cl_GetBytesFromFormat      ) > fnGetBytesFromFormat      ;
00347         helper::DynFuncHolder< decltype(sound4cl_GetMaxPacketFrame       ) > fnGetMaxPacketFrame       ;
00348         helper::DynFuncHolder< decltype(sound4cl_AddAudio                ) > fnAddAudio                ;
00349         helper::DynFuncHolder< decltype(sound4cl_AddPadAudio             ) > fnAddPadAudio             ;
00350         helper::DynFuncHolder< decltype(sound4cl_GetOutputCount          ) > fnGetOutputCount          ;
00351         helper::DynFuncHolder< decltype(sound4cl_GetAudio                ) > fnGetAudio                ;
00352         helper::DynFuncHolder< decltype(sound4cl_AudioConvertFrom        ) > fnAudioConvertFrom        ;
00353         helper::DynFuncHolder< decltype(sound4cl_AudioConvertTo          ) > fnAudioConvertTo          ;
00354         helper::DynFuncHolder< decltype(sound4cl_StereoToMono            ) > fnStereoToMono            ;
00355         helper::DynFuncHolder< decltype(sound4cl_MonoToStereo            ) > fnMonoToStereo            ;
00356         helper::DynFuncHolder< decltype(sound4cl_AudioMonoFromLiveStereo) > fnAudioMonoFromLiveStereo;
00357         helper::DynFuncHolder< decltype(sound4cl_AudioMonoToLiveStereo   ) > fnAudioMonoToLiveStereo   ;
00358         helper::DynFuncHolder< decltype(sound4cl_NewClient               ) > fnNewClient               ;
00359         helper::DynFuncHolder< decltype(sound4cl_DeleteClient            ) > fnDeleteClient            ;
00360         helper::DynFuncHolder< decltype(sound4cl_ProcessJson             ) > fnProcessJson             ;
00361         helper::DynFuncHolder< decltype(sound4cl_FreeJsonAnswer          ) > fnFreeJsonAnswer          ;
00362         helper::DynFuncHolder< decltype(sound4cl_SaveState               ) > fnSaveState               ;
00363
00364         // only for processes supporting webserver
00365         helper::DynFuncHolder< decltype(sound4cl_Webserver_tcp           ) > fnWebserver_tcp           ;
00366         helper::DynFuncHolder< decltype(sound4cl_Webserver_tcp2          ) > fnWebserver_tcp2          ;
00367         helper::DynFuncHolder< decltype(sound4cl_Webserver               ) > fnWebserver               ;
00368         helper::DynFuncHolder< decltype(sound4cl_Webserver_Stop          ) > fnWebserver_Stop          ;
00369         helper::DynFuncHolder< decltype(sound4cl_Webserver_Status        ) > fnWebserver_Status        ;
00370
00371         // added 2023-03-22
00372         helper::DynFuncHolder< decltype(sound4cl_StereoToMono_Planar     ) > fnStereoToMono_Planar     ;
00373         helper::DynFuncHolder< decltype(sound4cl_MonoToStereo_Planar     ) > fnMonoToStereo_Planar     ;
00374
00375         // added 2023-05-22
00376         helper::DynFuncHolder< decltype(sound4cl_SetMetadata             ) > fnSetMetadata             ;
00377         helper::DynFuncHolder< decltype(sound4cl_GetMetadataInfos        ) > fnGetMetadataInfos        ;
00378         helper::DynFuncHolder< decltype(sound4cl_FreeMetadataInfos       ) > fnFreeMetadataInfos       ;
00379
00380         // added 2023-06-20
00381         helper::DynFuncHolder< decltype(sound4cl_SetPresetManager                ) >
      fnSetPresetManager      ;
00382         helper::DynFuncHolder< decltype(sound4cl_PresetManager_InformChange      ) >
      fnPresetManager_InformChange      ;
00383
00384         // added 2023-09-21
00385         helper::DynFuncHolder< decltype(sound4cl_GetPossibleChunkSizeInFrames    ) >
      fnGetPossibleChunkSizeInFrames   ;
00386         helper::DynFuncHolder< decltype(sound4cl_GetProcessChunkFrames           ) >
      fnGetProcessChunkFrames   ;
00387         helper::DynFuncHolder< decltype(sound4cl_InitProcess3                    ) > fnInitProcess3
      ;
```

```
00388
00389         // added 2023-06-26, only for processes supporting bus
00390         helper::DynFuncHolder< decltype(sound4cl_NewBus                 ) > fnNewBus      ;
00391         helper::DynFuncHolder< decltype(sound4cl_FreeBus                ) > fnFreeBus      ;
00392         helper::DynFuncHolder< decltype(sound4cl_SetInstanceBus         ) > fnSetInstanceBus      ;
00393
00394         // added 2024-02-19
00395         helper::DynFuncHolder< decltype(sound4cl_SetMetadataMulti       ) > fnSetMetadataMulti
    ;
00396
00397         // added 2024-05-23
00398         helper::DynFuncHolder< decltype(sound4cl_Webserver_SetAppHealth    ) >
    fnWebserver_SetAppHealth      ;
00399         helper::DynFuncHolder< decltype(sound4cl_Webserver_GetAppHealth    ) >
    fnWebserver_GetAppHealth      ;
00400         helper::DynFuncHolder< decltype(sound4cl_Webserver_FreeString      ) > fnWebserver_FreeString
    ;
00401
00402 #ifdef _WIN32
00403         // added 2025-05-28
00404         helper::DynFuncHolder< decltype(sound4cl_SetInstanceTracing                ) >
    fnSetInstanceTracing                ;
00405         helper::DynFuncHolder< decltype(sound4cl_SetInstanceTracingProcessActivity ) >
    fnSetInstanceTracingProcessActivity ;
00406 #endif // _WIN32
00407
00408             template <typename T>
00409         helper::DynFuncHolder<T> GetPrefixSymbol(const std::string& name) {
00410             std::string prefix_name = m_prefix+name;
00411             return m_lib.GetSymbol<T>(prefix_name);
00412         }
00413
00414     public:
00415         CProcessor() = default;
00416
00424         bool Load(const std::filesystem::path& filepath) {
00425             m_lib.Close();
00426             // If a path is given, use it directly and do not try other path
00427             if (filepath.has_parent_path() && !m_lib.Load(filepath)) {
00428                 return false;
00429             } else if (!m_lib.IsOk()) {
00430                 auto thisdir=helper::CDynLoader::GetThisLibraryPath().parent_path();
00431                 auto filename = filepath.filename();
00432                 #ifndef _WIN32
00433                 // Linux: if in a bin directory, try ../lib first
00434                 if (!m_lib.IsOk() && thisdir.filename()=="bin") {
00435                     auto libdir = thisdir.parent_path() / "lib";
00436                     m_lib.Load(libdir / filename);
00437                 }
00438                 #endif // !_WIN32
00439                 if (!m_lib.IsOk()) {
00440                     // Search in the same directory this code is in
00441                     m_lib.Load(thisdir / filename);
00442                 }
00443                 if (!m_lib.IsOk()) {
00444                     // Try current path
00445                     std::error_code ec;
00446                     auto p = std::filesystem::current_path(ec);
00447                     if (!ec) {
00448                         m_lib.Load(p / filename);
00449                     }
00450                 }
00451                 if (!m_lib.IsOk()) {
00452                     return false;
00453                 }
00454             }
00455             // Get information from the library itself
00456             try {
00457                 auto GetInfo = m_lib.GetSymbol< decltype(sound4cl_SOUND4_GetProcessInfo             )
    >("SOUND4_GetProcessInfo"   );
00458                 auto info = GetInfo();
00459                 m_prefix = info->prefix;
00460             } catch (std::runtime_error& ) {
00461                 // Compatibility: search in known libraries without this function
00462                 #ifdef _WIN32
00463                     std::string filename = helper::WStringToUTF8(filepath.stem());
00464                 #else // !_WIN32
00465                     std::string filename = filepath.stem();
00466                     // remove lib prefix
00467                     filename=filename.substr(3);
00468                 #endif // ! _WIN32
00469                 if (filename=="sound4.x1.cloud") {
00470                     m_prefix="cloudx1_";
00471                 } else if (filename=="sound4.impact.cl") {
00472                     m_prefix="impact_";
00473                 } else if (filename=="sound4.bigvoice.cl") {
00474                     m_prefix="bigvoice_";
```

```
00475                 } else {
00476                     return false;
00477                 }
00478             }
00479 
00480             // Load all C functions
00481             try {
00482                 fnGetVersion              = GetPrefixSymbol< decltype(sound4cl_GetVersion
      ) >("GetVersion"              );
00483                 fnGetChunkSizeInFrames    = GetPrefixSymbol< decltype(sound4cl_GetChunkSizeInFrames
      ) >("GetChunkSizeInFrames"    );
00484                 fnGetChannelCount         = GetPrefixSymbol< decltype(sound4cl_GetChannelCount
      ) >("GetChannelCount"         );
00485                 fnGetAudioInputCount      = GetPrefixSymbol< decltype(sound4cl_GetAudioInputCount
      ) >("GetAudioInputCount"      );
00486                 fnGetAudioOutputCount     = GetPrefixSymbol< decltype(sound4cl_GetAudioOutputCount
      ) >("GetAudioOutputCount"     );
00487                 fnGetSampleRate           = GetPrefixSymbol< decltype(sound4cl_GetSampleRate
      ) >("GetSampleRate"           );
00488                 fnSetLoggerCallback       = GetPrefixSymbol< decltype(sound4cl_SetLoggerCallback
      ) >("SetLoggerCallback"       );
00489                 fnSetLogSeverity          = GetPrefixSymbol< decltype(sound4cl_SetLogSeverity
      ) >("SetLogSeverity"          );
00490                 fnNewParameters           = GetPrefixSymbol< decltype(sound4cl_NewParameters
      ) >("NewParameters"           );
00491                 fnFreeParameters          = GetPrefixSymbol< decltype(sound4cl_FreeParameters
      ) >("FreeParameters"          );
00492                 fnSetParameter            = GetPrefixSymbol< decltype(sound4cl_SetParameter
      ) >("SetParameter"            );
00493                 fnGetParameter            = GetPrefixSymbol< decltype(sound4cl_GetParameter
      ) >("GetParameter"            );
00494                 fnFreeParameterValue      = GetPrefixSymbol< decltype(sound4cl_FreeParameterValue
      ) >("FreeParameterValue"      );
00495                 fnInitProcess             = GetPrefixSymbol< decltype(sound4cl_InitProcess
      ) >("InitProcess"             );
00496                 fnInitProcess2            = GetPrefixSymbol< decltype(sound4cl_InitProcess2
      ) >("InitProcess2"            );
00497                 fnTerminateProcess        = GetPrefixSymbol< decltype(sound4cl_TerminateProcess
      ) >("TerminateProcess"        );
00498                 fnExitProcess             = GetPrefixSymbol< decltype(sound4cl_ExitProcess
      ) >("ExitProcess"             );
00499                 fnStartUpdateThread       = GetPrefixSymbol< decltype(sound4cl_StartUpdateThread
      ) >("StartUpdateThread"       );
00500                 fnStopUpdateThread        = GetPrefixSymbol< decltype(sound4cl_StopUpdateThread
      ) >("StopUpdateThread"        );
00501                 fnWaitUpdateThreadReady   = GetPrefixSymbol< decltype(sound4cl_WaitUpdateThreadReady
      ) >("WaitUpdateThreadReady"   );
00502                 fnProcessAudio            = GetPrefixSymbol< decltype(sound4cl_ProcessAudio
      ) >("ProcessAudio"            );
00503                 fnProcessAudio_Planar     = GetPrefixSymbol< decltype(sound4cl_ProcessAudio_Planar
      ) >("ProcessAudio_Planar"     );
00504                 fnGetBufferIn             = GetPrefixSymbol< decltype(sound4cl_GetBufferIn
      ) >("GetBufferIn"             );
00505                 fnGetBufferOut            = GetPrefixSymbol< decltype(sound4cl_GetBufferOut
      ) >("GetBufferOut"            );
00506                 fnGetEstimatedDelay       = GetPrefixSymbol< decltype(sound4cl_GetEstimatedDelay
      ) >("GetEstimatedDelay"       );
00507                 fnGetFormatName           = GetPrefixSymbol< decltype(sound4cl_GetFormatName
      ) >("GetFormatName"           );
00508                 fnGetFormatFromName       = GetPrefixSymbol< decltype(sound4cl_GetFormatFromName
      ) >("GetFormatFromName"       );
00509                 fnGetBytesFromFormat      = GetPrefixSymbol< decltype(sound4cl_GetBytesFromFormat
      ) >("GetBytesFromFormat"      );
00510                 fnGetMaxPacketFrame       = GetPrefixSymbol< decltype(sound4cl_GetMaxPacketFrame
      ) >("GetMaxPacketFrame"       );
00511                 fnAddAudio                = GetPrefixSymbol< decltype(sound4cl_AddAudio
      ) >("AddAudio"                );
00512                 fnAddPadAudio             = GetPrefixSymbol< decltype(sound4cl_AddPadAudio
      ) >("AddPadAudio"             );
00513                 fnGetOutputCount          = GetPrefixSymbol< decltype(sound4cl_GetOutputCount
      ) >("GetOutputCount"          );
00514                 fnGetAudio                = GetPrefixSymbol< decltype(sound4cl_GetAudio
      ) >("GetAudio"                );
00515                 fnAudioConvertFrom        = GetPrefixSymbol< decltype(sound4cl_AudioConvertFrom
      ) >("AudioConvertFrom"        );
00516                 fnAudioConvertTo          = GetPrefixSymbol< decltype(sound4cl_AudioConvertTo
      ) >("AudioConvertTo"          );
00517                 fnStereoToMono            = GetPrefixSymbol< decltype(sound4cl_StereoToMono
      ) >("StereoToMono"            );
00518                 fnMonoToStereo            = GetPrefixSymbol< decltype(sound4cl_MonoToStereo
      ) >("MonoToStereo"            );
00519                 fnAudioMonoFromLiveStereo = GetPrefixSymbol<
      decltype(sound4cl_AudioMonoFromLiveStereo) >("AudioMonoFromLiveStereo");
00520                 fnAudioMonoToLiveStereo   = GetPrefixSymbol< decltype(sound4cl_AudioMonoToLiveStereo
      ) >("AudioMonoToLiveStereo"   );
00521                 fnNewClient               = GetPrefixSymbol< decltype(sound4cl_NewClient
      ) >("NewClient"               );
```

```
00522                 fnDeleteClient            = GetPrefixSymbol< decltype(sound4cl_DeleteClient
      ) >("DeleteClient"           );
00523                 fnProcessJson             = GetPrefixSymbol< decltype(sound4cl_ProcessJson
      ) >("ProcessJson"            );
00524                 fnFreeJsonAnswer          = GetPrefixSymbol< decltype(sound4cl_FreeJsonAnswer
      ) >("FreeJsonAnswer"         );
00525                 fnSaveState               = GetPrefixSymbol< decltype(sound4cl_SaveState
      ) >("SaveState"              );
00526             } catch (std::runtime_error& ) {
00527                 return false;
00528             }
00529             // Webserver : not for all projects
00530             try {
00531                 fnWebserver_tcp           = GetPrefixSymbol< decltype(sound4cl_Webserver_tcp
      ) >("Webserver_tcp"          );
00532                 fnWebserver_tcp2          = GetPrefixSymbol< decltype(sound4cl_Webserver_tcp2
      ) >("Webserver_tcp2"         );
00533                 fnWebserver               = GetPrefixSymbol< decltype(sound4cl_Webserver
      ) >("Webserver"              );
00534                 fnWebserver_Stop          = GetPrefixSymbol< decltype(sound4cl_Webserver_Stop
      ) >("Webserver_Stop"         );
00535                 fnWebserver_Status        = GetPrefixSymbol< decltype(sound4cl_Webserver_Status
      ) >("Webserver_Status"       );
00536             } catch (std::runtime_error& ) {
00537                 // Ignored, handler will take care
00538             }
00539             // Stereo/Mono conversion : must be present
00540             try {
00541                 // added 2023-03-22
00542                 fnStereoToMono_Planar     = GetPrefixSymbol< decltype(sound4cl_StereoToMono_Planar
      ) >("StereoToMono_Planar"    );
00543                 fnMonoToStereo_Planar     = GetPrefixSymbol< decltype(sound4cl_MonoToStereo_Planar
      ) >("MonoToStereo_Planar"    );
00544
00545             } catch (std::runtime_error& ) {
00546                 return false;
00547             }
00548             // C functions allowed to be missing
00549             try {
00550                 // added 2023-05-22
00551                 fnSetMetadata             = GetPrefixSymbol< decltype(sound4cl_SetMetadata
      ) >("SetMetadata"            );
00552                 fnGetMetadataInfos        = GetPrefixSymbol< decltype(sound4cl_GetMetadataInfos
      ) >("GetMetadataInfos"       );
00553                 fnFreeMetadataInfos       = GetPrefixSymbol< decltype(sound4cl_FreeMetadataInfos
      ) >("FreeMetadataInfos"      );
00554                 // added 2023-06-20
00555                 fnSetPresetManager            = GetPrefixSymbol< decltype(sound4cl_SetPresetManager
      ) >("SetPresetManager"               );
00556                 fnPresetManager_InformChange  = GetPrefixSymbol<
      decltype(sound4cl_PresetManager_InformChange     ) >("PresetManager_InformChange"    );
00557
00558                 // added 2023-09-21
00559                 fnGetPossibleChunkSizeInFrames = GetPrefixSymbol<
      decltype(sound4cl_GetPossibleChunkSizeInFrames  ) >("GetPossibleChunkSizeInFrames"  );
00560                 fnGetProcessChunkFrames        = GetPrefixSymbol<
      decltype(sound4cl_GetProcessChunkFrames         ) >("GetProcessChunkFrames"         );
00561                 fnInitProcess3                 = GetPrefixSymbol< decltype(sound4cl_InitProcess3
      ) >("InitProcess3"                   );
00562             }  catch (std::runtime_error& ) {
00563                 // Ignored, handler will take care
00564             }
00565
00566             // bus: not for all projects
00567             try {
00568                 // added 2023-06-26
00569                 fnNewBus                  = GetPrefixSymbol< decltype(sound4cl_NewBus
      ) >("NewBus"                 );
00570                 fnFreeBus                 = GetPrefixSymbol< decltype(sound4cl_FreeBus
      ) >("FreeBus"                );
00571                 fnSetInstanceBus          = GetPrefixSymbol< decltype(sound4cl_SetInstanceBus
      ) >("SetInstanceBus"         );
00572             }  catch (std::runtime_error& ) {
00573                 // Ignored, handler will take care
00574             }
00575
00576             // Other optional
00577             try {
00578                 // added 2024-02-19
00579                 fnSetMetadataMulti        = GetPrefixSymbol< decltype(sound4cl_SetMetadataMulti
      ) >("SetMetadataMulti"       );
00580
00581             }  catch (std::runtime_error& ) {
00582                 // Ignored, handler will take care
00583             }
00584
00585             // Other optional, web server only
```

```
00586             try {
00587                 // added 2024-05-23
00588                 fnWebserver_SetAppHealth    = GetPrefixSymbol<
      decltype(sound4cl_Webserver_SetAppHealth    ) >("Webserver_SetAppHealth"     );
00589                 fnWebserver_GetAppHealth    = GetPrefixSymbol<
      decltype(sound4cl_Webserver_GetAppHealth    ) >("Webserver_GetAppHealth"     );
00590                 fnWebserver_FreeString      = GetPrefixSymbol< decltype(sound4cl_Webserver_FreeString
      ) >("Webserver_FreeString"       );
00591             }  catch (std::runtime_error& ) {
00592                 // Ignored, handler will take care
00593             }
00594
00595 #ifdef _WIN32
00596             // Other optional, windows tracing
00597             try {
00598                 // added 2025-05-28
00599                 fnSetInstanceTracing               = GetPrefixSymbol<
      decltype(sound4cl_SetInstanceTracing                  ) >("SetInstanceTracing"               );
00600                 fnSetInstanceTracingProcessActivity= GetPrefixSymbol<
      decltype(sound4cl_SetInstanceTracingProcessActivity    ) >("SetInstanceTracingProcessActivity");
00601             }  catch (std::runtime_error& ) {
00602                 // Ignored, handler will take care
00603             }
00604 #endif // _WIN32
00605
00606             m_bOK=true;
00607             return true;
00608         }
00615         bool IsOk() const {
00616             return m_bOK;
00617         }
00618
00619         // ------------------------------------------------------------
00626         // ------------------------------------------------------------
00637         void AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl, SampleFormat fmt)
00638             { fnAudioConvertFrom(payload, output, nSpl, (sound4cl_SampleFormat)fmt); }
00639
00650         void AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl, SampleFormat fmt)
00651             { fnAudioConvertTo(input, payload, nSpl, (sound4cl_SampleFormat)fmt); }
00652
00662         void StereoToMono(const float *input, float *output, size_t nFrame)
00663             { fnStereoToMono(input, output, nFrame); }
00664
00674         void MonoToStereo(const float *input, float *output, size_t nFrame)
00675             { fnMonoToStereo(input, output, nFrame); }
00676
00687         void StereoToMono_Planar(const float *inputL, const float *inputR, float *output, size_t
      nFrame)
00688             { fnStereoToMono_Planar(inputL, inputR, output, nFrame); }
00689
00700         void MonoToStereo_Planar(const float *input, float *outputL, float *outputR, size_t nFrame)
00701             { fnMonoToStereo_Planar(input, outputL, outputR, nFrame); }
00702
00709         void AudioMonoFromLiveStereo(const uint8_t *payload, float *output)
00710             { fnAudioMonoFromLiveStereo(payload, output); }
00711
00718         void AudioMonoToLiveStereo(const float *input, uint8_t *payload)
00719             { fnAudioMonoToLiveStereo(input, payload); }
00720
00728         std::string GetVersion()
00729             { return std::string(fnGetVersion()); }
00730
00741         unsigned int GetChunkSizeInFrames()
00742             { return fnGetChunkSizeInFrames(); }
00743
00752         std::vector<unsigned int> GetPossibleChunkSizeInFrames()
00753             {
00754                 std::vector<unsigned int> list;
00755                 if (fnGetPossibleChunkSizeInFrames) {
00756                     for (unsigned int* src=fnGetPossibleChunkSizeInFrames();*src;src++) {
00757                         list.push_back(*src);
00758                     }
00759                 } else {
00760                     list.push_back(fnGetChunkSizeInFrames());
00761                 }
00762                 return list;
00763             }
00764
00770         unsigned int GetChannelCount()
00771             { return fnGetChannelCount(); }
00772
00780         unsigned int GetAudioInputCount()
00781             { return fnGetAudioInputCount(); }
00782
00790         unsigned int GetAudioOutputCount()
00791             { return fnGetAudioOutputCount(); }
00792
```

```
00800         unsigned int GetSampleRate()
00801             { return fnGetSampleRate(); }
00802
00809         std::string GetFormatName( const SampleFormat fmt)
00810             { return std::string(fnGetFormatName((sound4cl_SampleFormat)fmt)); }
00811
00818         SampleFormat GetFormatFromName( const std::string& name)
00819             { return SampleFormat(fnGetFormatFromName(name.c_str())); }
00820
00827         unsigned int GetBytesFromFormat( const SampleFormat fmt)
00828             { return fnGetBytesFromFormat((sound4cl_SampleFormat)fmt); }
00829
00833         void SetLogSeverity(LogSeverity severity)
00834             { fnSetLogSeverity((sound4cl_LogSeverity)severity); }
00835
00839         void SetLoggerCallback(log_cb_t cb)
00840             { _log_cb=cb; fnSetLoggerCallback(&_log_cb_c); }
00841     };
00842
00848     class CBus {
00849         public:
00850             CBus(CProcessor& dynlib)
00851                 : m_dynlib(dynlib)
00852                 {
00853                     if (m_dynlib.fnNewBus) {
00854                         m_bus=m_dynlib.fnNewBus();
00855                     }
00856                 }
00857             ~CBus()
00858                 {
00859                     if (m_bus && m_dynlib.fnFreeBus) {
00860                         m_dynlib.fnFreeBus(m_bus);
00861                     }
00862                     m_bus = nullptr;
00863                 }
00864         protected:
00865             friend class CInstance;
00866             sound4cl_CBus *Get() const { return m_bus; }
00867         private:
00868             CProcessor& m_dynlib;
00869             sound4cl_CBus *m_bus;
00870     };
00871
00877     class CPresetLoader {
00878     public:
00879         CPresetLoader() = default;
00880         virtual ~CPresetLoader() = default;
00881
00882         virtual bool IsReadOnly() = 0;
00883         virtual bool Exists(const std::filesystem::path &name) = 0;
00884         virtual bool Remove(const std::filesystem::path &name) = 0;
00885         virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) = 0;
00886         virtual std::vector<std::filesystem::path> GetAll() = 0;
00887         virtual std::string Read(const std::filesystem::path &filename) = 0;
00888         virtual bool Write(const std::filesystem::path &filename, const std::string &content) =0;
00889     };
00890     enum PresetChange_Kind {
00891         change_kind_created  = sound4cl_PresetChange_Kind::change_kind_created,
00892         change_kind_modified = sound4cl_PresetChange_Kind::change_kind_modified,
00893         change_kind_deleted  = sound4cl_PresetChange_Kind::change_kind_deleted,
00894     };
00900     class CInstance {
00901     public:
00907         CInstance(CProcessor& dynlib)
00908         : m_dynlib(dynlib)
00909             {
00910                 params = m_dynlib.fnNewParameters();
00911                 if (!params) throw std::bad_alloc();
00912             }
00913
00922         CInstance(CProcessor& dynlib, void* _instance)
00923         : m_dynlib(dynlib)
00924         , instance(reinterpret_cast<sound4cl_CInstance*>(_instance))
00925         , m_bOwned(false)
00926             {
00927             }
00928         // non-copyable
00929         CInstance( const CInstance& ) = delete;
00930         CInstance& operator=( const CInstance& ) = delete;
00934         virtual ~CInstance()
00935             {
00936                 Stop();
00937                 if (params) m_dynlib.fnFreeParameters(params);
00938             }
00942        bool IsOk() const { return instance!=nullptr; }
00952         void SetParam(const std::string& name, const std::string& value)
00953             {
```

```
00954                 assert(params);
00955                 m_dynlib.fnSetParameter(params, name.c_str(), value.c_str());
00956             }
00963         std::string GetParam(const std::string& name)
00964             {
00965                 assert(params);
00966                 auto c_value=m_dynlib.fnGetParameter(params, name.c_str());
00967                 std::string ret(c_value);
00968                 m_dynlib.fnFreeParameterValue(c_value);
00969                 return ret;
00970             }
00971
00980         void SetBus(const CBus& bus) {
00981             assert(params);
00982             if (m_dynlib.fnSetInstanceBus) {
00983                 m_dynlib.fnSetInstanceBus(params,bus.Get());
00984             }
00985         }
00986
00997         void SetPresetManager(CPresetLoader *preset_manager)
00998             {
00999                 if (!preset_manager) return;
01000                 if (!m_dynlib.fnSetPresetManager) return;
01001                 assert(params);
01002                 m_dynlib.fnSetPresetManager(params,
01003                     sound4cl_custom_reader,
01004                     sound4cl_custom_reader_free,
01005                     sound4cl_custom_writer,
01006                     sound4cl_custom_exists,
01007                     sound4cl_custom_getall,
01008                     sound4cl_custom_getall_free,
01009                     sound4cl_custom_remove,
01010                     sound4cl_custom_rename,
01011                     preset_manager->IsReadOnly(),
01012                     preset_manager
01013                 );
01014             }
01015
01038         bool Create(const std::string& LoginKey, const std::string& RadioName, const std::string&
      Access_Key_ID, const std::string& Access_Key_Secret, const std::filesystem::path& save_path, int
      json_port = 0, unsigned int frames_per_chunk=0)
01039             {
01040                 assert(!instance);
01041                 std::string l_save_path;
01042                 if (!save_path.empty()) {
01043                     #if (__cplusplus<202002L)
01044                     l_save_path = save_path.u8string();
01045                     #else // C++20
01046                     l_save_path = (const char*)save_path.u8string().c_str();
01047                     #endif // C++20
01048                 }
01049                 if (frames_per_chunk==0) {
01050                     frames_per_chunk=m_dynlib.GetChunkSizeInFrames();
01051                 }
01052                 if (m_dynlib.fnInitProcess3) {
01053                     instance = m_dynlib.fnInitProcess3(LoginKey.c_str(), RadioName.c_str(),
      Access_Key_ID.c_str(), Access_Key_Secret.c_str(), l_save_path.c_str(), params, frames_per_chunk);
01054                 } else if (frames_per_chunk!=m_dynlib.GetChunkSizeInFrames()) {
01055                     return false;
01056                 } else {
01057                     instance = m_dynlib.fnInitProcess2(LoginKey.c_str(), RadioName.c_str(),
      Access_Key_ID.c_str(), Access_Key_Secret.c_str(), l_save_path.c_str(), params);
01058                 }
01059                 if (!instance) return false;
01060                 if (!init_metadata.empty()) {
01061                     for (auto&& [key,value]: init_metadata) {
01062                         m_dynlib.fnSetMetadata(instance, key.c_str(), value.c_str());
01063                     }
01064                     init_metadata.clear();
01065                 }
01066                 update_thread = std::thread([this, json_port](){
01067                     OnUpdateThreadStart();
01068                     m_dynlib.fnStartUpdateThread(instance, json_port);
01069                     OnUpdateThreadStop();
01070                 });
01071                 int timeout=5000;
01072                 #ifdef DEBUG
01073                     timeout=60*1000; // For debugger pauses
01074                 #endif
01075                 if (m_dynlib.fnWaitUpdateThreadReady(instance, timeout)<0) {
01076                     return false;
01077                 }
01078                 return true;
01079             }
01080
01088         unsigned int GetChunkFrames() {
01089             if (instance && m_dynlib.fnGetProcessChunkFrames) {
```

```
01090                 return m_dynlib.fnGetProcessChunkFrames(instance);
01091             }
01092             return m_dynlib.fnGetChunkSizeInFrames();
01093         }
01094
01102         void PresetManager_InformChange(const std::filesystem::path& relative_path, PresetChange_Kind
      change_kind)
01103             {
01104                 if (m_dynlib.fnPresetManager_InformChange) {
01105                     m_dynlib.fnPresetManager_InformChange(instance, relative_path.c_str(),
      (sound4cl_PresetChange_Kind) change_kind);
01106                 }
01107             }
01108
01120         void SetMetadata(const std::string& key, const char* value)
01121             {
01122                 if (m_dynlib.fnSetMetadata) {
01123                     if (instance) {
01124                         m_dynlib.fnSetMetadata(instance, key.c_str(), value);
01125                     } else {
01126                         init_metadata.push_back( {key, value} );
01127                     }
01128                 }
01129             }
01130
01140         void SetMetadataMulti(const std::unordered_map<std::string, const char*>& list)
01141             {
01142                 if (instance) {
01143                     if (m_dynlib.fnSetMetadataMulti) {
01144                         typedef const char* pchar;
01145                         pchar* keyvalue=new pchar[2*list.size()+1];
01146                         size_t n=0;
01147                         for (auto&& [key,value]: list) {
01148                             keyvalue[2*n+0]=key.c_str();
01149                             keyvalue[2*n+1]=value;
01150                             n++;
01151                         }
01152                         keyvalue[2*n+0]=nullptr;
01153
01154                         sound4cl_SetMetadataMulti(instance, keyvalue);
01155
01156                         delete[] keyvalue;
01157                     } else {
01158                         for (auto&& [key,value]: list) {
01159                             SetMetadata(key, value);
01160                         }
01161                     }
01162                 } else {
01163                     for (auto&& [key,value]: list) {
01164                         if (value) {
01165                             init_metadata.push_back( {key, value} );
01166                         }
01167                     }
01168                 }
01169             }
01170
01176         std::vector< std::tuple<std::string,std::string> > GetMetadataInfos()
01177             {
01178                 std::vector< std::tuple<std::string,std::string> > values;
01179                 if (m_dynlib.fnGetMetadataInfos) {
01180                     const char** c_values = m_dynlib.fnGetMetadataInfos(instance);
01181                     if (c_values) {
01182                         for (const char** c_value=c_values; *c_value; ) {
01183                             std::string key(*c_value);
01184                             c_value++;
01185                             if (*c_value) {
01186                                 std::string descr(*c_value);
01187                                 c_value++;
01188                                 values.push_back( {key,descr} );
01189                             }
01190                         }
01191                         m_dynlib.fnFreeMetadataInfos(instance, c_values);
01192                     }
01193                 }
01194                 return values;
01195             }
01196
01200         virtual void OnUpdateThreadStart() {}
01204         virtual void OnUpdateThreadStop() {}
01205
01206
01220         bool StartWebServer(int http_port, int https_port=0)
01221             {
01222                 assert(instance);
01223                 assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
01224                 if (!m_dynlib.fnWebserver) {
01225                     return false;
```

```
01226                 }
01227                 webserver = m_dynlib.fnWebserver(http_port,https_port,instance);
01228                 if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
01229                     return false;
01230                 }
01231                 int web_status=m_dynlib.fnWebserver_Status(webserver);
01232                 if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
01233                     return false;
01234                 }
01235                 if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
01236                     return false;
01237                 }
01238                 return true;
01239             }
01240 
01248             void StopWebServer(int timeout_ms = 1000)
01249             {
01250                 if (!m_dynlib.fnWebserver_Stop) return;
01251                 if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
01252                     m_dynlib.fnWebserver_Stop(webserver, timeout_ms);
01253                     webserver = SOUND4_INVALID_WEBSERVER_ID;
01254                 }
01255             }
01256 
01260         void SetWebServerAppHealth(int httpcode, const std::string& contenttype, const std::string&
    content)
01261             {
01262                 assert(instance);
01263                 if (!m_dynlib.fnWebserver_SetAppHealth) return;
01264                 m_dynlib.fnWebserver_SetAppHealth(instance, httpcode, contenttype.c_str(),
    content.c_str());
01265             }
01269         void GetWebServerAppHealth(int &httpcode, std::string& contenttype, std::string& content)
01270             {
01271                 assert(instance);
01272                 if (!m_dynlib.fnWebserver_GetAppHealth) return;
01273                 char* c_contenttype=nullptr;
01274                 char* c_content=nullptr;
01275                 m_dynlib.fnWebserver_GetAppHealth(instance, &httpcode, &c_contenttype, &c_content);
01276                 contenttype=c_contenttype;
01277                 content=c_content;
01278                 m_dynlib.fnWebserver_FreeString(c_contenttype);
01279                 m_dynlib.fnWebserver_FreeString(c_content);
01280             }
01289         int Terminate()
01290             {
01291                 if (!instance) return 0;
01292                 return m_dynlib.fnTerminateProcess(instance);
01293             }
01294 
01300         void Stop()
01301             {
01302                 if (!instance) return;
01303                 if (m_bOwned) {
01304                     StopWebServer();
01305                     if (update_thread.joinable()) {
01306                         m_dynlib.fnStopUpdateThread(instance); // this will exit the update thread
01307                         update_thread.join();
01308                     }
01309                     m_dynlib.fnExitProcess(instance);
01310                 }
01311                 instance=nullptr;
01312             }
01313 
01323         unsigned int GetEstimatedDelay()
01324             {
01325                 assert(instance);
01326                 return m_dynlib.fnGetEstimatedDelay(instance);
01327             }
01328 
01341         float* GetBufferIn()
01342             {
01343                 assert(instance);
01344                 return m_dynlib.fnGetBufferIn(instance);
01345 
01346             }
01358         float* GetBufferOut()
01359             {
01360                 assert(instance);
01361                 return m_dynlib.fnGetBufferOut(instance);
01362             }
01366         void ProcessAudio()
01367             {
01368                 assert(instance);
01369                 m_dynlib.fnProcessAudio(instance, GetBufferIn(), GetBufferOut());
01370             }
01382         void ProcessAudio_Planar(float const * const *input, float * const *output)
```

```
01383             {
01384                 assert(instance);
01385                 m_dynlib.fnProcessAudio_Planar(instance, input, output);
01386             }
01387 
01399             template<typename T>
01400         std::vector<T> ProcessAnyAudio(const std::vector<T> input)
01401             {
01402                 assert(instance);
01403                 std::vector<T> output;
01404                 unsigned int out_offset=0;
01405                 unsigned int in_offset=0;
01406                 unsigned int todo = input.size();
01407                 while (todo>0) {
01408                     unsigned int left = AddAudio(&input[in_offset], todo);
01409                     unsigned int out_avail = m_dynlib.fnGetOutputCount(instance);
01410                     output.resize(out_offset + out_avail);
01411                     GetAudio(&output[out_offset], out_avail);
01412                     out_offset+=out_avail;
01413                     in_offset += todo-left;
01414                     todo=left;
01415                 }
01416                 return output;
01417             }
01418 
01424         class CClient {
01425             public:
01426                 CClient(sound4cl_CInstance* instance, CProcessor& dynlib)
01427                 : m_dynlib(dynlib)
01428                     {
01429                         assert(instance);
01430                         client=m_dynlib.fnNewClient(instance);
01431                         if (!client) throw std::bad_alloc();
01432                     }
01433                 // non-copyable
01434                 CClient( const CInstance& ) = delete;
01435                 CClient& operator=( const CInstance& ) = delete;
01436                 ~CClient()
01437                     {
01438                         if (client) {
01439                             m_dynlib.fnDeleteClient(client);
01440                             client=nullptr;
01441                         }
01442                     }
01450                 std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
01451                     {
01452                         assert(client);
01453                         int need_save=0;
01454                         const char *canswer = m_dynlib.fnProcessJson(client, request.c_str(),
      &need_save);
01455                         if (!canswer) return {};
01456                         std::string answer(canswer);
01457                         m_dynlib.fnFreeJsonAnswer (canswer);
01458                         if (NeedSave) {
01459                             *NeedSave=(need_save!=0);
01460                         }
01461                         return answer;
01462                     }
01463             private:
01464                 CProcessor& m_dynlib;
01465                 sound4cl_CClientInstance *client = nullptr;
01466         };
01474         std::shared_ptr<CClient> NewClient()
01475             {
01476                 assert(instance);
01477                 return std::make_shared<CClient>(instance, m_dynlib);
01478             }
01479 
01490         bool SaveState() {
01491             assert(instance);
01492             if (!m_dynlib.fnSaveState || m_dynlib.fnSaveState(instance)!=0) {
01493                 return false;
01494             }
01495             return true;
01496         }
01497 #ifdef _WIN32
01504         void SetInstanceTracing(TraceLoggingHProvider tracing_provider, GUID activity_guid = {}) {
01505             if (m_dynlib.fnSetInstanceTracing) {
01506                 m_dynlib.fnSetInstanceTracing(params, tracing_provider, activity_guid);
01507             }
01508         }
01515         void SetInstanceTracingProcessActivity(GUID activity_guid) {
01516             assert(instance);
01517             if (m_dynlib.fnSetInstanceTracingProcessActivity) {
01518                 m_dynlib.fnSetInstanceTracingProcessActivity(instance, activity_guid);
01519             }
01520         }
```

```
01521 #endif // _WIN32
01522     protected:
01523             template<typename T>
01524         unsigned int AddAudio(const T* payload, unsigned int nFrame)
01525             {
01526                 assert(instance);
01527                 return m_dynlib.fnAddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
      helper::SampleFormat<T>::format);
01528             }
01529             template<typename T>
01530         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
01531             {
01532                 assert(instance);
01533                 return m_dynlib.fnGetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
      helper::SampleFormat<T>::format);
01534             }
01535
01536     private:
01537         CProcessor& m_dynlib;
01538         sound4cl_CParameters* params = nullptr;
01539         sound4cl_CInstance* instance = nullptr;
01540         std::thread update_thread;
01541         std::vector< std::pair<std::string,std::string> > init_metadata;
01542         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
01543         bool m_bOwned = true;
01544     };
01545
01546 }; // namespace sound4
01547
01548
01549 // bridge C callbacks to CPresetLoader
01550 extern "C" {
01551     static char *sound4cl_custom_reader(const fs_char *filename, void* userdata) {
01552         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01553         std::string content=preset_loader->Read(filename);
01554         return strdup(content.c_str());
01555     }
01556     static void sound4cl_custom_reader_free(char *content, void* userdata) {
01557         if (!content) return;
01558         free(content);
01559     }
01560     static int sound4cl_custom_writer(const fs_char *filename, const char *content, void* userdata) {
01561         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01562         auto res=preset_loader->Write(filename,content);
01563         return res?0:-1;
01564     }
01565     static int sound4cl_custom_exists(const fs_char *filename, void* userdata) {
01566         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01567         auto res=preset_loader->Exists(filename);
01568         return res?0:-1;
01569     }
01570     static fs_char** sound4cl_custom_getall(void* userdata) {
01571         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01572         auto res=preset_loader->GetAll();
01573         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
01574         for (size_t n=0;n<res.size();n++) {
01575             all[n]=fs_strdup(res[n].c_str());
01576         }
01577         all[res.size()]=nullptr;
01578         return all;
01579     }
01580     static void sound4cl_custom_getall_free(fs_char** all, void* userdata) {
01581         if (!all) return;
01582         for (fs_char** one=all;*one;one++) {
01583             free(*one);
01584         }
01585         free(all);
01586     }
01587     static int sound4cl_custom_remove(const fs_char *filename, void* userdata) {
01588         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01589         auto res=preset_loader->Remove(filename);
01590         return res?0:-1;
01591     }
01592     static int sound4cl_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
01593         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01594         auto res=preset_loader->Rename(from,to);
01595         return res?0:-1;
01596     }
01597
01598 };
```

15.27 sound4cl_cdef.h File Reference

C function signature definition for all sound4.cl libraries.

```
#include <stdint.h>
#include <stringapiset.h>
#include <wchar.h>
```

Macros

- #define SOUND4_INVALID_WEBSERVER_ID ((uint64_t)-1)
- #define SOUND4_WEBSERVER_HTTP_OK (1<<0)
- #define SOUND4_WEBSERVER_HTTPS_OK (1<<1)

Typedefs

- typedef wchar_t fs_char
- typedef struct _tlgProvider_t const * TraceLoggingHProvider

15.27.1 Macro Definition Documentation

15.27.1.1 SOUND4_INVALID_WEBSERVER_ID

```
#define SOUND4_INVALID_WEBSERVER_ID ((uint64_t)-1)
```

Definition at line 65 of file sound4cl_cdef.h.

15.27.1.2 SOUND4_WEBSERVER_HTTP_OK

```
#define SOUND4_WEBSERVER_HTTP_OK (1<<0)
```

Definition at line 66 of file sound4cl_cdef.h.

15.27.1.3 SOUND4_WEBSERVER_HTTPS_OK

```
#define SOUND4_WEBSERVER_HTTPS_OK (1<<1)
```

Definition at line 67 of file sound4cl_cdef.h.

15.27.2 Typedef Documentation

15.27.2.1 fs_char

```
typedef wchar_t fs_char
```

Definition at line 18 of file sound4cl_cdef.h.

15.27.2.2 TraceLoggingHProvider

```
typedef struct _tlgProvider_t const* TraceLoggingHProvider
```

Definition at line 210 of file sound4cl_cdef.h.

15.28 sound4cl_cdef.h

Go to the documentation of this file.

```
00001
00006 #pragma once
00007
00008 #include <stdint.h>
00009 #ifdef __unix__
00010     #include <sys/types.h>
00011 #endif
00012
00013 #ifdef _WIN32
00014     #include <stringapiset.h>
00015     #include <wchar.h>
00017     #define fs_strdup wcsdup
00018     typedef wchar_t fs_char;
00019     #ifdef _MSC_VER
00020         #define __BYTE_ORDER__  REG_DWORD
00021         #define __ORDER_LITTLE_ENDIAN__ REG_DWORD_LITTLE_ENDIAN
00022         #define __ORDER_BIG_ENDIAN__    REG_DWORD_BIG_ENDIAN
00023     #endif
00024     #ifdef _MSC_VER
00025         #pragma warning(disable : 4996)
00026     #endif
00027 #else // !_WIN32
00029     #define fs_strdup strdup
00030     typedef char fs_char;
00031 #endif // !_WIN32
00032
00033 #ifdef __cplusplus
00034 extern "C" {
00035 #endif // __cplusplus
00036
00037 struct sound4cl_SOUND4_ProcessInfo {
00038     size_t struct_size;
00039     const char *name;
00040     const char *prefix;
00041     const char *shortname;
00042     const char *version;
00043 };
00044 enum sound4cl_LogSeverity {
00045     sound4cl_none     = 0,
00046     sound4cl_fatal    = 1,
00047     sound4cl_error    = 2,
00048     sound4cl_warning  = 3,
00049     sound4cl_info     = 4,
00050     sound4cl_verbose  = 5,
00051     sound4cl_verbose2 = 6,
00052     sound4cl_verbose3 = 7,
00053     sound4cl_verbose4 = 8,
00054     sound4cl_verbose5 = 9,
00055 };
00056 struct sound4cl_CInstance;
00057 struct sound4cl_CParameters;
00058 struct sound4cl_CBus;
00059 struct sound4cl_CClientInstance;
00060 enum sound4cl_PresetChange_Kind {
00061     change_kind_created = 1,
00062     change_kind_modified   ,
00063     change_kind_deleted    ,
00064 };
00065 #define SOUND4_INVALID_WEBSERVER_ID            ((uint64_t)-1)
00066 #define SOUND4_WEBSERVER_HTTP_OK               (1<<0)
00067 #define SOUND4_WEBSERVER_HTTPS_OK              (1<<1)
00068
00072 enum sound4cl_SampleFormat {
00073     INVALID_FORMAT=0,
00074     S16_LE,
00075     S16_BE,
00076     S24_LE,
00077     S24_BE,
00078     S32_LE,
```

```
00079     S32_BE,
00080     F32_LE,
00081     F32_BE,
00082 
00083     // Native definitions, only links to the physical ones
00084     #if __BYTE_ORDER__ == __ORDER_LITTLE_ENDIAN__
00085         S16_NATIVE=S16_LE,
00086         S24_NATIVE=S24_LE,
00087         S32_NATIVE=S32_LE,
00088         F32_NATIVE=F32_LE,
00089     #else
00090         S16_NATIVE=S16_BE,
00091         S24_NATIVE=S24_BE,
00092         S32_NATIVE=S32_BE,
00093         F32_NATIVE=F32_BE,
00094     #endif
00095 };
00096 
00097 const struct sound4cl_SOUND4_ProcessInfo* sound4cl_SOUND4_GetProcessInfo();
00098 const char *sound4cl_GetVersion();
00099 unsigned int sound4cl_GetChunkSizeInFrames();
00100 unsigned int* sound4cl_GetPossibleChunkSizeInFrames();
00101 unsigned int sound4cl_GetChannelCount();
00102 unsigned int sound4cl_GetAudioInputCount();
00103 unsigned int sound4cl_GetAudioOutputCount();
00104 unsigned int sound4cl_GetSampleRate();
00105 typedef void (*sound4cl_loggerfn) (enum sound4cl_LogSeverity, const char *);
00106 void sound4cl_SetLoggerCallback( sound4cl_loggerfn logger );
00107 void sound4cl_SetLogSeverity( enum sound4cl_LogSeverity severity );
00108 struct sound4cl_CParameters *sound4cl_NewParameters();
00109 void sound4cl_FreeParameters(struct sound4cl_CParameters *params);
00110 void sound4cl_SetParameter(struct sound4cl_CParameters *params, const char *name, const char *value);
00111 const char *sound4cl_GetParameter(struct sound4cl_CParameters *params, const char *name);
00112 void sound4cl_FreeParameterValue(const char *value);
00113 struct sound4cl_CInstance *sound4cl_InitProcess(
00114         const char *LoginKey,
00115         const char *RadioName,
00116         const char *Access_Key_ID,
00117         const char *Access_Key_Secret,
00118         const char *save_path
00119     );
00120 struct sound4cl_CInstance *sound4cl_InitProcess2(
00121         const char *LoginKey,
00122         const char *RadioName,
00123         const char *Access_Key_ID,
00124         const char *Access_Key_Secret,
00125         const char *save_path,
00126         const struct sound4cl_CParameters *parameters
00127     );
00128 struct sound4cl_CInstance *sound4cl_InitProcess3(
00129         const char *LoginKey,
00130         const char *RadioName,
00131         const char *Access_Key_ID,
00132         const char *Access_Key_Secret,
00133         const char *save_path,
00134         const struct sound4cl_CParameters *parameters,
00135         unsigned int frames_per_chunk
00136     );
00137 unsigned int sound4cl_GetProcessChunkFrames(struct sound4cl_CInstance *instance);
00138 int sound4cl_TerminateProcess(struct sound4cl_CInstance *instance);
00139 void sound4cl_ExitProcess(struct sound4cl_CInstance *instance);
00140 struct sound4cl_CBus* sound4cl_NewBus();
00141 void sound4cl_FreeBus(struct sound4cl_CBus *bus);
00142 void sound4cl_SetInstanceBus(struct sound4cl_CParameters *params, struct sound4cl_CBus *bus);
00143 typedef char * (*sound4cl_storage_reader) (const fs_char *filename, void* userdata);
00144 typedef void (*sound4cl_storage_reader_free) (char *content, void* userdata);
00145 typedef int (*sound4cl_storage_writer) (const fs_char *filename, const char *content, void* userdata);
00146 typedef int (*sound4cl_storage_exists) (const fs_char *filename, void* userdata);
00147 typedef fs_char** (*sound4cl_storage_getall) (void* userdata);
00148 typedef void (*sound4cl_storage_getall_free) (fs_char**all, void* userdata);
00149 typedef int (*sound4cl_storage_remove) (const fs_char *filename, void* userdata);
00150 typedef int (*sound4cl_storage_rename) (const fs_char *from, const fs_char *to, void* userdata);
00151 void sound4cl_SetPresetManager(struct sound4cl_CParameters *params
00152     , sound4cl_storage_reader reader, sound4cl_storage_reader_free
00153     , sound4cl_storage_writer writer
00154     , sound4cl_storage_exists exists
00155     , sound4cl_storage_getall getall, sound4cl_storage_getall_free getall_free
00156     , sound4cl_storage_remove remove
00157     , sound4cl_storage_rename rename
00158     , int IsReadOnly
00159     , void* userdata
00160     );
00161 void sound4cl_PresetManager_InformChange(struct sound4cl_CInstance *instance, const fs_char
      *relative_path, enum sound4cl_PresetChange_Kind change_kind);
00162 void sound4cl_SetMetadata(struct sound4cl_CInstance *instance, const char* key, const char* value);
00163 void sound4cl_SetMetadataMulti(struct sound4cl_CInstance *instance, const char** keyvalue);
00164 const char** sound4cl_GetMetadataInfos(struct sound4cl_CInstance *instance);
```

```
00165 void sound4cl_FreeMetadataInfos(struct sound4cl_CInstance *instance, const char** infos);
00166 void sound4cl_StartUpdateThread(struct sound4cl_CInstance *instance, unsigned int port);
00167 void sound4cl_StopUpdateThread(struct sound4cl_CInstance *instance);
00168 int sound4cl_WaitUpdateThreadReady(struct sound4cl_CInstance *instance, int milliseconds);
00169 void sound4cl_ProcessAudio(struct sound4cl_CInstance *instance, const float *input, float *output );
00170 void sound4cl_ProcessAudio_Planar(struct sound4cl_CInstance *instance
00171     , float const * const *input
00172     , float * const *output);
00173 float *sound4cl_GetBufferIn(struct sound4cl_CInstance *instance);
00174 float *sound4cl_GetBufferOut(struct sound4cl_CInstance *instance);
00175 unsigned int sound4cl_GetEstimatedDelay(struct sound4cl_CInstance *instance);
00176 const char *sound4cl_GetFormatName(const enum sound4cl_SampleFormat fmt);
00177 enum sound4cl_SampleFormat sound4cl_GetFormatFromName(const char *name);
00178 unsigned int sound4cl_GetBytesFromFormat(const enum sound4cl_SampleFormat fmt);
00179 unsigned int sound4cl_GetMaxPacketFrame(struct sound4cl_CInstance *instance);
00180 unsigned int sound4cl_AddAudio(struct sound4cl_CInstance *instance, const uint8_t *payload, unsigned
      int nFrame, enum sound4cl_SampleFormat fmt );
00181 unsigned int sound4cl_AddPadAudio(struct sound4cl_CInstance *instance);
00182 unsigned int sound4cl_GetOutputCount(struct sound4cl_CInstance *instance);
00183 unsigned int sound4cl_GetAudio(struct sound4cl_CInstance *instance, uint8_t *payload, unsigned int
      max_nFrame, enum sound4cl_SampleFormat fmt );
00184 void sound4cl_AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl, enum
      sound4cl_SampleFormat fmt);
00185 void sound4cl_AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl, enum
      sound4cl_SampleFormat fmt);
00186 void sound4cl_StereoToMono(const float *input, float *output, size_t nFrame);
00187 void sound4cl_MonoToStereo(const float *input, float *output, size_t nFrame);
00188 void sound4cl_StereoToMono_Planar(const float *inputL, const float *inputR, float *output, size_t
      nFrame);
00189 void sound4cl_MonoToStereo_Planar(const float *input, float *outputL, float *outputR, size_t nFrame);
00190 void sound4cl_AudioMonoFromLiveStereo(const uint8_t *payload, float *output);
00191 void sound4cl_AudioMonoToLiveStereo(const float *input, uint8_t *payload);
00192 struct sound4cl_CClientInstance *sound4cl_NewClient(struct sound4cl_CInstance *instance);
00193 void sound4cl_DeleteClient(struct sound4cl_CClientInstance *client);
00194 const char *sound4cl_ProcessJson(struct sound4cl_CClientInstance *client, const char *json_str, int
      *need_save);
00195 void sound4cl_FreeJsonAnswer(const char *json_str);
00196 int sound4cl_SaveState(struct sound4cl_CInstance *instance);
00197 uint64_t sound4cl_Webserver_tcp(unsigned int listenport, unsigned int listenport_secure, const char
      *socket_ip, unsigned int socket_port);
00198 uint64_t sound4cl_Webserver_tcp2(unsigned int listenport, unsigned int listenport_secure, const char
      *socket_ip, unsigned int socket_port, const struct sound4cl_CParameters *parameters);
00199 uint64_t sound4cl_Webserver(unsigned int listenport, unsigned int listenport_secure, struct
      sound4cl_CInstance *instance);
00200 int sound4cl_Webserver_Stop(uint64_t id, int timeout_ms);
00201 int sound4cl_Webserver_Status(uint64_t id);
00202 void sound4cl_Webserver_SetAppHealth(struct sound4cl_CInstance *instance, int httpcode, const char*
      contenttype, const char* content);
00203 void sound4cl_Webserver_GetAppHealth(struct sound4cl_CInstance *instance, int* httpcode, char**
      contenttype, char** content);
00204 void sound4cl_Webserver_FreeString(char* str);
00205
00206 //   Tracing (Windows only)
00207 #ifdef _WIN32
00208     #ifndef TLG_HAVE_EVENT_SET_INFORMATION // TraceLoggingProvider.h has not been included
00209         struct _tlgProvider_t;
00210         typedef struct _tlgProvider_t const* TraceLoggingHProvider;
00211     #endif // !TLG_HAVE_EVENT_SET_INFORMATION
00212 void sound4cl_SetInstanceTracing(struct sound4cl_CParameters *params, TraceLoggingHProvider
      tracing_provider, GUID activity_guid);
00213 void sound4cl_SetInstanceTracingProcessActivity(struct sound4cl_CInstance *instance, GUID
      activity_guid);
00214 #endif // _WIN32
00215
00216
00217 #ifdef __cplusplus
00218 } // extern "C"
00219 #endif // __cplusplus
```

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