SOUND4 x1.CLOUD Library [1.4.7]

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Chapter 1

SOUND4 x1.CLOUD Library

1.1 General 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

To access the presets/settings, you can either use JSON socket from Update Management or do all manually with Client's JSon config interfacing using JSON syntax

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

You can also use the C++ wrapper from header sound4.x1.cloud.hpp or the one with dynamic library loading sound4.x1.cloud_dyn.hpp.

Note

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

1.2 Examples

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

Chapter 2

Deprecated List

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)

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Chapter 8

Module Documentation

8.1 Sample using C interface

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

8.1.1 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);
     }*/
```

8.1.2 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;
        }
    }
```

8.1.3 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);
```

8.2 Environment variables and parameters

8.2.1 Parameters defaulting from environment

The following environment variables are used by software library:

Note

Those variables can be passed as parameters with cloudx1_InitProcess2

8.2.1.1 Webserver authentification setup :

- `SETUP_USER` see cloudx1_InitProcess
- `SETUP_SECRET` see cloudx1_InitProcess
- `ADMIN_USER` see cloudx1_InitProcess
- `ADMIN_SECRET` see cloudx1_InitProcess

8.2.1.2 Webserver secure :

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

8.2.1.3 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_CHECK` : if "false", do not check HTTPS certificates

8.2.2 Parameters

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

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=notempty` : force the storage in read-only mode
- `STATE_RO=notempty` : force the state in read-only mode (but can save presets/auth)
- `WAIT_LICENSE=notempty` : force to wait the license load before starting (always in file mode)

8.2.3 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.

8.3 Global setup

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)

8.3.1 Detailed Description

Get information on the library. Set logging mode

8.3.2 Macro Definition Documentation

8.3.2.1 CLOUDX1_AUDIO_INPUT_COUNT

```
#define CLOUDX1_AUDIO_INPUT_COUNT 1
```

This version number of inputs for this process.

Remarks

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

Definition at line 168 of file sound4.x1.cloud.h.

8.3.2.2 CLOUDX1_AUDIO_OUTPUT_COUNT

```
#define CLOUDX1_AUDIO_OUTPUT_COUNT 1
```

This version number of outputs for this process.

Remarks

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

Definition at line 174 of file sound4.x1.cloud.h.

8.3.2.3 CLOUDX1_AUDIOFRAME_COUNT

```
#define CLOUDX1_AUDIOFRAME_COUNT 64
```

This version number of frames in a process chunk.

Remarks

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

Definition at line 156 of file sound4.x1.cloud.h.

8.3.2.4 CLOUDX1_CHANNEL_COUNT

```
#define CLOUDX1_CHANNEL_COUNT 2
```

This version number of channels.

Remarks

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

Definition at line 162 of file sound4.x1.cloud.h.

8.3.2.5 CLOUDX1_SAMPLE_RATE

```
#define CLOUDX1_SAMPLE_RATE 48000
```

This input/output sample-rate.

Remarks

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

Definition at line 180 of file sound4.x1.cloud.h.

8.3.3 Typedef Documentation

8.3.3.1 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 295 of file sound4.x1.cloud.h.

8.3.4 Enumeration Type Documentation

8.3.4.1 cloudx1_LogSeverity

```
enum cloudx1_LogSeverity
```

The logging levels

Enumerator

none	
fatal	
error	
warning	
info	
verbose	
verbose2	
verbose3	
verbose4	
verbose5	

Definition at line 276 of file sound4.x1.cloud.h.

8.3.5 Function Documentation

8.3.5.1 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

8.3.5.2 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

8.3.5.3 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

8.3.5.4 cloudx1_GetChunkSizeInFrames()

```
unsigned int cloudx1_GetChunkSizeInFrames ( )
```

Get the 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

8.3.5.5 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

8.3.5.6 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

8.3.5.7 cloudx1_GetVersion()

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

Get the process version string

Returns

version string

8.3.5.8 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.

8.3.5.9 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

8.3.5.10 SOUND4_GetProcessInfo()

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

Get this processor description

Common to all SOUND4 processors.

Returns

the process description

8.4 Process creation/destruction

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)

8.4.1 Detailed Description

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

8.4.2 Function Documentation

8.4.2.1 cloudx1_ExitProcess()

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

Quit and destroy the instance

Parameters

instance	the instance to destroy

8.4.2.2 cloudx1_FreeParameters()

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

Free the parameters created with cloudx1_NewParameters.

8.4.2.3 cloudx1_FreeParameterValue()

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

Free a parameter value returned by cloudx1_GetParameter

Parameters

value	the returned value

8.4.2.4 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

8.4.2.5 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

8.4.2.6 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

8.4.2.7 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

8.4.2.8 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.

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

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 (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

8.4.2.9 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).

8.4.2.10 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

8.4.2.11 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

8.5 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)

8.5.1 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)

8.5.2 Typedef Documentation

8.5.2.1 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 602 of file sound4.x1.cloud.h.

8.5.2.2 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 611 of file sound4.x1.cloud.h.

8.5.2.3 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 619 of file sound4.x1.cloud.h.

8.5.2.4 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 575 of file sound4.x1.cloud.h.

8.5.2.5 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 583 of file sound4.x1.cloud.h.

8.5.2.6 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 628 of file sound4.x1.cloud.h.

8.5.2.7 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 638 of file sound4.x1.cloud.h.

8.5.2.8 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 593 of file sound4.x1.cloud.h.

8.5.2.9 fs_char

```
typedef wchar_t fs_char
```

Definition at line 563 of file sound4.x1.cloud.h.

8.5.3 Enumeration Type Documentation

8.5.3.1 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 671 of file sound4.x1.cloud.h.

8.5.4 Function Documentation

8.5.4.1 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

8.5.4.2 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

8.6 Metadata Management

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)

8.6.1 Detailed Description

Metadata handling.

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

8.6.2 Function Documentation

8.6.2.1 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

8.6.2.2 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

8.6.2.3 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.

8.6.2.4 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.

8.7 Update Management

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)

8.7.1 Detailed Description

Manage the process update.

8.7.2 Function Documentation

8.7.2.1 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

8.7.2.2 cloudx1_StopUpdateThread()

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

Stop the update thread

Parameters

instance	the processing instance

8.7.2.3 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

8.8 Direct processing

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)

8.8.1 Detailed Description

Optimized processing with direct in->out.

8.8.2 Function Documentation

8.8.2.1 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.

8.8.2.2 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.

8.8.2.3 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.

Returns

Estimated delay in frames

8.8.2.4 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

8.8.2.5 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)

8.9 Audio managing (any audio)

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)

8.9.1 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.

8.9.2 Enumeration Type Documentation

8.9.2.1 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 894 of file sound4.x1.cloud.h.

8.9.3 Function Documentation

8.9.3.1 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

8.9.3.2 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

8.9.3.3 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

8.9.3.4 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

8.9.3.5 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.

8.9.3.6 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

8.9.3.7 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.

8.9.3.8 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

8.10 Audio convert helpers

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)

8.10.1 Detailed Description

8.10.2 Function Documentation

8.10.2.1 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

8.10.2.2 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

8.10.2.3 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)

8.10.2.4 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

8.10.2.5 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

8.10.2.6 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

8.10.2.7 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

8.10.2.8 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

8.11 Client's JSon config interfacing

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)

8.11.1 Detailed Description

Allow low-level JSON configuration. see also JSON syntax

8.11.2 Function Documentation

8.11.2.1 cloudx1_DeleteClient()

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

Deletes a client

Parameters

client	the client instance

8.11.2.2 cloudx1_FreeJsonAnswer()

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

Free a JSON answer returned by cloudx1_ProcessJson

Parameters

json_str	the JSON request

8.11.2.3 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

8.11.2.4 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)

8.11.2.5 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

8.12 JSON syntax

JSON protocol to configure the process

8.12.1 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.

```
{ "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

See also JSON syntax for internal setup

8.12.2 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" }
```

8.12.3 Examples

8.12.3.1 Get status

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

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

8.12.3.2 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":{...}},
       ...
       }
```

8.12.3.3 Check license

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

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

8.12.3.4 Set Processor name

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

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

8.12.3.5 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"},
           ...
       ]}}
```

8.12.3.6 Load a preset

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

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

8.12.3.7 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"}}}
```

8.12.3.8 Set input gain

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

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

8.12.3.9 Set bypass

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

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

8.12.3.10 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

8.12.3.11 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"}
```

8.13 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.

8.13.1 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}
       }}}
```

8.13.2 Authentication management

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

Secret stored is

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

8.13.2.1 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.

8.13.2.2 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

8.13.2.3 Change setup account

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

8.13.2.3.1 Set the setup/admin account

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

answer:

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

8.13.2.3.2 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"}}
```

8.13.2.3.3 Remove the setup/admin account

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

answer:

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

8.13.2.4 Get user info

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

answer:

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

8.13.2.5 Add or modify a user

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

answer:

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

8.13.2.6 Removes a user

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

answer:

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

8.13.2.7 List users

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

answer:

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

8.13.2.8 Get/set unlogged access

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

answer:

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

8.13.2.9 Get realm

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

answer:

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

8.13.2.10 Get API version

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

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

8.13.2.11 Get setup is admin

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

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

8.13.2.12 Get/set setup account

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

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

8.13.2.13 Get/set custom storage

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

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

8.13.3 Get process' interface description

8.13.3.1 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 !

8.13.3.2 Get Process Image

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

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

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

8.13.3.3 Get Process Ico

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

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

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

8.14 Web server

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)

8.14.1 Detailed Description

Run a web server to configure the processor

See also how to setup authentication with Environment variables and parameters. Their use is documented in cloudx1_InitProcess.

8.14.2 Macro Definition Documentation

8.14.2.1 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 1541 of file sound4.x1.cloud.h.

8.14.2.2 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 1546 of file sound4.x1.cloud.h.

8.14.2.3 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 1550 of file sound4.x1.cloud.h.

8.14.3 Function Documentation

8.14.3.1 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

8.14.3.2 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

8.14.3.3 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

8.14.3.4 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

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

Returns

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

8.14.3.5 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

8.15 Sample using C++ interface wrapper

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

8.15.1 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");
```

8.15.2 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;
}
```

8.15.3 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;
```

8.15.4 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;
}
```

8.15.5 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;
    }
}
```

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

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

8.16.1 Dynamic loading

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

8.16.2 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");
```

8.16.3 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;
}
```

8.16.4 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;
```

8.16.5 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;
}
```

8.16.6 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;
        }
    }
```

8.16.7 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;
            if ( !std::filesystem::exists(m_preset_path ) ) {
                return false;
            }
            std::error_code ec;
            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;
            for (const auto & entry : std::filesystem::directory_iterator(m_preset_path.c_str(),
    std::filesystem::directory_options::skip_permission_denied)) {
                if (entry.is_regular_file()) {
                    list.push_back(entry.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;
        }
};
```

8.16.8 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 " « store_path.c_str() «
       std::endl;
            return 1;
        }
        instance.SetPresetManager(&preset_manager);
    }
```

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

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

It uses sound4cl.hpp header.

See full example cpp/sound4cl-pipe.cpp

8.17.1 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;
    }
```

8.17.2 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");
```

8.17.3 Create the processing instance

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

8.17.4 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;
        }
    }
```

8.17.5 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;
    }
```

8.17.6 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;
```

8.17.7 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;
            if ( !std::filesystem::exists(m_preset_path ) ) {
                return false;
            }
            std::error_code ec;
            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;
            for (const auto & entry : std::filesystem::directory_iterator(m_preset_path.c_str(),
       std::filesystem::directory_options::skip_permission_denied)) {
                if (entry.is_regular_file()) {
                    list.push_back(entry.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;
        }
};
```

8.17.8 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 " « store_path.c_str() «
       std::endl;
            return 1;
        }
        instance.SetPresetManager(&preset_manager);
    }
```

Chapter 9

Namespace Documentation

9.1 dyn Namespace Reference

9.1.1 Detailed Description

Dynamic loading namespace

9.2 sound4 Namespace Reference

Namespaces

- cloudx1
- helper

Classes

- class CProcessor

  Dynamic library interface.
- class CBus

  Shared Bus.
- class CPresetLoader

  Custom preset handler helper.
- class CInstance

  Instance handling class.

Typedefs

- using LogSeverity = sound4cl_LogSeverity
- using log_cb_t = std::function< void(LogSeverity, const std::string &)>
- using PresetChange_Kind = sound4cl_PresetChange_Kind

Variables

- const LogSeverity none = (LogSeverity) sound4cl_none
- const LogSeverity fatal = (LogSeverity) sound4cl_fatal
- const LogSeverity error = (LogSeverity) sound4cl_error
- const LogSeverity warning = (LogSeverity) sound4cl_warning
- const LogSeverity info = (LogSeverity) sound4cl_info
- const LogSeverity verbose = (LogSeverity) sound4cl_verbose
- const LogSeverity verbose2 = (LogSeverity) sound4cl_verbose2
- const LogSeverity verbose3 = (LogSeverity) sound4cl_verbose3
- const LogSeverity verbose4 = (LogSeverity) sound4cl_verbose4
- const LogSeverity verbose5 = (LogSeverity) sound4cl_verbose5

9.2.1 Detailed Description

SOUND4 namespace

9.2.2 Typedef Documentation

9.2.2.1 log_cb_t

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

Log callback type

Definition at line 252 of file sound4cl.hpp.

9.2.2.2 LogSeverity

```
using sound4::LogSeverity = typedef sound4cl_LogSeverity
```

Log Severity levels

Definition at line 237 of file sound4cl.hpp.

9.2.2.3 PresetChange_Kind

```
using sound4::PresetChange_Kind = typedef sound4cl_PresetChange_Kind
```

Definition at line 728 of file sound4cl.hpp.

9.2.3 Variable Documentation

9.2.3.1 error

```
const LogSeverity sound4::error = (LogSeverity) sound4cl_error
```

Definition at line 240 of file sound4cl.hpp.

9.2.3.2 fatal

```
const LogSeverity sound4::fatal = (LogSeverity) sound4cl_fatal
```

Definition at line 239 of file sound4cl.hpp.

9.2.3.3 info

```
const LogSeverity sound4::info = (LogSeverity) sound4cl_info
```

Definition at line 242 of file sound4cl.hpp.

9.2.3.4 none

```
const LogSeverity sound4::none = (LogSeverity) sound4cl_none
```

Definition at line 238 of file sound4cl.hpp.

9.2.3.5 verbose

```
const LogSeverity sound4::verbose = (LogSeverity) sound4cl_verbose
```

Definition at line 243 of file sound4cl.hpp.

9.2.3.6 verbose2

```
const LogSeverity sound4::verbose2 = (LogSeverity) sound4cl_verbose2
```

Definition at line 244 of file sound4cl.hpp.

9.2.3.7 verbose3

```
const LogSeverity sound4::verbose3 = (LogSeverity) sound4cl_verbose3
```

Definition at line 245 of file sound4cl.hpp.

9.2.3.8 verbose4

```
const LogSeverity sound4::verbose4 = (LogSeverity) sound4cl_verbose4
```

Definition at line 246 of file sound4cl.hpp.

9.2.3.9 verbose5

```
const LogSeverity sound4::verbose5 = (LogSeverity) sound4cl_verbose5
```

Definition at line 247 of file sound4cl.hpp.

9.2.3.10 warning

```
const LogSeverity sound4::warning = (LogSeverity) sound4cl_warning
```

Definition at line 241 of file sound4cl.hpp.

9.3 sound4::cloudx1 Namespace Reference

Namespaces

- dyn
- helper

Classes

- class CPresetLoader
- class CInstance

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

Variables

- const size_t ChunkFrames =CLOUDX1_AUDIOFRAME_COUNT
- const size_t InputChannels =CLOUDX1_CHANNEL_COUNT∗CLOUDX1_AUDIO_INPUT_COUNT
- const size_t OutputChannels =CLOUDX1_CHANNEL_COUNT∗CLOUDX1_AUDIO_OUTPUT_COUNT
- const size_t InputSampleSize =ChunkFrames∗InputChannels
- const size_t OutputSampleSize =ChunkFrames∗OutputChannels
- const size_t SampleRate =CLOUDX1_SAMPLE_RATE

9.3.1 Detailed Description

cloudx1 namespace

9.3.2 Typedef Documentation

9.3.2.1 log_cb_t

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

Log callback type

Definition at line 320 of file sound4.x1.cloud.hpp.

9.3.2.2 LogSeverity

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

Log Severity levels

Definition at line 316 of file sound4.x1.cloud.hpp.

9.3.2.3 PresetChange_Kind

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

Definition at line 380 of file sound4.x1.cloud.hpp.

9.3.2.4 SampleFormat

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

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

9.3.3 Variable Documentation

9.3.3.1 ChunkFrames

```
const size_t sound4::cloudx1::ChunkFrames =CLOUDX1_AUDIOFRAME_COUNT
```

Number of frames in a chunk

Definition at line 57 of file sound4.x1.cloud.hpp.

9.3.3.2 InputChannels

```
const size_t sound4::cloudx1::InputChannels =CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_INPUT_COUNT
```

Number of float values in an input frame

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

9.3.3.3 InputSampleSize

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

Number of float values for an input chunk

Definition at line 69 of file sound4.x1.cloud.hpp.

9.3.3.4 OutputChannels

```
const size_t sound4::cloudx1::OutputChannels =CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_OUTPUT_COUNT
```

Number of float values in an output frame

Definition at line 65 of file sound4.x1.cloud.hpp.

9.3.3.5 OutputSampleSize

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

Number of float values for an output chunk

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

9.3.3.6 SampleRate

```
const size_t sound4::cloudx1::SampleRate =CLOUDX1_SAMPLE_RATE
```

Sample rate of library

Definition at line 77 of file sound4.x1.cloud.hpp.

9.4 sound4::cloudx1::dyn Namespace Reference

Namespaces

- helper

Classes

- class CDynLib

  Dynamic library interface.
- class CPresetLoader
- class CInstance

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

Variables

- const size_t ChunkFrames =CLOUDX1_AUDIOFRAME_COUNT
- const size_t InputChannels =CLOUDX1_CHANNEL_COUNT∗CLOUDX1_AUDIO_INPUT_COUNT
- const size_t OutputChannels =CLOUDX1_CHANNEL_COUNT∗CLOUDX1_AUDIO_OUTPUT_COUNT
- const size_t InputSampleSize =ChunkFrames∗InputChannels
- const size_t OutputSampleSize =ChunkFrames∗OutputChannels
- const size_t SampleRate =CLOUDX1_SAMPLE_RATE

9.4.1 Typedef Documentation

9.4.1.1 log_cb_t

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

Log callback type

Definition at line 717 of file sound4.x1.cloud_dyn.hpp.

9.4.1.2 LogSeverity

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

Log Severity levels

Definition at line 713 of file sound4.x1.cloud_dyn.hpp.

9.4.1.3 PresetChange_Kind

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

Definition at line 785 of file sound4.x1.cloud_dyn.hpp.

9.4.1.4 SampleFormat

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

Definition at line 446 of file sound4.x1.cloud_dyn.hpp.

9.4.2 Variable Documentation

9.4.2.1 ChunkFrames

```
const size_t sound4::cloudx1::dyn::ChunkFrames =CLOUDX1_AUDIOFRAME_COUNT
```

Number of frames in a chunk

Definition at line 450 of file sound4.x1.cloud_dyn.hpp.

9.4.2.2 InputChannels

```
const size_t sound4::cloudx1::dyn::InputChannels =CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_INPUT_COUNT
```

Number of float values in an input frame

Definition at line 454 of file sound4.x1.cloud_dyn.hpp.

9.4.2.3 InputSampleSize

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

Number of float values for an input chunk

Definition at line 462 of file sound4.x1.cloud_dyn.hpp.

9.4.2.4 OutputChannels

```
const size_t sound4::cloudx1::dyn::OutputChannels =CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_OUTPUT_COUNT
```

Number of float values in an output frame

Definition at line 458 of file sound4.x1.cloud_dyn.hpp.

9.4.2.5 OutputSampleSize

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

Number of float values for an output chunk

Definition at line 466 of file sound4.x1.cloud_dyn.hpp.

9.4.2.6 SampleRate

```
const size_t sound4::cloudx1::dyn::SampleRate =CLOUDX1_SAMPLE_RATE
```

Sample rate of library

Definition at line 470 of file sound4.x1.cloud_dyn.hpp.

9.5 sound4::cloudx1::dyn::helper Namespace Reference

Classes

- class DynFuncHolder

  Helper to wrap a function pointer.
- class CDynLoader

  Helper to load dynamic library.
- struct SampleFormat

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

Typedefs

- using DynLib_t = HMODULE
- using DynFunc_t = FARPROC

9.5.1 Detailed Description

helper functions for unicode strings in Windows

9.5.2 Typedef Documentation

9.5.2.1 DynFunc_t

```
using sound4::cloudx1::dyn::helper::DynFunc_t = typedef FARPROC
```

Definition at line 77 of file sound4.x1.cloud_dyn.hpp.

9.5.2.2 DynLib_t

```
using sound4::cloudx1::dyn::helper::DynLib_t = typedef HMODULE
```

Definition at line 76 of file sound4.x1.cloud_dyn.hpp.

9.6 sound4::cloudx1::helper Namespace Reference

Classes

- struct SampleFormat

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

9.6.1 Detailed Description

helper functions for unicode strings in Windows

9.7 sound4::helper Namespace Reference

Classes

- struct SampleFormat

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

  Helper to wrap a function pointer.
- class CDynLoader

  Helper to load dynamic library.

Typedefs

- using DynLib_t = HMODULE
- using DynFunc_t = FARPROC

9.7.1 Detailed Description

helper functions for unicode strings in Windows

9.7.2 Typedef Documentation

9.7.2.1 DynFunc_t

```
using sound4::helper::DynFunc_t = typedef FARPROC
```

Definition at line 106 of file sound4cl.hpp.

9.7.2.2 DynLib_t

```
using sound4::helper::DynLib_t = typedef HMODULE
```

Definition at line 105 of file sound4cl.hpp.

9.8 std Namespace Reference

Chapter 10

Class Documentation

10.1 sound4::CBus Class Reference

Shared Bus.

`#include <sound4cl.hpp>`

Public Member Functions

- CBus (CProcessor &dynlib)
- ~CBus ()
- sound4cl_CBus * Get () const

10.1.1 Detailed Description

Some processor can share a bus for realtime data exchange

Definition at line 688 of file sound4cl.hpp.

10.1.2 Constructor & Destructor Documentation

10.1.2.1 CBus()

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

Definition at line 690 of file sound4cl.hpp.

10.1.2.2 ~CBus()

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

Definition at line 697 of file sound4cl.hpp.

10.1.3 Member Function Documentation

10.1.3.1 Get()

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

Definition at line 704 of file sound4cl.hpp.

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

- sound4cl.hpp

10.2 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.

10.2.1 Detailed Description

Low-level JSON client.

See also

JSON syntax

Definition at line 1176 of file sound4cl.hpp.

10.2.2 Constructor & Destructor Documentation

10.2.2.1 CClient() [1/2]

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

Definition at line 1178 of file sound4cl.hpp.

10.2.2.2 CClient() [2/2]

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

10.2.2.3 ~CClient()

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

Definition at line 1188 of file sound4cl.hpp.

10.2.3 Member Function Documentation

10.2.3.1 operator=()

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

10.2.3.2 ProcessJson()

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

Parameters

request	the JSON request.

See also

JSON syntax

Parameters

NeedSave	if non null, returns if the saving is required (maybe delayed)

Returns

the JSON answer

Definition at line 1202 of file sound4cl.hpp.

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

- sound4cl.hpp

10.3 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.

10.3.1 Detailed Description

Low-level JSON client.

See also

JSON syntax

Definition at line 804 of file sound4.x1.cloud.hpp.

10.3.2 Constructor & Destructor Documentation

10.3.2.1 CClient() [1/2]

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

Definition at line 806 of file sound4.x1.cloud.hpp.

10.3.2.2 CClient() [2/2]

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

10.3.2.3 ~CClient()

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

Definition at line 815 of file sound4.x1.cloud.hpp.

10.3.3 Member Function Documentation

10.3.3.1 operator=()

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

10.3.3.2 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

Parameters

NeedSave	if non null, returns if the saving is required (maybe delayed)

Returns

the JSON answer

Definition at line 829 of file sound4.x1.cloud.hpp.

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

- sound4.x1.cloud.hpp

10.4 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.

10.4.1 Detailed Description

Low-level JSON client.

See also

JSON syntax

Definition at line 1231 of file sound4.x1.cloud_dyn.hpp.

10.4.2 Constructor & Destructor Documentation

10.4.2.1 CClient() [1/2]

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

Definition at line 1233 of file sound4.x1.cloud_dyn.hpp.

10.4.2.2 CClient() [2/2]

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

10.4.2.3 ~CClient()

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

Definition at line 1243 of file sound4.x1.cloud_dyn.hpp.

10.4.3 Member Function Documentation

10.4.3.1 operator=()

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

10.4.3.2 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

Parameters

NeedSave	if non null, returns if the saving is required (maybe delayed)

Returns

the JSON answer

Definition at line 1257 of file sound4.x1.cloud_dyn.hpp.

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

- sound4.x1.cloud_dyn.hpp

10.5 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

10.5.1 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 210 of file sound4.x1.cloud_dyn.hpp.

10.5.2 Constructor & Destructor Documentation

10.5.2.1 CDynLib()

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

10.5.3 Member Function Documentation

10.5.3.1 IsOk()

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

Returns

true if OK.

false if not OK.

Definition at line 436 of file sound4.x1.cloud_dyn.hpp.

10.5.3.2 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 305 of file sound4.x1.cloud_dyn.hpp.

10.5.4 Member Data Documentation

10.5.4.1 AddAudio

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

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

10.5.4.2 AddPadAudio

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

Definition at line 248 of file sound4.x1.cloud_dyn.hpp.

10.5.4.3 AudioConvertFrom

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

Definition at line 251 of file sound4.x1.cloud_dyn.hpp.

10.5.4.4 AudioConvertTo

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

Definition at line 252 of file sound4.x1.cloud_dyn.hpp.

10.5.4.5 AudioMonoFromLiveStereo

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

Definition at line 255 of file sound4.x1.cloud_dyn.hpp.

10.5.4.6 AudioMonoToLiveStereo

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

Definition at line 256 of file sound4.x1.cloud_dyn.hpp.

10.5.4.7 DeleteClient

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

Definition at line 258 of file sound4.x1.cloud_dyn.hpp.

10.5.4.8 ExitProcess

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

Definition at line 234 of file sound4.x1.cloud_dyn.hpp.

10.5.4.9 FreeJsonAnswer

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

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

10.5.4.10 FreeMetadataInfos

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

Definition at line 277 of file sound4.x1.cloud_dyn.hpp.

10.5.4.11 FreeParameters

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

Definition at line 227 of file sound4.x1.cloud_dyn.hpp.

10.5.4.12 FreeParameterValue

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

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

10.5.4.13 GetAudio

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

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

10.5.4.14 GetAudioInputCount

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

Definition at line 221 of file sound4.x1.cloud_dyn.hpp.

10.5.4.15 GetAudioOutputCount

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

Definition at line 222 of file sound4.x1.cloud_dyn.hpp.

10.5.4.16 GetBufferIn

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

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

10.5.4.17 GetBufferOut

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

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

10.5.4.18 GetBytesFromFormat

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

Definition at line 245 of file sound4.x1.cloud_dyn.hpp.

10.5.4.19 GetChannelCount

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

Definition at line 220 of file sound4.x1.cloud_dyn.hpp.

10.5.4.20 GetChunkSizeInFrames

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

Definition at line 219 of file sound4.x1.cloud_dyn.hpp.

10.5.4.21 GetEstimatedDelay

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

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

10.5.4.22 GetFormatFromName

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

Definition at line 244 of file sound4.x1.cloud_dyn.hpp.

10.5.4.23 GetFormatName

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

Definition at line 243 of file sound4.x1.cloud_dyn.hpp.

10.5.4.24 GetMaxPacketFrame

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

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

10.5.4.25 GetMetadataInfos

```
helper::DynFuncHolder< decltype(cloudx1_GetMetadataInfos ) > sound4::cloudx1::dyn::CDynLib::↩
GetMetadataInfos
```

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

10.5.4.26 GetOutputCount

```
helper::DynFuncHolder< decltype(cloudx1_GetOutputCount ) > sound4::cloudx1::dyn::CDynLib::↩
GetOutputCount
```

Definition at line 249 of file sound4.x1.cloud_dyn.hpp.

10.5.4.27 GetParameter

```
helper::DynFuncHolder< decltype(cloudx1_GetParameter ) > sound4::cloudx1::dyn::CDynLib::Get↩
Parameter
```

Definition at line 229 of file sound4.x1.cloud_dyn.hpp.

10.5.4.28 GetPossibleChunkSizeInFrames

```
helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames ) > sound4::cloudx1↩
::dyn::CDynLib::GetPossibleChunkSizeInFrames
```

Definition at line 284 of file sound4.x1.cloud_dyn.hpp.

10.5.4.29 GetProcessChunkFrames

```
helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames ) > sound4::cloudx1::dyn::CDyn↩
Lib::GetProcessChunkFrames
```

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

10.5.4.30 GetSampleRate

```
helper::DynFuncHolder< decltype(cloudx1_GetSampleRate ) > sound4::cloudx1::dyn::CDynLib::Get↩
SampleRate
```

Definition at line 223 of file sound4.x1.cloud_dyn.hpp.

10.5.4.31 GetVersion

```
helper::DynFuncHolder< decltype(cloudx1_GetVersion ) > sound4::cloudx1::dyn::CDynLib::Get↩
Version
```

Definition at line 218 of file sound4.x1.cloud_dyn.hpp.

10.5.4.32 InitProcess

```
helper::DynFuncHolder< decltype(cloudx1_InitProcess ) > sound4::cloudx1::dyn::CDynLib::Init↩
Process
```

Definition at line 231 of file sound4.x1.cloud_dyn.hpp.

10.5.4.33 InitProcess2

```
helper::DynFuncHolder< decltype(cloudx1_InitProcess2 ) > sound4::cloudx1::dyn::CDynLib::Init↩
Process2
```

Definition at line 232 of file sound4.x1.cloud_dyn.hpp.

10.5.4.34 InitProcess3

```
helper::DynFuncHolder< decltype(cloudx1_InitProcess3 ) > sound4::cloudx1::dyn::CDynLib::Init↩
Process3
```

Definition at line 286 of file sound4.x1.cloud_dyn.hpp.

10.5.4.35 MonoToStereo

```
helper::DynFuncHolder< decltype(cloudx1_MonoToStereo ) > sound4::cloudx1::dyn::CDynLib::Mono↩
ToStereo
```

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

10.5.4.36 MonoToStereo_Planar

```
helper::DynFuncHolder< decltype(cloudx1_MonoToStereo_Planar ) > sound4::cloudx1::dyn::CDyn↩
Lib::MonoToStereo_Planar
```

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

10.5.4.37 NewClient

```
helper::DynFuncHolder< decltype(cloudx1_NewClient ) > sound4::cloudx1::dyn::CDynLib::NewClient
```

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

10.5.4.38 NewParameters

```
helper::DynFuncHolder< decltype(cloudx1_NewParameters ) > sound4::cloudx1::dyn::CDynLib::New↩
Parameters
```

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

10.5.4.39 PresetManager_InformChange

```
helper::DynFuncHolder< decltype(cloudx1_PresetManager_InformChange ) > sound4::cloudx1::dyn↩
::CDynLib::PresetManager_InformChange
```

Definition at line 281 of file sound4.x1.cloud_dyn.hpp.

10.5.4.40 ProcessAudio

```
helper::DynFuncHolder< decltype(cloudx1_ProcessAudio ) > sound4::cloudx1::dyn::CDynLib::↩
ProcessAudio
```

Definition at line 238 of file sound4.x1.cloud_dyn.hpp.

10.5.4.41 ProcessAudio_Planar

```
helper::DynFuncHolder< decltype(cloudx1_ProcessAudio_Planar ) > sound4::cloudx1::dyn::CDyn↩
Lib::ProcessAudio_Planar
```

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

10.5.4.42 ProcessJson

```
helper::DynFuncHolder< decltype(cloudx1_ProcessJson ) > sound4::cloudx1::dyn::CDynLib::↩
ProcessJson
```

Definition at line 259 of file sound4.x1.cloud_dyn.hpp.

10.5.4.43 SaveState

```
helper::DynFuncHolder< decltype(cloudx1_SaveState ) > sound4::cloudx1::dyn::CDynLib::SaveState
```

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

10.5.4.44 SetLoggerCallback

```
helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback ) > sound4::cloudx1::dyn::CDynLib↩
::SetLoggerCallback
```

Definition at line 224 of file sound4.x1.cloud_dyn.hpp.

10.5.4.45 SetLogSeverity

```
helper::DynFuncHolder< decltype(cloudx1_SetLogSeverity ) > sound4::cloudx1::dyn::CDynLib::↩
SetLogSeverity
```

Definition at line 225 of file sound4.x1.cloud_dyn.hpp.

10.5.4.46 SetMetadata

```
helper::DynFuncHolder< decltype(cloudx1_SetMetadata ) > sound4::cloudx1::dyn::CDynLib::Set↩
Metadata
```

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

10.5.4.47 SetMetadataMulti

```
helper::DynFuncHolder< decltype(cloudx1_SetMetadataMulti ) > sound4::cloudx1::dyn::CDynLib::↩
SetMetadataMulti
```

Definition at line 296 of file sound4.x1.cloud_dyn.hpp.

10.5.4.48 SetParameter

```
helper::DynFuncHolder< decltype(cloudx1_SetParameter ) > sound4::cloudx1::dyn::CDynLib::Set↩
Parameter
```

Definition at line 228 of file sound4.x1.cloud_dyn.hpp.

10.5.4.49 SetPresetManager

```
helper::DynFuncHolder< decltype(cloudx1_SetPresetManager ) > sound4::cloudx1::dyn::CDynLib::↩
SetPresetManager
```

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

10.5.4.50 StartUpdateThread

```
helper::DynFuncHolder< decltype(cloudx1_StartUpdateThread ) > sound4::cloudx1::dyn::CDynLib↩
::StartUpdateThread
```

Definition at line 235 of file sound4.x1.cloud_dyn.hpp.

10.5.4.51 StereoToMono

```
helper::DynFuncHolder< decltype(cloudx1_StereoToMono ) > sound4::cloudx1::dyn::CDynLib::↩
StereoToMono
```

Definition at line 253 of file sound4.x1.cloud_dyn.hpp.

10.5.4.52 StereoToMono_Planar

```
helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar ) > sound4::cloudx1::dyn::CDyn↩
Lib::StereoToMono_Planar
```

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

10.5.4.53 StopUpdateThread

```
helper::DynFuncHolder< decltype(cloudx1_StopUpdateThread ) > sound4::cloudx1::dyn::CDynLib::↩
StopUpdateThread
```

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

10.5.4.54 TerminateProcess

```
helper::DynFuncHolder< decltype(cloudx1_TerminateProcess ) > sound4::cloudx1::dyn::CDynLib::↩
TerminateProcess
```

Definition at line 233 of file sound4.x1.cloud_dyn.hpp.

10.5.4.55 WaitUpdateThreadReady

```
helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady ) > sound4::cloudx1::dyn::CDyn↩
Lib::WaitUpdateThreadReady
```

Definition at line 237 of file sound4.x1.cloud_dyn.hpp.

10.5.4.56 Webserver

```
helper::DynFuncHolder< decltype(cloudx1_Webserver ) > sound4::cloudx1::dyn::CDynLib::Webserver
```

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

10.5.4.57 Webserver_Status

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_Status ) > sound4::cloudx1::dyn::CDynLib::↩
Webserver_Status
```

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

10.5.4.58 Webserver_Stop

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_Stop ) > sound4::cloudx1::dyn::CDynLib::↩
Webserver_Stop
```

Definition at line 266 of file sound4.x1.cloud_dyn.hpp.

10.5.4.59 Webserver_tcp

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp ) > sound4::cloudx1::dyn::CDynLib::↩
Webserver_tcp
```

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

10.5.4.60 Webserver_tcp2

```
helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp2 ) > sound4::cloudx1::dyn::CDynLib::↩
Webserver_tcp2
```

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

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

- sound4.x1.cloud_dyn.hpp

10.6 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_LIBRARY_SEARCH_APPLICATION_DIR|LOAD_LIBRARY_SEARCH_USER_DIRS|LOAD_↩ LIBRARY_SEARCH_SYSTEM32)
- 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)

10.6.1 Detailed Description

Definition at line 101 of file sound4.x1.cloud_dyn.hpp.

10.6.2 Constructor & Destructor Documentation

10.6.2.1 CDynLoader() [1/3]

```
sound4::cloudx1::dyn::helper::CDynLoader::CDynLoader ( )  [default]
```

10.6.2.2 CDynLoader() [2/3]

```
sound4::cloudx1::dyn::helper::CDynLoader::CDynLoader (
            CDynLoader &&  )  [default]
```

10.6.2.3 CDynLoader() [3/3]

```
sound4::cloudx1::dyn::helper::CDynLoader::CDynLoader (
            const CDynLoader &  )  [delete]
```

10.6.2.4 ~CDynLoader()

```
virtual sound4::cloudx1::dyn::helper::CDynLoader::~CDynLoader ( )  [inline], [virtual]
```

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

10.6.3 Member Function Documentation

10.6.3.1 Close()

```
void sound4::cloudx1::dyn::helper::CDynLoader::Close ( )  [inline]
```

Definition at line 159 of file sound4.x1.cloud_dyn.hpp.

10.6.3.2 GetSymbol()

```
template<typename T >
DynFuncHolder<T> sound4::cloudx1::dyn::helper::CDynLoader::GetSymbol (
            const std::string & name )  [inline]
```

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

10.6.3.3 GetSymbol_safe()

```
template<typename T >
DynFuncHolder<T> sound4::cloudx1::dyn::helper::CDynLoader::GetSymbol_safe (
            const std::string & name )  [inline]
```

Definition at line 180 of file sound4.x1.cloud_dyn.hpp.

10.6.3.4 GetThisLibraryPath()

```
static std::filesystem::path sound4::cloudx1::dyn::helper::CDynLoader::GetThisLibraryPath (
            void  )  [inline], [static]
```

Definition at line 184 of file sound4.x1.cloud_dyn.hpp.

10.6.3.5 IsOk()

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

Definition at line 113 of file sound4.x1.cloud_dyn.hpp.

10.6.3.6 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_LIBRARY_SEARCH_USER_DIRS|LOAD_LIBRARY_SEARCH_SYSTEM32 )  [inline]
```

Definition at line 153 of file sound4.x1.cloud_dyn.hpp.

10.6.3.7 operator bool()

```
sound4::cloudx1::dyn::helper::CDynLoader::operator bool ( ) const  [inline]
```

Definition at line 110 of file sound4.x1.cloud_dyn.hpp.

10.6.3.8 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

10.7 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_LIBRARY_SEARCH_APPLICATION_DIR|LOAD_LIBRARY_SEARCH_USER_DIRS|LOAD_↩ LIBRARY_SEARCH_SYSTEM32)
- 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)

10.7.1 Detailed Description

Definition at line 130 of file sound4cl.hpp.

10.7.2 Constructor & Destructor Documentation

10.7.2.1 CDynLoader() [1/3]

```
sound4::helper::CDynLoader::CDynLoader ( )  [default]
```

10.7.2.2 CDynLoader() [2/3]

```
sound4::helper::CDynLoader::CDynLoader (
            CDynLoader &&  )  [default]
```

10.7.2.3 CDynLoader() [3/3]

```
sound4::helper::CDynLoader::CDynLoader (
            const CDynLoader &  )  [delete]
```

10.7.2.4 ~CDynLoader()

```
virtual sound4::helper::CDynLoader::~CDynLoader ( )  [inline], [virtual]
```

Definition at line 227 of file sound4cl.hpp.

10.7.3 Member Function Documentation

10.7.3.1 Close()

```
void sound4::helper::CDynLoader::Close ( )  [inline]
```

Definition at line 188 of file sound4cl.hpp.

10.7.3.2 GetSymbol()

```
template<typename T >
DynFuncHolder<T> sound4::helper::CDynLoader::GetSymbol (
            const std::string & name )  [inline]
```

Definition at line 201 of file sound4cl.hpp.

10.7.3.3 GetSymbol_safe()

```
template<typename T >
DynFuncHolder<T> sound4::helper::CDynLoader::GetSymbol_safe (
            const std::string & name )  [inline]
```

Definition at line 209 of file sound4cl.hpp.

10.7.3.4 GetThisLibraryPath()

```
static std::filesystem::path sound4::helper::CDynLoader::GetThisLibraryPath (
            void  )  [inline], [static]
```

Definition at line 213 of file sound4cl.hpp.

10.7.3.5 IsOk()

```
bool sound4::helper::CDynLoader::IsOk ( ) const  [inline]
```

Definition at line 142 of file sound4cl.hpp.

10.7.3.6 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_LIBRARY_SEARCH_USER_DIRS|LOAD_LIBRARY_SEARCH_SYSTEM32 )  [inline]
```

Definition at line 182 of file sound4cl.hpp.

10.7.3.7 operator bool()

```
sound4::helper::CDynLoader::operator bool ( ) const  [inline]
```

Definition at line 139 of file sound4cl.hpp.

10.7.3.8 operator=()

```
CDynLoader& sound4::helper::CDynLoader::operator= (
            CDynLoader const &  )  [delete]
```

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

- sound4cl.hpp

10.8 sound4::CInstance Class Reference

Instance handling class.

`#include <sound4cl.hpp>`

Classes

- class CClient

Public Member Functions

- CInstance (CProcessor &dynlib)
- CInstance (const CInstance &)=delete
- CInstance & operator= (const CInstance &)=delete
- ~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 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 ()

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)

10.8.1 Detailed Description

Holds an instance of processing

Definition at line 735 of file sound4cl.hpp.

10.8.2 Constructor & Destructor Documentation

10.8.2.1 CInstance() [1/2]

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

Creates the instance, with default parameters

Definition at line 740 of file sound4cl.hpp.

10.8.2.2 CInstance() [2/2]

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

10.8.2.3 ~CInstance()

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

Destructor, stopping any running tasks

Definition at line 752 of file sound4cl.hpp.

10.8.3 Member Function Documentation

10.8.3.1 AddAudio()

```
template<typename T >
unsigned int sound4::CInstance::AddAudio (
            const T * payload,
            unsigned int nFrame )  [inline], [protected]
```

Definition at line 1234 of file sound4cl.hpp.

10.8.3.2 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

See also

sound4cl_InitProcess2

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 sound4cl_GetPossibleChunkSizeInFrames, or 0 to set default

Returns

false if failed

Definition at line 839 of file sound4cl.hpp.

10.8.3.3 GetAudio()

```
template<typename T >
unsigned int sound4::CInstance::GetAudio (
```

```
T * payload,
unsigned int max_nFrame )  [inline], [protected]
```

Definition at line 1240 of file sound4cl.hpp.

10.8.3.4 GetBufferIn()

```
float* sound4::CInstance::GetBufferIn ( )  [inline]
```

Gets the input buffer used in ProcessAudio

Input has GetAudioInputCount() * 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]

Definition at line 1089 of file sound4cl.hpp.

10.8.3.5 GetBufferOut()

```
float* sound4::CInstance::GetBufferOut ( )  [inline]
```

Gets the output buffer used in ProcessAudio

Output has GetAudioOutputCount() * 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]

Definition at line 1105 of file sound4cl.hpp.

10.8.3.6 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 885 of file sound4cl.hpp.

10.8.3.7 GetEstimatedDelay()

```
unsigned int sound4::CInstance::GetEstimatedDelay ( )  [inline]
```

Gets an estimated delay of current processing

See also

sound4cl_GetEstimatedDelay

Definition at line 1073 of file sound4cl.hpp.

10.8.3.8 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 974 of file sound4cl.hpp.

10.8.3.9 GetParam()

```
std::string sound4::CInstance::GetParam (
            const std::string & name )  [inline]
```

Gets a parameter value

See also

sound4cl_GetParameter

Definition at line 778 of file sound4cl.hpp.

10.8.3.10 IsOk()

```
bool sound4::CInstance::IsOk ( ) const  [inline]
```

Returns true if an instance has been created and not stopped.

Definition at line 760 of file sound4cl.hpp.

10.8.3.11 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 1226 of file sound4cl.hpp.

10.8.3.12 OnUpdateThreadStart()

```
virtual void sound4::CInstance::OnUpdateThreadStart ( )  [inline], [virtual]
```

Definition at line 996 of file sound4cl.hpp.

10.8.3.13 OnUpdateThreadStop()

```
virtual void sound4::CInstance::OnUpdateThreadStop ( )  [inline], [virtual]
```

Definition at line 998 of file sound4cl.hpp.

10.8.3.14 operator=()

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

10.8.3.15 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 899 of file sound4cl.hpp.

10.8.3.16 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 1152 of file sound4cl.hpp.

10.8.3.17 ProcessAudio()

```
void sound4::CInstance::ProcessAudio ( )  [inline]
```

Process one audio chunk, from GetBufferIn() to GetBufferOut()

See also

sound4cl_ProcessAudio

Definition at line 1115 of file sound4cl.hpp.

10.8.3.18 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...], ...]

See also

sound4cl_ProcessAudio_Planar

Parameters

input	has GetAudioInputCount() ∗ GetChannelCount() channels
output	has GetAudioOutputCount() ∗ GetChannelCount() channels

Definition at line 1134 of file sound4cl.hpp.

10.8.3.19 SetBus()

```
void sound4::CInstance::SetBus (
            const CBus & bus )  [inline]
```

Set the instance bus

Definition at line 790 of file sound4cl.hpp.

10.8.3.20 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 917 of file sound4cl.hpp.

10.8.3.21 SetMetadataMulti()

```
void sound4::CInstance::SetMetadataMulti (
            const std::unordered_map< std::string, const char * > & list )  [inline]
```

Adds multiple metadata to the process.

This works like CInstance::SetMetadata but with multiple metadata at once.

See also

CInstance::SetMetadata

Parameters

list	a map of key/value pair.

Definition at line 938 of file sound4cl.hpp.

10.8.3.22 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

sound4cl_SetParameter

Definition at line 768 of file sound4cl.hpp.

10.8.3.23 SetPresetManager()

```
void sound4::CInstance::SetPresetManager (
            CPresetLoader * preset_manager )  [inline]
```

Sets a custom preset manager Optional, this overrides the `save_path` in Create

See also

sound4cl_SetPresetManager

Must be done before Create

Parameters

preset_manager	The custom preset manager

Definition at line 806 of file sound4cl.hpp.

10.8.3.24 StartWebServer()

```
bool sound4::CInstance::StartWebServer (
            int http_port,
            int https_port = 0 )  [inline]
```

Starts a Web server on requested ports

See also

sound4cl_Webserver

Definition at line 1005 of file sound4cl.hpp.

10.8.3.25 Stop()

```
void sound4::CInstance::Stop ( )  [inline]
```

Stops the instance and its web server and its update thread.

See also

sound4cl_ExitProcess,
sound4cl_StopUpdateThread and
sound4cl_Webserver_Stop

Definition at line 1056 of file sound4cl.hpp.

10.8.3.26 StopWebServer()

```
void sound4::CInstance::StopWebServer ( )  [inline]
```

Stops the Web server

See also

sound4cl_Webserver_Stop

Definition at line 1030 of file sound4cl.hpp.

10.8.3.27 Terminate()

```
int sound4::CInstance::Terminate ( )  [inline]
```

Terminate the processing. This is useful only with file processing, to get the final status.

See also

sound4cl_TerminateProcess

Definition at line 1045 of file sound4cl.hpp.

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

- sound4cl.hpp

10.9 sound4::cloudx1::CInstance Class Reference

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

Classes

- class CClient

Public Member Functions

- CInstance ()
- CInstance (const CInstance &)=delete
- CInstance & operator= (const CInstance &)=delete
- ~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 &AWS_Access_ID, const std::string &AWS_Access_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 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 ()

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)

10.9.1 Detailed Description

Instance handling class

Definition at line 385 of file sound4.x1.cloud.hpp.

10.9.2 Constructor & Destructor Documentation

10.9.2.1 CInstance() [1/2]

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

Creates the instance, with default parameters

Definition at line 390 of file sound4.x1.cloud.hpp.

10.9.2.2 CInstance() [2/2]

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

10.9.2.3 ~CInstance()

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

Destructor, stopping any running tasks

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

10.9.3 Member Function Documentation

10.9.3.1 AddAudio()

```
template<typename T >
unsigned int sound4::cloudx1::CInstance::AddAudio (
            const T * payload,
            unsigned int nFrame )  [inline], [protected]
```

Definition at line 860 of file sound4.x1.cloud.hpp.

10.9.3.2 Create()

```
bool sound4::cloudx1::CInstance::Create (
            const std::string & LoginKey,
            const std::string & RadioName,
            const std::string & AWS_Access_ID,
            const std::string & AWS_Access_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

See also

cloudx1_InitProcess2

Parameters

LoginKey	SOUND4 Login key
RadioName	SOUND4 RadioName
AWS_Access_ID	SOUND4 AWS access ID
AWS_Access_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 487 of file sound4.x1.cloud.hpp.

10.9.3.3 GetAudio()

```
template<typename T >
unsigned int sound4::cloudx1::CInstance::GetAudio (
            T * payload,
            unsigned int max_nFrame )  [inline], [protected]
```

Definition at line 866 of file sound4.x1.cloud.hpp.

10.9.3.4 GetBufferIn()

```
std::array<float,InputSampleSize>& sound4::cloudx1::CInstance::GetBufferIn ( )  [inline]
```

Gets the input buffer used in ProcessAudio

Input has GetAudioInputCount() * 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]

Definition at line 715 of file sound4.x1.cloud.hpp.

10.9.3.5 GetBufferOut()

```
std::array<float,OutputSampleSize>& sound4::cloudx1::CInstance::GetBufferOut ( )  [inline]
```

Gets the output buffer used in ProcessAudio

Output has GetAudioOutputCount() * 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]

Definition at line 732 of file sound4.x1.cloud.hpp.

10.9.3.6 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 524 of file sound4.x1.cloud.hpp.

10.9.3.7 GetEstimatedDelay()

```
unsigned int sound4::cloudx1::CInstance::GetEstimatedDelay ( )  [inline]
```

Gets an estimated delay of current processing

See also

cloudx1_GetEstimatedDelay

Definition at line 699 of file sound4.x1.cloud.hpp.

10.9.3.8 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 602 of file sound4.x1.cloud.hpp.

10.9.3.9 GetParam()

```
std::string sound4::cloudx1::CInstance::GetParam (
            const std::string & name )  [inline]
```

Gets a parameter value

See also

cloudx1_GetParameter

Definition at line 427 of file sound4.x1.cloud.hpp.

10.9.3.10 IsOk()

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

Returns true if an instance has been created and not stopped.

Definition at line 409 of file sound4.x1.cloud.hpp.

10.9.3.11 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 852 of file sound4.x1.cloud.hpp.

10.9.3.12 OnUpdateThreadStart()

```
virtual void sound4::cloudx1::CInstance::OnUpdateThreadStart ( )  [inline], [virtual]
```

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

10.9.3.13 OnUpdateThreadStop()

```
virtual void sound4::cloudx1::CInstance::OnUpdateThreadStop ( )  [inline], [virtual]
```

Definition at line 624 of file sound4.x1.cloud.hpp.

10.9.3.14 operator=()

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

10.9.3.15 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 538 of file sound4.x1.cloud.hpp.

10.9.3.16 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 780 of file sound4.x1.cloud.hpp.

10.9.3.17 ProcessAudio()

```
void sound4::cloudx1::CInstance::ProcessAudio ( )  [inline]
```

Process one audio chunk, from GetBufferIn() to GetBufferOut()

See also

cloudx1_ProcessAudio

Definition at line 743 of file sound4.x1.cloud.hpp.

10.9.3.18 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...], ...]

See also

cloudx1_ProcessAudio_Planar

Parameters

input	has GetAudioInputCount() * GetChannelCount() channels
output	has GetAudioOutputCount() * GetChannelCount() channels

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

10.9.3.19 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 554 of file sound4.x1.cloud.hpp.

10.9.3.20 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 CInstance::SetMetadata but with multiple metadata at once.

See also

CInstance::SetMetadata

Parameters

list	a map of key/value pair.

Definition at line 572 of file sound4.x1.cloud.hpp.

10.9.3.21 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

cloudx1_SetParameter

Definition at line 417 of file sound4.x1.cloud.hpp.

10.9.3.22 SetPresetManager()

```
void sound4::cloudx1::CInstance::SetPresetManager (
            CPresetLoader * preset_manager )  [inline]
```

Sets a custom preset manager Optional, this overrides the `save_path` in Create

See also

cloudx1_SetPresetManager

Must be done before Create

Parameters

preset_manager	The custom preset manager

Definition at line 445 of file sound4.x1.cloud.hpp.

10.9.3.23 StartWebServer()

```
bool sound4::cloudx1::CInstance::StartWebServer (
            int http_port,
            int https_port = 0 )  [inline]
```

Starts a Web server on requested ports

See also

cloudx1_Webserver

Definition at line 632 of file sound4.x1.cloud.hpp.

10.9.3.24 Stop()

```
void sound4::cloudx1::CInstance::Stop ( )  [inline]
```

Stops the instance and its web server and its update thread.

See also

cloudx1_ExitProcess,
cloudx1_StopUpdateThread and
cloudx1_Webserver_Stop

Definition at line 680 of file sound4.x1.cloud.hpp.

10.9.3.25 StopWebServer()

```
void sound4::cloudx1::CInstance::StopWebServer ( )  [inline]
```

Stops the Web server

See also

cloudx1_Webserver_Stop

Definition at line 654 of file sound4.x1.cloud.hpp.

10.9.3.26 Terminate()

```
int sound4::cloudx1::CInstance::Terminate ( )  [inline]
```

Terminate the processing. This is useful only with file processing, to get the final status.

See also

cloudx1_TerminateProcess

Definition at line 669 of file sound4.x1.cloud.hpp.

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

- sound4.x1.cloud.hpp

10.10 sound4::cloudx1::dyn::CInstance Class Reference

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

Classes

- class CClient

Public Member Functions

- CInstance (CDynLib &dynlib)
- CInstance (const CInstance &)=delete
- CInstance & operator= (const CInstance &)=delete
- ~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 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 ()

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)

10.10.1 Detailed Description

Instance handling class

Definition at line 790 of file sound4.x1.cloud_dyn.hpp.

10.10.2 Constructor & Destructor Documentation

10.10.2.1 CInstance() [1/2]

```
sound4::cloudx1::dyn::CInstance::CInstance (
            CDynLib & dynlib )  [inline]
```

Creates the instance, with default parameters

Definition at line 795 of file sound4.x1.cloud_dyn.hpp.

10.10.2.2 CInstance() [2/2]

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

10.10.2.3 ~CInstance()

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

Destructor, stopping any running tasks

Definition at line 807 of file sound4.x1.cloud_dyn.hpp.

10.10.3 Member Function Documentation

10.10.3.1 AddAudio()

```
template<typename T >
unsigned int sound4::cloudx1::dyn::CInstance::AddAudio (
            const T * payload,
            unsigned int nFrame )  [inline], [protected]
```

Definition at line 1289 of file sound4.x1.cloud_dyn.hpp.

10.10.3.2 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

See also

cloudx1_InitProcess2

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 895 of file sound4.x1.cloud_dyn.hpp.

10.10.3.3 GetAudio()

```
template<typename T >
unsigned int sound4::cloudx1::dyn::CInstance::GetAudio (
            T * payload,
            unsigned int max_nFrame )  [inline], [protected]
```

Definition at line 1295 of file sound4.x1.cloud_dyn.hpp.

10.10.3.4 GetBufferIn()

```
std::array<float,InputSampleSize>& sound4::cloudx1::dyn::CInstance::GetBufferIn ( )  [inline]
```

Gets the input buffer used in ProcessAudio

Input has GetAudioInputCount() * 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]

Definition at line 1142 of file sound4.x1.cloud_dyn.hpp.

10.10.3.5 GetBufferOut()

```
std::array<float,OutputSampleSize>& sound4::cloudx1::dyn::CInstance::GetBufferOut ( )  [inline]
```

Gets the output buffer used in ProcessAudio

Output has GetAudioOutputCount() * 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]

Definition at line 1159 of file sound4.x1.cloud_dyn.hpp.

10.10.3.6 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 938 of file sound4.x1.cloud_dyn.hpp.

10.10.3.7 GetEstimatedDelay()

```
unsigned int sound4::cloudx1::dyn::CInstance::GetEstimatedDelay ( )  [inline]
```

Gets an estimated delay of current processing

See also

cloudx1_GetEstimatedDelay

Definition at line 1126 of file sound4.x1.cloud_dyn.hpp.

10.10.3.8 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 1027 of file sound4.x1.cloud_dyn.hpp.

10.10.3.9 GetParam()

```
std::string sound4::cloudx1::dyn::CInstance::GetParam (
            const std::string & name )  [inline]
```

Gets a parameter value

See also

cloudx1_GetParameter

Definition at line 833 of file sound4.x1.cloud_dyn.hpp.

10.10.3.10 IsOk()

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

Returns true if an instance has been created and not stopped.

Definition at line 815 of file sound4.x1.cloud_dyn.hpp.

10.10.3.11 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 1281 of file sound4.x1.cloud_dyn.hpp.

10.10.3.12 OnUpdateThreadStart()

```
virtual void sound4::cloudx1::dyn::CInstance::OnUpdateThreadStart ( )  [inline], [virtual]
```

Definition at line 1049 of file sound4.x1.cloud_dyn.hpp.

10.10.3.13 OnUpdateThreadStop()

```
virtual void sound4::cloudx1::dyn::CInstance::OnUpdateThreadStop ( )  [inline], [virtual]
```

Definition at line 1051 of file sound4.x1.cloud_dyn.hpp.

10.10.3.14 operator=()

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

10.10.3.15 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 952 of file sound4.x1.cloud_dyn.hpp.

10.10.3.16 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 1207 of file sound4.x1.cloud_dyn.hpp.

10.10.3.17 ProcessAudio()

```
void sound4::cloudx1::dyn::CInstance::ProcessAudio ( )  [inline]
```

Process one audio chunk, from GetBufferIn() to GetBufferOut()

See also

cloudx1_ProcessAudio

Definition at line 1170 of file sound4.x1.cloud_dyn.hpp.

10.10.3.18 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...], ...]

See also

cloudx1_ProcessAudio_Planar

Parameters

input	has GetAudioInputCount() * GetChannelCount() channels
output	has GetAudioOutputCount() * GetChannelCount() channels

Definition at line 1189 of file sound4.x1.cloud_dyn.hpp.

10.10.3.19 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 970 of file sound4.x1.cloud_dyn.hpp.

10.10.3.20 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 CInstance::SetMetadata but with multiple metadata at once.

See also

CInstance::SetMetadata

Parameters

list	a map of key/value pair.

Definition at line 991 of file sound4.x1.cloud_dyn.hpp.

10.10.3.21 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

cloudx1_SetParameter

Definition at line 823 of file sound4.x1.cloud_dyn.hpp.

10.10.3.22 SetPresetManager()

```
void sound4::cloudx1::dyn::CInstance::SetPresetManager (
            CPresetLoader * preset_manager )  [inline]
```

Sets a custom preset manager Optional, this overrides the `save_path` in Create

See also

cloudx1_SetPresetManager

Must be done before Create

Parameters

preset_manager	The custom preset manager

Definition at line 862 of file sound4.x1.cloud_dyn.hpp.

10.10.3.23 StartWebServer()

```
bool sound4::cloudx1::dyn::CInstance::StartWebServer (
            int http_port,
            int https_port = 0 )  [inline]
```

Starts a Web server on requested ports

See also

cloudx1_Webserver

Definition at line 1059 of file sound4.x1.cloud_dyn.hpp.

10.10.3.24 Stop()

```
void sound4::cloudx1::dyn::CInstance::Stop ( )  [inline]
```

Stops the instance and its web server and its update thread.

See also

cloudx1_ExitProcess,
cloudx1_StopUpdateThread and
cloudx1_Webserver_Stop

Definition at line 1107 of file sound4.x1.cloud_dyn.hpp.

10.10.3.25 StopWebServer()

```
void sound4::cloudx1::dyn::CInstance::StopWebServer ( )  [inline]
```

Stops the Web server

See also

cloudx1_Webserver_Stop

Definition at line 1081 of file sound4.x1.cloud_dyn.hpp.

10.10.3.26 Terminate()

```
int sound4::cloudx1::dyn::CInstance::Terminate ( )  [inline]
```

Terminate the processing. This is useful only with file processing, to get the final status.

See also

cloudx1_TerminateProcess

Definition at line 1096 of file sound4.x1.cloud_dyn.hpp.

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

- sound4.x1.cloud_dyn.hpp

10.11 cloudx1_CClientInstance Struct Reference

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

10.11.1 Detailed Description

Abstract pointer for a client instance

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

- sound4.x1.cloud.h

10.12 cloudx1_CInstance Struct Reference

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

10.12.1 Detailed Description

Abstract holder for a process instance

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

- sound4.x1.cloud.h

10.13 cloudx1_CParameters Struct Reference

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

10.13.1 Detailed Description

Abstract holder for a process instance parameters

Definition at line 331 of file sound4.x1.cloud.h.

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

- sound4.x1.cloud.h

10.14 sound4::cloudx1::CPresetLoader Class Reference

`#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

10.14.1 Detailed Description

Custom preset handler helper Derive from this class and call CInstance::SetPresetManager

Definition at line 367 of file sound4.x1.cloud.hpp.

10.14.2 Constructor & Destructor Documentation

10.14.2.1 CPresetLoader()

```
sound4::cloudx1::CPresetLoader::CPresetLoader ( )  [default]
```

10.14.2.2 ~CPresetLoader()

```
virtual sound4::cloudx1::CPresetLoader::~CPresetLoader ( )  [virtual], [default]
```

10.14.3 Member Function Documentation

10.14.3.1 Exists()

```
virtual bool sound4::cloudx1::CPresetLoader::Exists (
            const std::filesystem::path & name )  [pure virtual]
```

10.14.3.2 GetAll()

```
virtual std::vector<std::filesystem::path> sound4::cloudx1::CPresetLoader::GetAll ( )  [pure
virtual]
```

10.14.3.3 IsReadOnly()

```
virtual bool sound4::cloudx1::CPresetLoader::IsReadOnly ( )  [pure virtual]
```

10.14.3.4 Read()

```
virtual std::string sound4::cloudx1::CPresetLoader::Read (
            const std::filesystem::path & filename )  [pure virtual]
```

10.14.3.5 Remove()

```
virtual bool sound4::cloudx1::CPresetLoader::Remove (
            const std::filesystem::path & name )  [pure virtual]
```

10.14.3.6 Rename()

```
virtual bool sound4::cloudx1::CPresetLoader::Rename (
            const std::filesystem::path & from,
            const std::filesystem::path & to )  [pure virtual]
```

10.14.3.7 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

10.15 sound4::cloudx1::dyn::CPresetLoader Class Reference

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

Inherited by MyPresetManager.

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

10.15.1 Detailed Description

Custom preset handler helper Derive from this class and call CInstance::SetPresetManager

Definition at line 772 of file sound4.x1.cloud_dyn.hpp.

10.15.2 Constructor & Destructor Documentation

10.15.2.1 CPresetLoader()

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

10.15.2.2 ~CPresetLoader()

`virtual sound4::cloudx1::dyn::CPresetLoader::~CPresetLoader ( ) [virtual], [default]`

10.15.3 Member Function Documentation

10.15.3.1 Exists()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::Exists (
            const std::filesystem::path & name )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.15.3.2 GetAll()

```
virtual std::vector<std::filesystem::path> sound4::cloudx1::dyn::CPresetLoader::GetAll ( )
[pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.15.3.3 IsReadOnly()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::IsReadOnly ( )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.15.3.4 Read()

```
virtual std::string sound4::cloudx1::dyn::CPresetLoader::Read (
            const std::filesystem::path & filename )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.15.3.5 Remove()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::Remove (
            const std::filesystem::path & name )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.15.3.6 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.

10.15.3.7 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

10.16 sound4::CPresetLoader Class Reference

Custom preset handler helper.

`#include <sound4cl.hpp>`

Inherited by MyPresetManager.

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

10.16.1 Detailed Description

Derive from this class and call CInstance::SetPresetManager

Definition at line 715 of file sound4cl.hpp.

10.16.2 Constructor & Destructor Documentation

10.16.2.1 CPresetLoader()

```
sound4::CPresetLoader::CPresetLoader ( )  [default]
```

10.16.2.2 ~CPresetLoader()

```
virtual sound4::CPresetLoader::~CPresetLoader ( )  [virtual], [default]
```

10.16.3 Member Function Documentation

10.16.3.1 Exists()

```
virtual bool sound4::CPresetLoader::Exists (
            const std::filesystem::path & name )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.16.3.2 GetAll()

```
virtual std::vector<std::filesystem::path> sound4::CPresetLoader::GetAll ( )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.16.3.3 IsReadOnly()

```
virtual bool sound4::CPresetLoader::IsReadOnly ( )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.16.3.4 Read()

```
virtual std::string sound4::CPresetLoader::Read (
            const std::filesystem::path & filename )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.16.3.5 Remove()

```
virtual bool sound4::CPresetLoader::Remove (
            const std::filesystem::path & name )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.16.3.6 Rename()

```
virtual bool sound4::CPresetLoader::Rename (
            const std::filesystem::path & from,
            const std::filesystem::path & to )  [pure virtual]
```

Implemented in MyPresetManager, and MyPresetManager.

10.16.3.7 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

10.17 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, sound4cl_SampleFormat fmt)
- void AudioConvertTo (const float *input, uint8_t *payload, size_t nSpl, sound4cl_SampleFormat fmt)
- void StereoToMono (const float *input, float *output, size_t nSpl)
- void MonoToStereo (const float *input, float *output, size_t nSpl)
- void StereoToMono_Planar (const float *inputL, const float *inputR, float *output, size_t nSpl)
- void MonoToStereo_Planar (const float *input, float *outputL, float *outputR, size_t nSpl)
- 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 sound4cl_SampleFormat fmt)
- sound4cl_SampleFormat GetFormatFromName (const std::string &name)
- unsigned int GetBytesFromFormat (const sound4cl_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)

Protected Attributes

- helper::DynFuncHolder< decltype(sound4cl_GetVersion) > fnGetVersion
- helper::DynFuncHolder< decltype(sound4cl_GetChunkSizeInFrames) > fnGetChunkSizeInFrames
- helper::DynFuncHolder< decltype(sound4cl_GetChannelCount) > fnGetChannelCount
- helper::DynFuncHolder< decltype(sound4cl_GetAudioInputCount) > fnGetAudioInputCount
- helper::DynFuncHolder< decltype(sound4cl_GetAudioOutputCount) > fnGetAudioOutputCount
- helper::DynFuncHolder< decltype(sound4cl_GetSampleRate) > fnGetSampleRate
- helper::DynFuncHolder< decltype(sound4cl_SetLoggerCallback) > fnSetLoggerCallback
- helper::DynFuncHolder< decltype(sound4cl_SetLogSeverity) > fnSetLogSeverity
- helper::DynFuncHolder< decltype(sound4cl_NewParameters) > fnNewParameters
- helper::DynFuncHolder< decltype(sound4cl_FreeParameters) > fnFreeParameters
- helper::DynFuncHolder< decltype(sound4cl_SetParameter) > fnSetParameter
- helper::DynFuncHolder< decltype(sound4cl_GetParameter) > fnGetParameter
- helper::DynFuncHolder< decltype(sound4cl_FreeParameterValue) > fnFreeParameterValue
- helper::DynFuncHolder< decltype(sound4cl_InitProcess) > fnInitProcess
- helper::DynFuncHolder< decltype(sound4cl_InitProcess2) > fnInitProcess2
- helper::DynFuncHolder< decltype(sound4cl_TerminateProcess) > fnTerminateProcess
- helper::DynFuncHolder< decltype(sound4cl_ExitProcess) > fnExitProcess
- helper::DynFuncHolder< decltype(sound4cl_StartUpdateThread) > fnStartUpdateThread
- helper::DynFuncHolder< decltype(sound4cl_StopUpdateThread) > fnStopUpdateThread
- helper::DynFuncHolder< decltype(sound4cl_WaitUpdateThreadReady) > fnWaitUpdateThreadReady
- helper::DynFuncHolder< decltype(sound4cl_ProcessAudio) > fnProcessAudio
- helper::DynFuncHolder< decltype(sound4cl_ProcessAudio_Planar) > fnProcessAudio_Planar
- helper::DynFuncHolder< decltype(sound4cl_GetBufferIn) > fnGetBufferIn
- helper::DynFuncHolder< decltype(sound4cl_GetBufferOut) > fnGetBufferOut
- helper::DynFuncHolder< decltype(sound4cl_GetEstimatedDelay) > fnGetEstimatedDelay
- helper::DynFuncHolder< decltype(sound4cl_GetFormatName) > fnGetFormatName
- helper::DynFuncHolder< decltype(sound4cl_GetFormatFromName) > fnGetFormatFromName
- helper::DynFuncHolder< decltype(sound4cl_GetBytesFromFormat) > fnGetBytesFromFormat
- helper::DynFuncHolder< decltype(sound4cl_GetMaxPacketFrame) > fnGetMaxPacketFrame
- helper::DynFuncHolder< decltype(sound4cl_AddAudio) > fnAddAudio
- helper::DynFuncHolder< decltype(sound4cl_AddPadAudio) > fnAddPadAudio
- helper::DynFuncHolder< decltype(sound4cl_GetOutputCount) > fnGetOutputCount
- helper::DynFuncHolder< decltype(sound4cl_GetAudio) > fnGetAudio
- helper::DynFuncHolder< decltype(sound4cl_AudioConvertFrom) > fnAudioConvertFrom
- helper::DynFuncHolder< decltype(sound4cl_AudioConvertTo) > fnAudioConvertTo
- helper::DynFuncHolder< decltype(sound4cl_StereoToMono) > fnStereoToMono
- helper::DynFuncHolder< decltype(sound4cl_MonoToStereo) > fnMonoToStereo
- helper::DynFuncHolder< decltype(sound4cl_AudioMonoFromLiveStereo) > fnAudioMonoFromLiveStereo
- helper::DynFuncHolder< decltype(sound4cl_AudioMonoToLiveStereo) > fnAudioMonoToLiveStereo
- helper::DynFuncHolder< decltype(sound4cl_NewClient) > fnNewClient
- helper::DynFuncHolder< decltype(sound4cl_DeleteClient) > fnDeleteClient
- helper::DynFuncHolder< decltype(sound4cl_ProcessJson) > fnProcessJson
- helper::DynFuncHolder< decltype(sound4cl_FreeJsonAnswer) > fnFreeJsonAnswer
- helper::DynFuncHolder< decltype(sound4cl_SaveState) > fnSaveState
- helper::DynFuncHolder< decltype(sound4cl_Webserver_tcp) > fnWebserver_tcp
- helper::DynFuncHolder< decltype(sound4cl_Webserver_tcp2) > fnWebserver_tcp2
- helper::DynFuncHolder< decltype(sound4cl_Webserver) > fnWebserver

- helper::DynFuncHolder< decltype(sound4cl_Webserver_Stop) > fnWebserver_Stop
- helper::DynFuncHolder< decltype(sound4cl_Webserver_Status) > fnWebserver_Status
- helper::DynFuncHolder< decltype(sound4cl_StereoToMono_Planar) > fnStereoToMono_Planar
- helper::DynFuncHolder< decltype(sound4cl_MonoToStereo_Planar) > fnMonoToStereo_Planar
- helper::DynFuncHolder< decltype(sound4cl_SetMetadata) > fnSetMetadata
- helper::DynFuncHolder< decltype(sound4cl_GetMetadataInfos) > fnGetMetadataInfos
- helper::DynFuncHolder< decltype(sound4cl_FreeMetadataInfos) > fnFreeMetadataInfos
- helper::DynFuncHolder< decltype(sound4cl_SetPresetManager) > fnSetPresetManager
- helper::DynFuncHolder< decltype(sound4cl_PresetManager_InformChange) > fnPresetManager_InformChange
- helper::DynFuncHolder< decltype(sound4cl_GetPossibleChunkSizeInFrames) > fnGetPossibleChunkSizeInFrames
- helper::DynFuncHolder< decltype(sound4cl_GetProcessChunkFrames) > fnGetProcessChunkFrames
- helper::DynFuncHolder< decltype(sound4cl_InitProcess3) > fnInitProcess3
- helper::DynFuncHolder< decltype(sound4cl_NewBus) > fnNewBus
- helper::DynFuncHolder< decltype(sound4cl_FreeBus) > fnFreeBus
- helper::DynFuncHolder< decltype(sound4cl_SetInstanceBus) > fnSetInstanceBus
- helper::DynFuncHolder< decltype(sound4cl_SetMetadataMulti) > fnSetMetadataMulti

Friends

- class CBus
- class CInstance

10.17.1 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 270 of file sound4cl.hpp.

10.17.2 Constructor & Destructor Documentation

10.17.2.1 CProcessor()

```
sound4::CProcessor::CProcessor ( )  [default]
```

10.17.3 Member Function Documentation

10.17.3.1 AudioConvertFrom()

```
void sound4::CProcessor::AudioConvertFrom (
            const uint8_t * payload,
            float * output,
            size_t nSpl,
            sound4cl_SampleFormat fmt )  [inline]
```

Conversion helpers

Definition at line 548 of file sound4cl.hpp.

10.17.3.2 AudioConvertTo()

```
void sound4::CProcessor::AudioConvertTo (
            const float * input,
            uint8_t * payload,
            size_t nSpl,
            sound4cl_SampleFormat fmt )  [inline]
```

Definition at line 550 of file sound4cl.hpp.

10.17.3.3 AudioMonoFromLiveStereo()

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

Definition at line 560 of file sound4cl.hpp.

10.17.3.4 AudioMonoToLiveStereo()

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

Definition at line 562 of file sound4cl.hpp.

10.17.3.5 GetAudioInputCount()

```
unsigned int sound4::CProcessor::GetAudioInputCount ( )  [inline]
```

Get the number of inputs for this process

Remarks

All inputs have sound4cl_GetChannelCount() channels

Returns

The process input count

Definition at line 620 of file sound4cl.hpp.

10.17.3.6 GetAudioOutputCount()

```
unsigned int sound4::CProcessor::GetAudioOutputCount ( )  [inline]
```

Get the number of outputs for this process

Remarks

All outputs have sound4cl_GetChannelCount() channels

Returns

The process outputs count

Definition at line 630 of file sound4cl.hpp.

10.17.3.7 GetBytesFromFormat()

```
unsigned int sound4::CProcessor::GetBytesFromFormat (
            const sound4cl_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 667 of file sound4cl.hpp.

10.17.3.8 GetChannelCount()

```
unsigned int sound4::CProcessor::GetChannelCount ( )  [inline]
```

Get the number of channels needed by this process

Returns

The process channels count

Definition at line 610 of file sound4cl.hpp.

10.17.3.9 GetChunkSizeInFrames()

```
unsigned int sound4::CProcessor::GetChunkSizeInFrames ( )  [inline]
```

Get the 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 sound4cl_GetChannelCount samples

Returns

The process chunk size in frame

Definition at line 581 of file sound4cl.hpp.

10.17.3.10 GetFormatFromName()

```
sound4cl_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 658 of file sound4cl.hpp.

10.17.3.11 GetFormatName()

```
std::string sound4::CProcessor::GetFormatName (
            const sound4cl_SampleFormat fmt )  [inline]
```

Convert format to string

Parameters

fmt	the format

Returns

the string name of the format

Definition at line 649 of file sound4cl.hpp.

10.17.3.12 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 sound4cl_GetChannelCount samples

Returns

An vector of possible process chunk size in frame

Definition at line 592 of file sound4cl.hpp.

10.17.3.13 GetPrefixSymbol()

```
template<typename T >
helper::DynFuncHolder<T> sound4::CProcessor::GetPrefixSymbol (
            const std::string & name )  [inline], [protected]
```

Definition at line 359 of file sound4cl.hpp.

10.17.3.14 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 640 of file sound4cl.hpp.

10.17.3.15 GetVersion()

```
std::string sound4::CProcessor::GetVersion ( )  [inline]
```

Get the process version string

Returns

version string

Definition at line 570 of file sound4cl.hpp.

10.17.3.16 IsOk()

```
bool sound4::CProcessor::IsOk ( ) const  [inline]
```

Returns

true if OK.

false if not OK.

Definition at line 540 of file sound4cl.hpp.

10.17.3.17 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 374 of file sound4cl.hpp.

10.17.3.18 MonoToStereo()

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

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

Definition at line 554 of file sound4cl.hpp.

10.17.3.19 MonoToStereo_Planar()

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

Definition at line 558 of file sound4cl.hpp.

10.17.3.20 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 679 of file sound4cl.hpp.

10.17.3.21 SetLogSeverity()

```
void sound4::CProcessor::SetLogSeverity (
            LogSeverity severity )  [inline]
```

Sets the log severity (global)

Definition at line 673 of file sound4cl.hpp.

10.17.3.22 StereoToMono()

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

Definition at line 552 of file sound4cl.hpp.

10.17.3.23 StereoToMono_Planar()

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

Definition at line 556 of file sound4cl.hpp.

10.17.4 Friends And Related Function Documentation

10.17.4.1 CBus

```
friend class CBus  [friend]
```

Definition at line 276 of file sound4cl.hpp.

10.17.4.2 CInstance

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

Definition at line 277 of file sound4cl.hpp.

10.17.5 Member Data Documentation

10.17.5.1 fnAddAudio

```
helper::DynFuncHolder< decltype(sound4cl_AddAudio ) > sound4::CProcessor::fnAddAudio  [protected]
```

Definition at line 309 of file sound4cl.hpp.

10.17.5.2 fnAddPadAudio

```
helper::DynFuncHolder< decltype(sound4cl_AddPadAudio ) > sound4::CProcessor::fnAddPadAudio
[protected]
```

Definition at line 310 of file sound4cl.hpp.

10.17.5.3 fnAudioConvertFrom

helper::DynFuncHolder< decltype(sound4cl_AudioConvertFrom) > sound4::CProcessor::fnAudioConvertFrom [protected]

Definition at line 313 of file sound4cl.hpp.

10.17.5.4 fnAudioConvertTo

helper::DynFuncHolder< decltype(sound4cl_AudioConvertTo) > sound4::CProcessor::fnAudioConvertTo [protected]

Definition at line 314 of file sound4cl.hpp.

10.17.5.5 fnAudioMonoFromLiveStereo

helper::DynFuncHolder< decltype(sound4cl_AudioMonoFromLiveStereo) > sound4::CProcessor::fnAudioMonoFromLiveStereo [protected]

Definition at line 317 of file sound4cl.hpp.

10.17.5.6 fnAudioMonoToLiveStereo

helper::DynFuncHolder< decltype(sound4cl_AudioMonoToLiveStereo) > sound4::CProcessor::fnAudioMonoToLiveStereo [protected]

Definition at line 318 of file sound4cl.hpp.

10.17.5.7 fnDeleteClient

helper::DynFuncHolder< decltype(sound4cl_DeleteClient) > sound4::CProcessor::fnDeleteClient [protected]

Definition at line 320 of file sound4cl.hpp.

10.17.5.8 fnExitProcess

helper::DynFuncHolder< decltype(sound4cl_ExitProcess) > sound4::CProcessor::fnExitProcess [protected]

Definition at line 296 of file sound4cl.hpp.

10.17.5.9 fnFreeBus

```
helper::DynFuncHolder< decltype(sound4cl_FreeBus ) > sound4::CProcessor::fnFreeBus  [protected]
```

Definition at line 352 of file sound4cl.hpp.

10.17.5.10 fnFreeJsonAnswer

```
helper::DynFuncHolder< decltype(sound4cl_FreeJsonAnswer ) > sound4::CProcessor::fnFreeJson↩
Answer  [protected]
```

Definition at line 322 of file sound4cl.hpp.

10.17.5.11 fnFreeMetadataInfos

```
helper::DynFuncHolder< decltype(sound4cl_FreeMetadataInfos ) > sound4::CProcessor::fnFree↩
MetadataInfos  [protected]
```

Definition at line 339 of file sound4cl.hpp.

10.17.5.12 fnFreeParameters

```
helper::DynFuncHolder< decltype(sound4cl_FreeParameters ) > sound4::CProcessor::fnFreeParameters
[protected]
```

Definition at line 289 of file sound4cl.hpp.

10.17.5.13 fnFreeParameterValue

```
helper::DynFuncHolder< decltype(sound4cl_FreeParameterValue ) > sound4::CProcessor::fnFree↩
ParameterValue  [protected]
```

Definition at line 292 of file sound4cl.hpp.

10.17.5.14 fnGetAudio

```
helper::DynFuncHolder< decltype(sound4cl_GetAudio ) > sound4::CProcessor::fnGetAudio  [protected]
```

Definition at line 312 of file sound4cl.hpp.

10.17.5.15 fnGetAudioInputCount

helper::DynFuncHolder< decltype(sound4cl_GetAudioInputCount) > sound4::CProcessor::fnGet↩
AudioInputCount [protected]

Definition at line 283 of file sound4cl.hpp.

10.17.5.16 fnGetAudioOutputCount

helper::DynFuncHolder< decltype(sound4cl_GetAudioOutputCount) > sound4::CProcessor::fnGet↩
AudioOutputCount [protected]

Definition at line 284 of file sound4cl.hpp.

10.17.5.17 fnGetBufferIn

helper::DynFuncHolder< decltype(sound4cl_GetBufferIn) > sound4::CProcessor::fnGetBufferIn
[protected]

Definition at line 302 of file sound4cl.hpp.

10.17.5.18 fnGetBufferOut

helper::DynFuncHolder< decltype(sound4cl_GetBufferOut) > sound4::CProcessor::fnGetBufferOut
[protected]

Definition at line 303 of file sound4cl.hpp.

10.17.5.19 fnGetBytesFromFormat

helper::DynFuncHolder< decltype(sound4cl_GetBytesFromFormat) > sound4::CProcessor::fnGet↩
BytesFromFormat [protected]

Definition at line 307 of file sound4cl.hpp.

10.17.5.20 fnGetChannelCount

helper::DynFuncHolder< decltype(sound4cl_GetChannelCount) > sound4::CProcessor::fnGetChannel↩
Count [protected]

Definition at line 282 of file sound4cl.hpp.

10.17.5.21 fnGetChunkSizeInFrames

helper::DynFuncHolder< decltype(sound4cl_GetChunkSizeInFrames) > sound4::CProcessor::fnGet↩
ChunkSizeInFrames [protected]

Definition at line 281 of file sound4cl.hpp.

10.17.5.22 fnGetEstimatedDelay

helper::DynFuncHolder< decltype(sound4cl_GetEstimatedDelay) > sound4::CProcessor::fnGet↩
EstimatedDelay [protected]

Definition at line 304 of file sound4cl.hpp.

10.17.5.23 fnGetFormatFromName

helper::DynFuncHolder< decltype(sound4cl_GetFormatFromName) > sound4::CProcessor::fnGet↩
FormatFromName [protected]

Definition at line 306 of file sound4cl.hpp.

10.17.5.24 fnGetFormatName

helper::DynFuncHolder< decltype(sound4cl_GetFormatName) > sound4::CProcessor::fnGetFormatName
[protected]

Definition at line 305 of file sound4cl.hpp.

10.17.5.25 fnGetMaxPacketFrame

helper::DynFuncHolder< decltype(sound4cl_GetMaxPacketFrame) > sound4::CProcessor::fnGetMax↩
PacketFrame [protected]

Definition at line 308 of file sound4cl.hpp.

10.17.5.26 fnGetMetadataInfos

helper::DynFuncHolder< decltype(sound4cl_GetMetadataInfos) > sound4::CProcessor::fnGet↩
MetadataInfos [protected]

Definition at line 338 of file sound4cl.hpp.

10.17.5.27 fnGetOutputCount

helper::DynFuncHolder< decltype(sound4cl_GetOutputCount) > sound4::CProcessor::fnGetOutput↩
Count [protected]

Definition at line 311 of file sound4cl.hpp.

10.17.5.28 fnGetParameter

helper::DynFuncHolder< decltype(sound4cl_GetParameter) > sound4::CProcessor::fnGetParameter
[protected]

Definition at line 291 of file sound4cl.hpp.

10.17.5.29 fnGetPossibleChunkSizeInFrames

helper::DynFuncHolder< decltype(sound4cl_GetPossibleChunkSizeInFrames) > sound4::CProcessor↩
::fnGetPossibleChunkSizeInFrames [protected]

Definition at line 346 of file sound4cl.hpp.

10.17.5.30 fnGetProcessChunkFrames

helper::DynFuncHolder< decltype(sound4cl_GetProcessChunkFrames) > sound4::CProcessor::fnGet↩
ProcessChunkFrames [protected]

Definition at line 347 of file sound4cl.hpp.

10.17.5.31 fnGetSampleRate

helper::DynFuncHolder< decltype(sound4cl_GetSampleRate) > sound4::CProcessor::fnGetSampleRate
[protected]

Definition at line 285 of file sound4cl.hpp.

10.17.5.32 fnGetVersion

helper::DynFuncHolder< decltype(sound4cl_GetVersion) > sound4::CProcessor::fnGetVersion
[protected]

Definition at line 280 of file sound4cl.hpp.

10.17.5.33 fnInitProcess

```
helper::DynFuncHolder< decltype(sound4cl_InitProcess ) > sound4::CProcessor::fnInitProcess
[protected]
```

Definition at line 293 of file sound4cl.hpp.

10.17.5.34 fnInitProcess2

```
helper::DynFuncHolder< decltype(sound4cl_InitProcess2 ) > sound4::CProcessor::fnInitProcess2
[protected]
```

Definition at line 294 of file sound4cl.hpp.

10.17.5.35 fnInitProcess3

```
helper::DynFuncHolder< decltype(sound4cl_InitProcess3 ) > sound4::CProcessor::fnInitProcess3
[protected]
```

Definition at line 348 of file sound4cl.hpp.

10.17.5.36 fnMonoToStereo

```
helper::DynFuncHolder< decltype(sound4cl_MonoToStereo ) > sound4::CProcessor::fnMonoToStereo
[protected]
```

Definition at line 316 of file sound4cl.hpp.

10.17.5.37 fnMonoToStereo_Planar

```
helper::DynFuncHolder< decltype(sound4cl_MonoToStereo_Planar ) > sound4::CProcessor::fnMono↩
ToStereo_Planar  [protected]
```

Definition at line 334 of file sound4cl.hpp.

10.17.5.38 fnNewBus

```
helper::DynFuncHolder< decltype(sound4cl_NewBus ) > sound4::CProcessor::fnNewBus  [protected]
```

Definition at line 351 of file sound4cl.hpp.

10.17.5.39 fnNewClient

helper::DynFuncHolder< decltype(sound4cl_NewClient) > sound4::CProcessor::fnNewClient [protected]

Definition at line 319 of file sound4cl.hpp.

10.17.5.40 fnNewParameters

helper::DynFuncHolder< decltype(sound4cl_NewParameters) > sound4::CProcessor::fnNewParameters [protected]

Definition at line 288 of file sound4cl.hpp.

10.17.5.41 fnPresetManager_InformChange

helper::DynFuncHolder< decltype(sound4cl_PresetManager_InformChange) > sound4::CProcessor↩ ::fnPresetManager_InformChange [protected]

Definition at line 343 of file sound4cl.hpp.

10.17.5.42 fnProcessAudio

helper::DynFuncHolder< decltype(sound4cl_ProcessAudio) > sound4::CProcessor::fnProcessAudio [protected]

Definition at line 300 of file sound4cl.hpp.

10.17.5.43 fnProcessAudio_Planar

helper::DynFuncHolder< decltype(sound4cl_ProcessAudio_Planar) > sound4::CProcessor::fn↩ ProcessAudio_Planar [protected]

Definition at line 301 of file sound4cl.hpp.

10.17.5.44 fnProcessJson

helper::DynFuncHolder< decltype(sound4cl_ProcessJson) > sound4::CProcessor::fnProcessJson [protected]

Definition at line 321 of file sound4cl.hpp.

10.17.5.45 fnSaveState

```
helper::DynFuncHolder< decltype(sound4cl_SaveState ) > sound4::CProcessor::fnSaveState  [protected]
```

Definition at line 323 of file sound4cl.hpp.

10.17.5.46 fnSetInstanceBus

```
helper::DynFuncHolder< decltype(sound4cl_SetInstanceBus ) > sound4::CProcessor::fnSetInstance↩
Bus  [protected]
```

Definition at line 353 of file sound4cl.hpp.

10.17.5.47 fnSetLoggerCallback

```
helper::DynFuncHolder< decltype(sound4cl_SetLoggerCallback ) > sound4::CProcessor::fnSet↩
LoggerCallback  [protected]
```

Definition at line 286 of file sound4cl.hpp.

10.17.5.48 fnSetLogSeverity

```
helper::DynFuncHolder< decltype(sound4cl_SetLogSeverity ) > sound4::CProcessor::fnSetLog↩
Severity  [protected]
```

Definition at line 287 of file sound4cl.hpp.

10.17.5.49 fnSetMetadata

```
helper::DynFuncHolder< decltype(sound4cl_SetMetadata ) > sound4::CProcessor::fnSetMetadata
[protected]
```

Definition at line 337 of file sound4cl.hpp.

10.17.5.50 fnSetMetadataMulti

```
helper::DynFuncHolder< decltype(sound4cl_SetMetadataMulti ) > sound4::CProcessor::fnSet↩
MetadataMulti  [protected]
```

Definition at line 356 of file sound4cl.hpp.

10.17.5.51 fnSetParameter

```
helper::DynFuncHolder< decltype(sound4cl_SetParameter ) > sound4::CProcessor::fnSetParameter
[protected]
```

Definition at line 290 of file sound4cl.hpp.

10.17.5.52 fnSetPresetManager

```
helper::DynFuncHolder< decltype(sound4cl_SetPresetManager ) > sound4::CProcessor::fnSet↩
PresetManager [protected]
```

Definition at line 342 of file sound4cl.hpp.

10.17.5.53 fnStartUpdateThread

```
helper::DynFuncHolder< decltype(sound4cl_StartUpdateThread ) > sound4::CProcessor::fnStart↩
UpdateThread [protected]
```

Definition at line 297 of file sound4cl.hpp.

10.17.5.54 fnStereoToMono

```
helper::DynFuncHolder< decltype(sound4cl_StereoToMono ) > sound4::CProcessor::fnStereoToMono
[protected]
```

Definition at line 315 of file sound4cl.hpp.

10.17.5.55 fnStereoToMono_Planar

```
helper::DynFuncHolder< decltype(sound4cl_StereoToMono_Planar ) > sound4::CProcessor::fn↩
StereoToMono_Planar [protected]
```

Definition at line 333 of file sound4cl.hpp.

10.17.5.56 fnStopUpdateThread

```
helper::DynFuncHolder< decltype(sound4cl_StopUpdateThread ) > sound4::CProcessor::fnStop↩
UpdateThread [protected]
```

Definition at line 298 of file sound4cl.hpp.

10.17.5.57 fnTerminateProcess

```
helper::DynFuncHolder< decltype(sound4cl_TerminateProcess ) > sound4::CProcessor::fnTerminate↩
Process  [protected]
```

Definition at line 295 of file sound4cl.hpp.

10.17.5.58 fnWaitUpdateThreadReady

```
helper::DynFuncHolder< decltype(sound4cl_WaitUpdateThreadReady ) > sound4::CProcessor::fn↩
WaitUpdateThreadReady  [protected]
```

Definition at line 299 of file sound4cl.hpp.

10.17.5.59 fnWebserver

```
helper::DynFuncHolder< decltype(sound4cl_Webserver ) > sound4::CProcessor::fnWebserver  [protected]
```

Definition at line 328 of file sound4cl.hpp.

10.17.5.60 fnWebserver_Status

```
helper::DynFuncHolder< decltype(sound4cl_Webserver_Status ) > sound4::CProcessor::fnWebserver↩
_Status  [protected]
```

Definition at line 330 of file sound4cl.hpp.

10.17.5.61 fnWebserver_Stop

```
helper::DynFuncHolder< decltype(sound4cl_Webserver_Stop ) > sound4::CProcessor::fnWebserver_↩
Stop  [protected]
```

Definition at line 329 of file sound4cl.hpp.

10.17.5.62 fnWebserver_tcp

```
helper::DynFuncHolder< decltype(sound4cl_Webserver_tcp ) > sound4::CProcessor::fnWebserver_tcp
[protected]
```

Definition at line 326 of file sound4cl.hpp.

10.17.5.63 fnWebserver_tcp2

```
helper::DynFuncHolder< decltype(sound4cl_Webserver_tcp2 ) > sound4::CProcessor::fnWebserver_↩
tcp2  [protected]
```

Definition at line 327 of file sound4cl.hpp.

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

- sound4cl.hpp

10.18 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

10.18.1 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 86 of file sound4.x1.cloud_dyn.hpp.

10.18.2 Constructor & Destructor Documentation

10.18.2.1 DynFuncHolder() [1/2]

```
template<typename T >
sound4::cloudx1::dyn::helper::DynFuncHolder< T >::DynFuncHolder ( )  [default]
```

10.18.2.2 DynFuncHolder() [2/2]

```
template<typename T >
sound4::cloudx1::dyn::helper::DynFuncHolder< T >::DynFuncHolder (
            DynFunc_t a_ptr )  [inline]
```

Definition at line 91 of file sound4.x1.cloud_dyn.hpp.

10.18.3 Member Function Documentation

10.18.3.1 IsOk()

```
template<typename T >
bool sound4::cloudx1::dyn::helper::DynFuncHolder< T >::IsOk ( ) const  [inline]
```

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

10.18.3.2 operator bool()

```
template<typename T >
sound4::cloudx1::dyn::helper::DynFuncHolder< T >::operator bool ( ) const  [inline]
```

Definition at line 92 of file sound4.x1.cloud_dyn.hpp.

10.18.3.3 operator T*()

```
template<typename T >
sound4::cloudx1::dyn::helper::DynFuncHolder< T >::operator T* ( ) const  [inline]
```

Definition at line 94 of file sound4.x1.cloud_dyn.hpp.

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

- sound4.x1.cloud_dyn.hpp

10.19 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

10.19.1 Detailed Description

template<typename T>
class sound4::helper::DynFuncHolder< T >

Parameters

T	is the function type, you may use decltype(fn)

Definition at line 115 of file sound4cl.hpp.

10.19.2 Constructor & Destructor Documentation

10.19.2.1 DynFuncHolder() [1/2]

```
template<typename T >
sound4::helper::DynFuncHolder< T >::DynFuncHolder ( )  [default]
```

10.19.2.2 DynFuncHolder() [2/2]

```
template<typename T >
sound4::helper::DynFuncHolder< T >::DynFuncHolder (
            DynFunc_t a_ptr )  [inline]
```

Definition at line 120 of file sound4cl.hpp.

10.19.3 Member Function Documentation

10.19.3.1 IsOk()

```
template<typename T >
bool sound4::helper::DynFuncHolder< T >::IsOk ( ) const  [inline]
```

Definition at line 122 of file sound4cl.hpp.

10.19.3.2 operator bool()

```
template<typename T >
sound4::helper::DynFuncHolder< T >::operator bool ( ) const  [inline]
```

Definition at line 121 of file sound4cl.hpp.

10.19.3.3 operator T*()

```
template<typename T >
sound4::helper::DynFuncHolder< T >::operator T* ( ) const  [inline]
```

Definition at line 123 of file sound4cl.hpp.

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

- sound4cl.hpp

10.20 MyPresetManager Class Reference

[Custom preset manager]

Inherits sound4::cloudx1::dyn::CPresetLoader, and sound4::CPresetLoader.

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

10.20.1 Detailed Description

Definition at line 119 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.2 Constructor & Destructor Documentation

10.20.2.1 MyPresetManager() [1/2]

```
MyPresetManager::MyPresetManager ( )  [default]
```

10.20.2.2 ~MyPresetManager() [1/2]

```
virtual MyPresetManager::~MyPresetManager ( )  [virtual], [default]
```

10.20.2.3 MyPresetManager() [2/2]

```
MyPresetManager::MyPresetManager ( )  [default]
```

10.20.2.4 ~MyPresetManager() [2/2]

```
virtual MyPresetManager::~MyPresetManager ( )  [virtual], [default]
```

10.20.3 Member Function Documentation

10.20.3.1 Exists() [1/2]

```
virtual bool MyPresetManager::Exists (
            const std::filesystem::path & name )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 137 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.3.2 Exists() [2/2]

```
virtual bool MyPresetManager::Exists (
            const std::filesystem::path & name )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 121 of file sound4cl-pipe.cpp.

10.20.3.3 GetAll() [1/2]

```
virtual std::vector<std::filesystem::path> MyPresetManager::GetAll ( )  [inline], [override],
[virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 153 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.3.4 GetAll() [2/2]

```
virtual std::vector<std::filesystem::path> MyPresetManager::GetAll ( )  [inline], [override],
[virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 137 of file sound4cl-pipe.cpp.

10.20.3.5 IsReadOnly() [1/2]

```
virtual bool MyPresetManager::IsReadOnly ( )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 136 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.3.6 IsReadOnly() [2/2]

```
virtual bool MyPresetManager::IsReadOnly ( )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 120 of file sound4cl-pipe.cpp.

10.20.3.7 Read() [1/2]

```
virtual std::string MyPresetManager::Read (
            const std::filesystem::path & filename )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 163 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.3.8 Read() [2/2]

```
virtual std::string MyPresetManager::Read (
            const std::filesystem::path & filename )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 147 of file sound4cl-pipe.cpp.

10.20.3.9 Remove() [1/2]

```
virtual bool MyPresetManager::Remove (
            const std::filesystem::path & name )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 142 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.3.10 Remove() [2/2]

```
virtual bool MyPresetManager::Remove (
            const std::filesystem::path & name )  [inline], [override], [virtual]
```

Implements sound4::cloudx1::dyn::CPresetLoader.

Definition at line 126 of file sound4cl-pipe.cpp.

10.20.3.11 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 147 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.3.12 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 131 of file sound4cl-pipe.cpp.

10.20.3.13 SetupPath() [1/2]

```
bool MyPresetManager::SetupPath (
            const std::filesystem::path & a_preset_path )  [inline]
```

Definition at line 124 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.3.14 SetupPath() [2/2]

```
bool MyPresetManager::SetupPath (
            const std::filesystem::path & a_preset_path )  [inline]
```

Definition at line 108 of file sound4cl-pipe.cpp.

10.20.3.15 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 173 of file sound4.x1.cloud-pipe-dyn.cpp.

10.20.3.16 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 157 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

10.21 sound4::cloudx1::dyn::helper::SampleFormat< T > Struct Template Reference

Helper for Sample format types.

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

10.21.1 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 509 of file sound4.x1.cloud_dyn.hpp.

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

- sound4.x1.cloud_dyn.hpp

10.22 sound4::cloudx1::helper::SampleFormat< T > Struct Template Reference

Helper for Sample format types.

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

10.22.1 Detailed Description

template<typename T>
struct sound4::cloudx1::helper::SampleFormat< T >

Template Parameters

T	the C type for one audio sample

Definition at line 116 of file sound4.x1.cloud.hpp.

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

- sound4.x1.cloud.hpp

10.23 sound4::helper::SampleFormat< T > Struct Template Reference

Helper for Sample format types.

`#include <sound4cl.hpp>`

10.23.1 Detailed Description

template<typename T>
struct sound4::helper::SampleFormat< T >

Template Parameters

T	the C type for one audio sample

Definition at line 85 of file sound4cl.hpp.

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

- sound4cl.hpp

10.24 sound4::cloudx1::dyn::helper::SampleFormat< float > Struct Reference

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

Public Attributes

- const cloudx1_SampleFormat format = F32_NATIVE

10.24.1 Detailed Description

Definition at line 520 of file sound4.x1.cloud_dyn.hpp.

10.24.2 Member Data Documentation

10.24.2.1 format

`const cloudx1_SampleFormat sound4::cloudx1::dyn::helper::SampleFormat< float >::format = F32_NATIVE`

Definition at line 521 of file sound4.x1.cloud_dyn.hpp.

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

- sound4.x1.cloud_dyn.hpp

10.25 sound4::cloudx1::helper::SampleFormat< float > Struct Reference

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

Public Attributes

- const cloudx1_SampleFormat format = F32_NATIVE

10.25.1 Detailed Description

Definition at line 127 of file sound4.x1.cloud.hpp.

10.25.2 Member Data Documentation

10.25.2.1 format

```
const cloudx1_SampleFormat sound4::cloudx1::helper::SampleFormat< float >::format = F32_NATIVE
```

Definition at line 128 of file sound4.x1.cloud.hpp.

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

- sound4.x1.cloud.hpp

10.26 sound4::helper::SampleFormat< float > Struct Reference

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

Public Attributes

- const sound4cl_SampleFormat format = F32_NATIVE

10.26.1 Detailed Description

Definition at line 96 of file sound4cl.hpp.

10.26.2 Member Data Documentation

10.26.2.1 format

```
const sound4cl_SampleFormat sound4::helper::SampleFormat< float >::format = F32_NATIVE
```

Definition at line 97 of file sound4cl.hpp.

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

- sound4cl.hpp

10.27 sound4::cloudx1::dyn::helper::SampleFormat< int16_t > Struct Reference

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

Public Attributes

- const cloudx1_SampleFormat format = S16_NATIVE

10.27.1 Detailed Description

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

10.27.2 Member Data Documentation

10.27.2.1 format

```
const cloudx1_SampleFormat sound4::cloudx1::dyn::helper::SampleFormat< int16_t >::format =
S16_NATIVE
```

Definition at line 513 of file sound4.x1.cloud_dyn.hpp.

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

- sound4.x1.cloud_dyn.hpp

10.28 sound4::cloudx1::helper::SampleFormat< int16_t > Struct Reference

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

Public Attributes

- const cloudx1_SampleFormat format = S16_NATIVE

10.28.1 Detailed Description

Definition at line 119 of file sound4.x1.cloud.hpp.

10.28.2 Member Data Documentation

10.28.2.1 format

```
const cloudx1_SampleFormat sound4::cloudx1::helper::SampleFormat< int16_t >::format = S16_NATIVE
```

Definition at line 120 of file sound4.x1.cloud.hpp.

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

- sound4.x1.cloud.hpp

10.29 sound4::helper::SampleFormat< int16_t > Struct Reference

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

Public Attributes

- const sound4cl_SampleFormat format = S16_NATIVE

10.29.1 Detailed Description

Definition at line 88 of file sound4cl.hpp.

10.29.2 Member Data Documentation

10.29.2.1 format

```
const sound4cl_SampleFormat sound4::helper::SampleFormat< int16_t >::format = S16_NATIVE
```

Definition at line 89 of file sound4cl.hpp.

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

- sound4cl.hpp

10.30 sound4::cloudx1::dyn::helper::SampleFormat< int32_t > Struct Reference

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

Public Attributes

- const cloudx1_SampleFormat format = S32_NATIVE

10.30.1 Detailed Description

Definition at line 516 of file sound4.x1.cloud_dyn.hpp.

10.30.2 Member Data Documentation

10.30.2.1 format

```
const cloudx1_SampleFormat sound4::cloudx1::dyn::helper::SampleFormat< int32_t >::format =
S32_NATIVE
```

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

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

- sound4.x1.cloud_dyn.hpp

10.31 sound4::cloudx1::helper::SampleFormat< int32_t > Struct Reference

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

Public Attributes

- const cloudx1_SampleFormat format = S32_NATIVE

10.31.1 Detailed Description

Definition at line 123 of file sound4.x1.cloud.hpp.

10.31.2 Member Data Documentation

10.31.2.1 format

```
const cloudx1_SampleFormat sound4::cloudx1::helper::SampleFormat< int32_t >::format = S32_NATIVE
```

Definition at line 124 of file sound4.x1.cloud.hpp.

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

- sound4.x1.cloud.hpp

10.32 sound4::helper::SampleFormat< int32_t > Struct Reference

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

Public Attributes

- const sound4cl_SampleFormat format = S32_NATIVE

10.32.1 Detailed Description

Definition at line 92 of file sound4cl.hpp.

10.32.2 Member Data Documentation

10.32.2.1 format

```
const sound4cl_SampleFormat sound4::helper::SampleFormat< int32_t >::format = S32_NATIVE
```

Definition at line 93 of file sound4cl.hpp.

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

- sound4cl.hpp

10.33 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.

10.33.1 Detailed Description

Information on this processor.

See also

SOUND4_GetProcessInfo

Definition at line 187 of file sound4.x1.cloud.h.

10.33.2 Member Data Documentation

10.33.2.1 name

```
const char* SOUND4_ProcessInfo::name
```

Definition at line 189 of file sound4.x1.cloud.h.

10.33.2.2 prefix

```
const char* SOUND4_ProcessInfo::prefix
```

Definition at line 190 of file sound4.x1.cloud.h.

10.33.2.3 shortname

```
const char* SOUND4_ProcessInfo::shortname
```

Definition at line 191 of file sound4.x1.cloud.h.

10.33.2.4 struct_size

```
size_t SOUND4_ProcessInfo::struct_size
```

Definition at line 188 of file sound4.x1.cloud.h.

10.33.2.5 version

```
const char* SOUND4_ProcessInfo::version
```

Definition at line 192 of file sound4.x1.cloud.h.

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

- sound4.x1.cloud.h

10.34 sound4cl_SOUND4_ProcessInfo Struct Reference

```
#include <sound4cl_cdef.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.

10.34.1 Detailed Description

Definition at line 34 of file sound4cl_cdef.h.

10.34.2 Member Data Documentation

10.34.2.1 name

```
const char* sound4cl_SOUND4_ProcessInfo::name
```

Definition at line 36 of file sound4cl_cdef.h.

10.34.2.2 prefix

```
const char* sound4cl_SOUND4_ProcessInfo::prefix
```

Definition at line 37 of file sound4cl_cdef.h.

10.34.2.3 shortname

```
const char* sound4cl_SOUND4_ProcessInfo::shortname
```

Definition at line 38 of file sound4cl_cdef.h.

10.34.2.4 struct_size

```
size_t sound4cl_SOUND4_ProcessInfo::struct_size
```

Definition at line 35 of file sound4cl_cdef.h.

10.34.2.5 version

```
const char* sound4cl_SOUND4_ProcessInfo::version
```

Definition at line 39 of file sound4cl_cdef.h.

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

- sound4cl_cdef.h

Chapter 11

File Documentation

11.1 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)

11.1.1 Function Documentation

11.1.1.1 GetEnv()

```
std::string GetEnv (
            const std::string & name )
```

Definition at line 39 of file sound4.x1.cloud-pipe-cxx.cpp.

11.1.1.2 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 104 of file sound4.x1.cloud-pipe-cxx.cpp.

11.1.1.3 MyLogger()

```
void MyLogger (
            sound4::cloudx1::LogSeverity severity,
            const std::string & msg )
```

Definition at line 99 of file sound4.x1.cloud-pipe-cxx.cpp.

11.1.1.4 ProcessLoop()

```
void ProcessLoop (
            sound4::cloudx1::CInstance & instance )
```

[Processing Loop]

[Processing Loop]

Definition at line 48 of file sound4.x1.cloud-pipe-cxx.cpp.

11.1.1.5 Usage()

```
void Usage (
            const char * progname )
```

Definition at line 79 of file sound4.x1.cloud-pipe-cxx.cpp.

11.2 sound4.x1.cloud-pipe-cxx.cpp

```
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 // ------------------------------------------------------------
00039 std::string GetEnv(const std::string& name)
00040 {
00041     char *data=getenv(name.c_str());
00042     if (!data) return {};
00043     return std::string(data);
00044 }
00045
00046
00047 // Reads from stdin, write to stdout
00048 void ProcessLoop(sound4::cloudx1::CInstance &instance)
00049 {
00050 bool stopthread=false;
00051
00052     #if defined(_WIN32) || defined(WIN32)
00053         // Windows: The stdin, stdout, and stderr streams always open in text mode by default
00054         _setmode(_fileno(stdin), _O_BINARY);
00055         _setmode(_fileno(stdout), _O_BINARY);
00056     #endif
00057
00059     while (!stopthread)
00060     {
00061         // Read a chunk from stdin
00062         if (std::fread(instance.GetBufferIn().data(), sizeof(float), sound4::cloudx1::InputSampleSize,
       stdin) != sound4::cloudx1::InputSampleSize) {
00063             std::cerr « "ProcessLoop: input stopped"« std::endl;
00064             stopthread=true;
00065             break;
00066         }
00067         if (stopthread) break;
00068         // Process it
00069         instance.ProcessAudio();
00070         // Write it to stdout
00071         if (fwrite(instance.GetBufferOut().data(), sizeof(float), sound4::cloudx1::OutputSampleSize,
       stdout) != sound4::cloudx1::OutputSampleSize) {
00072             std::cerr « "Failed to write audio output" « std::endl;
00073             stopthread=true;
00074         }
00075     }
00077 }
00078
00079 void Usage(const char *progname)
00080 {
00081     std::cerr « "Usage: " « progname « std::endl;;
00082     std::cerr « "  Reads audio from stdin and return processed audio in stdout" « std::endl;
00083     std::cerr « "Environment:"« std::endl;;
00084     std::cerr « " - S4STORE_PATH            : path to store config [default: (no storage)]"«
       std::endl;;
00085     std::cerr « " - S4LOGINKEY              : SOUND4 Login key (or S4USERID)"« std::endl;;
00086     std::cerr « " - RADIO_NAME              : SOUND4 Radio Name"« std::endl;;
00087     std::cerr « " - ACCESS_KEY_ID           : SOUND4 Access Key ID"« std::endl;;
00088     std::cerr « " - ACCESS_KEY_SECRET       : SOUND4 Access Key Secret"« std::endl;;
00089     std::cerr « std::endl;
00090     std::cerr « "Example:"« std::endl;
00091     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;;
00092     #if defined(_WIN32) || defined(WIN32)
00093         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;;
00094     #else
00095         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;;
00096     #endif
00097 }
00098
00099 void MyLogger(sound4::cloudx1::LogSeverity severity,const std::string& msg)
00100 {
00101     std::cerr « msg « std::endl;
00102 }
```

```
00103
00104 int main(int argc, const char **argv)
00105 {
00106 #if (CLOUDX1_HAS_WEBSERVER)
00107     int listen_port = 8080;
00108 #endif // (CLOUDX1_HAS_WEBSERVER)
00109     auto store_path_str=GetEnv("S4STORE_PATH");
00110
00111     // Get credentials from environment
00112     auto LoginKey=GetEnv("S4LOGINKEY");
00113     if (LoginKey.empty()) {
00114         LoginKey=GetEnv("S4USERID");
00115     }
00116     auto RadioName=GetEnv("RADIO_NAME");
00117     auto KeyId=GetEnv("ACCESS_KEY_ID");
00118     auto AccessKey=GetEnv("ACCESS_KEY_SECRET");
00119
00120     const char *progname=argv[0];
00121
00122     if (argc>1) {
00123         if ((strcasecmp(argv[1],"-h")==0) || (strcasecmp(argv[1],"--help")==0)) {
00124             Usage(progname);
00125             return 0;
00126         }
00127     }
00128     if (LoginKey.empty() || RadioName.empty() || KeyId.empty() || AccessKey.empty()) {
00129         std::cerr « "Missing credentials in environment" « std::endl;
00130         Usage(progname);
00131         return 1;
00132     }
00133     std::filesystem::path store_path;
00134     if (!store_path_str.empty()) {
00135         store_path = std::filesystem::path(store_path_str);
00136         if (!std::filesystem::exists(store_path) || !std::filesystem::is_directory(store_path)) {
00137             std::cerr « "Storage folder '"«store_path.c_str()«"' is not a valid directory" «
    std::endl;
00138             Usage(progname);
00139             return 1;
00140         }
00141     }
00142
00144     sound4::cloudx1::SetLogSeverity(verbose5);
00145     sound4::cloudx1::SetLoggerCallback(MyLogger);
00146
00147     sound4::cloudx1::CInstance instance;
00148     instance.SetParam("ADMIN_USER","admin");
00149     instance.SetParam("ADMIN_SECRET","admin");
00151
00152     std::cerr « "Creating" « std::endl;
00154     if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, store_path)) {
00155         std::cerr « "Failed to create the processing instance" « std::endl;
00156         return 1;
00157     }
00159
00160 #if (CLOUDX1_HAS_WEBSERVER)
00161     std::cerr « "Starting web server" « std::endl;
00163     if (!instance.StartWebServer(listen_port,0)) {
00164         std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
00165         return 1;
00166     }
00168 #endif // (CLOUDX1_HAS_WEBSERVER)
00169
00170     {
00172         auto client = instance.NewClient();
00173         auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
00174         std::cerr « "Request for processor name returned "«answer«std::endl;
00176     }
00177
00178     ProcessLoop(instance);
00179
00180     std::cerr « "Stopping now" « std::endl;
00181     instance.Stop();
00182
00183     std::cerr « "End" « std::endl;
00184     return 0;
00185 }
```

11.3 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]

11.3.1 Function Documentation

11.3.1.1 GetEnv()

```
std::string GetEnv (
            const std::string & name )
```

Definition at line 51 of file sound4.x1.cloud-pipe-dyn.cpp.

11.3.1.2 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 194 of file sound4.x1.cloud-pipe-dyn.cpp.

11.3.1.3 MyLogger()

```
void MyLogger (
            sound4::cloudx1::dyn::LogSeverity severity,
            const std::string & msg )
```

Definition at line 113 of file sound4.x1.cloud-pipe-dyn.cpp.

11.3.1.4 ProcessLoop()

```
void ProcessLoop (
            sound4::cloudx1::dyn::CInstance & instance )
```

[Processing Loop]

[Processing Loop]

Definition at line 60 of file sound4.x1.cloud-pipe-dyn.cpp.

11.3.1.5 Usage()

```
void Usage (
              const char * progname,
              sound4::cloudx1::dyn::CDynLib & dynlib )
```

Definition at line 91 of file sound4.x1.cloud-pipe-dyn.cpp.

11.4 sound4.x1.cloud-pipe-dyn.cpp

```
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 // ------------------------------------------------------------
00051 std::string GetEnv(const std::string& name)
00052 {
00053     char *data=getenv(name.c_str());
00054     if (!data) return {};
00055     return std::string(data);
00056 }
00057
00058
00059 // Reads from stdin, write to stdout
00060 void ProcessLoop(sound4::cloudx1::dyn::CInstance &instance)
00061 {
00062 bool stopthread=false;
00063
00064     #if defined(_WIN32) || defined(WIN32)
00065         // Windows: The stdin, stdout, and stderr streams always open in text mode by default
00066         _setmode(_fileno(stdin), _O_BINARY);
00067         _setmode(_fileno(stdout), _O_BINARY);
00068     #endif
00069
00071     while (!stopthread)
00072     {
00073         // Read a chunk from stdin
00074         if (std::fread(instance.GetBufferIn().data(), sizeof(float),
      sound4::cloudx1::dyn::InputSampleSize, stdin) != sound4::cloudx1::dyn::InputSampleSize) {
00075             std::cerr « "ProcessLoop: input stopped"« std::endl;
00076             stopthread=true;
00077             break;
00078         }
00079         if (stopthread) break;
00080         // Process it
00081         instance.ProcessAudio();
00082         // Write it to stdout
00083         if (fwrite(instance.GetBufferOut().data(), sizeof(float),
      sound4::cloudx1::dyn::OutputSampleSize, stdout) != sound4::cloudx1::dyn::OutputSampleSize) {
00084             std::cerr « "Failed to write audio output" « std::endl;
00085             stopthread=true;
00086         }
00087     }
00089 }
00090
00091 void Usage(const char *progname, sound4::cloudx1::dyn::CDynLib &dynlib)
00092 {
00093     std::cerr « "Usage: " « progname « std::endl;;
00094     std::cerr « "  Reads audio from stdin and return processed audio in stdout" « std::endl;
00095     std::cerr « "Environment:"« std::endl;;
00096     std::cerr « " - S4STORE_PATH            : path to store config [default: (no storage)]"«
      std::endl;;
00097     std::cerr « " - S4LOGINKEY              : SOUND4 Login key (or S4USERID)"« std::endl;;
00098     std::cerr « " - RADIO_NAME              : SOUND4 Radio Name"« std::endl;;
00099     std::cerr « " - ACCESS_KEY_ID           : SOUND4 Access Key ID"« std::endl;;
00100     std::cerr « " - ACCESS_KEY_SECRET       : SOUND4 Access Key Secret"« std::endl;;
00101     if (dynlib.IsOk()) {
00102         std::cerr « std::endl;
```

```
00103         std::cerr « "Example:"« std::endl;
00104         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;;
00105         #if defined(_WIN32) || defined(WIN32)
00106             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;;
00107         #else
00108             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;;
00109         #endif
00110     }
00111 }
00112
00113 void MyLogger(sound4::cloudx1::dyn::LogSeverity severity,const std::string& msg)
00114 {
00115     std::cerr « msg « std::endl;
00116 }
00117
00119 class MyPresetManager : public sound4::cloudx1::dyn::CPresetLoader {
00120 public:
00121     MyPresetManager() = default;
00122     virtual ~MyPresetManager() = default;
00123
00124     bool SetupPath(const std::filesystem::path& a_preset_path)
00125         {
00126             m_preset_path=a_preset_path;
00127             if ( !std::filesystem::exists(m_preset_path ) ) {
00128                 return false;
00129             }
00130             std::error_code ec;
00131             if ( !std::filesystem::is_directory(m_preset_path, ec) ) {
00132                 return false;
00133             }
00134             return true;
00135         }
00136     virtual bool IsReadOnly() override { return false; };
00137     virtual bool Exists(const std::filesystem::path &name) override
00138         {
00139             std::error_code ec;
00140             return std::filesystem::exists(GetRealPath(name), ec);
00141         }
00142     virtual bool Remove(const std::filesystem::path &name) override
00143         {
00144             std::error_code ec;
00145             return std::filesystem::remove(GetRealPath(name), ec);
00146         }
00147     virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) override
00148         {
00149             std::error_code ec;
00150             std::filesystem::rename(GetRealPath(from), GetRealPath(to), ec);
00151             return (!ec);
00152         }
00153     virtual std::vector<std::filesystem::path> GetAll() override
00154         {
00155             std::vector<std::filesystem::path> list;
00156             for (const auto & entry : std::filesystem::directory_iterator(m_preset_path.c_str(),
      std::filesystem::directory_options::skip_permission_denied)) {
00157                 if (entry.is_regular_file()) {
00158                     list.push_back(entry.path().lexically_relative(m_preset_path));
00159                 }
00160             }
00161             return list;
00162         }
00163     virtual std::string Read(const std::filesystem::path &filename) override
00164         {
00165             std::ifstream f(GetRealPath(filename));
00166             if ( f.fail() ) {
00167                 return std::string();
00168             }
00169             std::ostringstream ss;
00170             ss « f.rdbuf();
00171             return ss.str();
00172         }
00173     virtual bool Write(const std::filesystem::path &filename, const std::string &content) override
00174         {
00175             std::ofstream f(GetRealPath(filename));
00176             if ( f.fail() ) {
00177                 return false;
00178             }
00179             f « content;
00180             if ( f.fail() ) {
00181                 return false;
00182             }
00183             return true;
```

```
00184         }
00185 private:
00186     std::filesystem::path m_preset_path;
00187     std::filesystem::path GetRealPath(const std::filesystem::path &name)
00188         {
00189             return m_preset_path / name;
00190         }
00191 };
00193
00194 int main(int argc, const char **argv)
00195 {
00196 #if (CLOUDX1_HAS_WEBSERVER)
00197     int listen_port = 8080;
00198 #endif // (CLOUDX1_HAS_WEBSERVER)
00199     auto store_path_str=GetEnv("S4STORE_PATH");
00200
00201     // Get credentials from environment
00202     auto LoginKey=GetEnv("S4LOGINKEY");
00203     if (LoginKey.empty()) {
00204         LoginKey=GetEnv("S4USERID");
00205     }
00206     auto RadioName=GetEnv("RADIO_NAME");
00207     auto KeyId=GetEnv("ACCESS_KEY_ID");
00208     auto AccessKey=GetEnv("ACCESS_KEY_SECRET");
00209
00210     const char *progname=argv[0];
00211
00212
00214     sound4::cloudx1::dyn::CDynLib dynlib;
00215     if (!dynlib.Load()) {
00216         std::cerr « "Failed to load processing library" « std::endl;
00217         return 1;
00218     }
00220
00221     if (argc>1) {
00222         if ((strcasecmp(argv[1],"-h")==0) || (strcasecmp(argv[1],"--help")==0)) {
00223             Usage(progname,dynlib);
00224             return 0;
00225         }
00226     }
00227     if (LoginKey.empty() || RadioName.empty() || KeyId.empty() || AccessKey.empty()) {
00228         std::cerr « "Missing credentials in environment" « std::endl;
00229         Usage(progname,dynlib);
00230         return 1;
00231     }
00232     std::filesystem::path store_path;
00233     if (!store_path_str.empty()) {
00234         store_path = std::filesystem::path(store_path_str);
00235         if (!std::filesystem::exists(store_path) || !std::filesystem::is_directory(store_path)) {
00236             std::cerr « "Storage folder '"«store_path.c_str()«"' is not a valid directory" «
 std::endl;
00237             Usage(progname,dynlib);
00238             return 1;
00239         }
00240     }
00241
00243     sound4::cloudx1::dyn::SetLogSeverity(dynlib, verbose5);
00244     sound4::cloudx1::dyn::SetLoggerCallback(dynlib, MyLogger);
00245
00246     sound4::cloudx1::dyn::CInstance instance(dynlib);
00247     instance.SetParam("ADMIN_USER","admin");
00248     instance.SetParam("ADMIN_SECRET","admin");
00250
00252     MyPresetManager preset_manager;
00253     if (!store_path.empty()) {
00254         if (!preset_manager.SetupPath(store_path)) {
00255             std::cerr « "Failed to setup the custom preset manager on path " « store_path.c_str() «
 std::endl;
00256             return 1;
00257         }
00258         instance.SetPresetManager(&preset_manager);
00259     }
00261
00262     std::cerr « "Creating" « std::endl;
00264     if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, {})) {
00265         std::cerr « "Failed to create the processing instance" « std::endl;
00266         return 1;
00267     }
00269
00270 #if (CLOUDX1_HAS_WEBSERVER)
00271     std::cerr « "Starting web server" « std::endl;
00273     if (!instance.StartWebServer(listen_port,0)) {
00274         std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
00275         return 1;
00276     }
00278 #endif // (CLOUDX1_HAS_WEBSERVER)
00279
```

```
00280     {
00282         auto client = instance.NewClient();
00283         auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
00284         std::cerr « "Request for processor name returned "«answer«std::endl;
00286     }
00287
00288     ProcessLoop(instance);
00289
00290     std::cerr « "Stopping now" « std::endl;
00291     instance.Stop();
00292
00293     std::cerr « "End" « std::endl;
00294     return 0;
00295 }
```

11.5 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 <experimental/filesystem>
#include <io.h>
#include <fcntl.h>
#include <stringapiset.h>
#include <sound4.x1.cloud.h>
```

Namespaces

- std

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[[maybe_unused]], const char ∗str)
- int main (int argc, char ∗const argv[ ])

11.5.1 Macro Definition Documentation

11.5.1.1 CHANNEL_COUNT

```
#define CHANNEL_COUNT 2
```

Definition at line 28 of file sound4.x1.cloud-pipe.cpp.

11.5.1.2 CHUNK_SIZE

```
#define CHUNK_SIZE 64
```

Definition at line 27 of file sound4.x1.cloud-pipe.cpp.

11.5.1.3 SAMPLE_RATE

```
#define SAMPLE_RATE 48000
```

Definition at line 26 of file sound4.x1.cloud-pipe.cpp.

11.5.2 Function Documentation

11.5.2.1 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 90 of file sound4.x1.cloud-pipe.cpp.

11.5.2.2 MyLogger()

```
void MyLogger (
            cloudx1_LogSeverity severe] [[maybe_unused],
            const char * str )
```

Definition at line 84 of file sound4.x1.cloud-pipe.cpp.

11.5.2.3 ProcessLoop()

```
void ProcessLoop (
            struct cloudx1_CInstance * pInstance )
```

[Processing Loop]

[Processing Loop]

Definition at line 31 of file sound4.x1.cloud-pipe.cpp.

11.5.2.4 Usage()

```
void Usage (
            const char * progname )
```

Definition at line 64 of file sound4.x1.cloud-pipe.cpp.

11.6 sound4.x1.cloud-pipe.cpp

```
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 // Choose good filesystem version depending on compiler.
00010 #if __has_include(<filesystem>)
00011     #include <filesystem>
00012 #else //if __cpp_lib_experimental_filesystem
00013     // We need the alias from std::experimental::filesystem to std::filesystem
00014     #include <experimental/filesystem>
00015     namespace std {
00016         namespace filesystem = experimental::filesystem;
00017     }
00018 #endif
00019 #if defined(_WIN32) || defined(WIN32)
00020     #include <io.h>
00021     #include <fcntl.h>
00022     #include <stringapiset.h>   // UTF-8 conversion
00023 #endif
00024 #include <sound4.x1.cloud.h>
00025
00026 #define SAMPLE_RATE       48000
00027 #define CHUNK_SIZE        64
00028 #define CHANNEL_COUNT     2
00029
00030 // Reads from stdin, write to stdout
00031 void ProcessLoop(struct cloudx1_CInstance *pInstance)
00032 {
00034 bool stopthread=false;
```

```
00035 alignas(64) float audio_in[CHUNK_SIZE*CHANNEL_COUNT];
00036 alignas(64) float audio_out[CHUNK_SIZE*CHANNEL_COUNT];
00037
00038     #if defined(_WIN32) || defined(WIN32)
00039         // Windows: The stdin, stdout, and stderr streams always open in text mode by default
00040         _setmode(_fileno(stdin), _O_BINARY);
00041         _setmode(_fileno(stdout), _O_BINARY);
00042     #endif
00043
00044     while (!stopthread)
00045     {
00046         // Read a chunk from stdin
00047         if (std::fread(&audio_in[0], sizeof(float), CHUNK_SIZE*CHANNEL_COUNT, stdin) !=
      CHUNK_SIZE*CHANNEL_COUNT) {
00048             std::cerr « "ProcessLoop: input stopped"« std::endl;
00049             stopthread=true;
00050             break;
00051         }
00052         if (stopthread) break;
00053         // Process it
00054         cloudx1_ProcessAudio(pInstance, audio_in, audio_out);
00055         // Write it to stdout
00056         if (fwrite(&audio_out[0], sizeof(float), CHUNK_SIZE*CHANNEL_COUNT, stdout) !=
      CHUNK_SIZE*CHANNEL_COUNT) {
00057             std::cerr « "Failed to write audio output" « std::endl;
00058             stopthread=true;
00059         }
00060     }
00062 }
00063
00064 void Usage(const char *progname)
00065 {
00066     std::cerr « "Usage: " « progname « std::endl;;
00067     std::cerr « "  Reads audio from stdin and return processed audio in stdout" « std::endl;
00068     std::cerr « "Environment:"« std::endl;;
00069     std::cerr « " - S4STORE_PATH            : path to store config [default: ./state]"« std::endl;;
00070     std::cerr « " - S4LOGINKEY              : SOUND4 Login key (or S4USERID)"« std::endl;;
00071     std::cerr « " - RADIO_NAME              : SOUND4 Radio Name"« std::endl;;
00072     std::cerr « " - ACCESS_KEY_ID           : SOUND4 Access Key ID"« std::endl;;
00073     std::cerr « " - ACCESS_KEY_SECRET       : SOUND4 Access Key Secret"« std::endl;;
00074     std::cerr « std::endl;
00075     std::cerr « "Example:"« std::endl;
00076     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;;
00077     #if defined(_WIN32) || defined(WIN32)
00078         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;;
00079     #else
00080         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;;
00081     #endif
00082 }
00083
00084 void MyLogger(cloudx1_LogSeverity severe [[maybe_unused]], const char *str)
00085 {
00086     std::cerr « str « std::endl;
00087 }
00088
00089
00090 int main(int argc, char *const argv[])
00091 {
00092     struct cloudx1_CInstance *pInstance = NULL;
00093     const char *store_path_str=getenv("S4STORE_PATH");
00094     // Get credentials from environment
00095     char *pLoginKey=getenv("S4LOGINKEY");
00096     if (!pLoginKey) {
00097         pLoginKey=getenv("S4USERID");
00098     }
00099     char *pRadioName=getenv("RADIO_NAME");
00100     char *pKeyId=getenv("ACCESS_KEY_ID");
00101     char *pAccessKey=getenv("ACCESS_KEY_SECRET");
00102
00103     const char *progname=argv[0];
00104
00105     if (argc>1) {
00106         if ((strcasecmp(argv[1],"-h")==0) || (strcasecmp(argv[1],"--help")==0)) {
00107             Usage(progname);
00108             return 0;
00109         }
00110     }
00111     if (!pLoginKey || !pRadioName || !pKeyId || !pAccessKey) {
00112         std::cerr « "Missing credentials in environment" « std::endl;
00113         Usage(progname);
00114         return 1;
00115     }
00116     std::filesystem::path fs_store_path;
```

```
00117     if (!store_path_str || store_path_str[0]==0) {
00118         fs_store_path=std::filesystem::current_path() / "state";
00119     } else {
00120         fs_store_path = std::filesystem::path(store_path_str);
00121     }
00122     if (!std::filesystem::exists(fs_store_path) || !std::filesystem::is_directory(fs_store_path)) {
00123         std::cerr « "Storage folder '"«fs_store_path.c_str()«"' is not a valid directory" « std::endl;
00124         Usage(progname);
00125         return 1;
00126     }
00127     std::string store_path;
00128     #ifdef _WIN32
00129     {
00130         // Convert path to UTF-8
00131         std::wstring wstr(fs_store_path.wstring());
00132         if (wstr.empty()) return {};
00133         int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL, NULL);
00134         std::string str(size, 0);
00135         WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00136         store_path=str;
00137     }
00138     #else // !_WIN32
00139         store_path=fs_store_path;
00140     #endif // !_WIN32
00141
00143     // Optional: Use our own logging, instead of default color output to stderr.
00144     //cloudx1_SetLoggerCallback(&MyLogger);
00145
00146     //cloudx1_SetLogSeverity(cloudx1_LogSeverity::info);
00147     cloudx1_SetLogSeverity(cloudx1_LogSeverity::verbose5);
00148
00149     std::cerr « "Process version: " « cloudx1_GetVersion() « std::endl;
00150     // Do some sanity checks
00151     if (cloudx1_GetSampleRate()!=SAMPLE_RATE) {
00152       std::cerr « "Bad library sampling rate, expecting '"«SAMPLE_RATE«"' but has "«
      cloudx1_GetSampleRate() « std::endl;
00153       return 1;
00154     }
00155     if (cloudx1_GetChunkSizeInFrames()!=CHUNK_SIZE) {
00156       std::cerr « "Bad library frame size, expecting '"«CHUNK_SIZE«"' but has "«
      cloudx1_GetChunkSizeInFrames() « std::endl;
00157       return 1;
00158     }
00159     if (cloudx1_GetChannelCount()!=CHANNEL_COUNT) {
00160       std::cerr « "Bad library channel count, expecting '"«CHANNEL_COUNT«"' but has "«
      cloudx1_GetChannelCount() « std::endl;
00161       return 1;
00162     }
00164
00166     // Setup parameters
00167     struct cloudx1_CParameters *params = cloudx1_NewParameters();
00168     // Optional: activate web authentication, set admin password
00169     // This creates the authentication only for a new storage path
00170     cloudx1_SetParameter(params,"ADMIN_USER", "admin");
00171     cloudx1_SetParameter(params,"ADMIN_SECRET", "admin");
00172
00173     // Create the processing instance
00174     pInstance=cloudx1_InitProcess2(pLoginKey,pRadioName,pKeyId,pAccessKey,store_path.c_str(), params);
00175     cloudx1_FreeParameters(params);
00176     if (!pInstance) {
00177       std::cerr « "Failed to create the process instance"« std::endl;
00178       return 1;
00179     }
00180
00181     // Start the update thread, without JSON server (low priority)
00182     std::thread updater([pInstance](){
00183        // will returned when stopped or destroyed
00184        std::cerr « "cloudx1_StartUpdateThread (no json port)" « std::endl;
00185        cloudx1_StartUpdateThread(pInstance, 0);
00186        std::cerr « "cloudx1_StartUpdateThread END" « std::endl;
00187      });
00188
00189     // This is not mandatory, but better be sure we are ready right now
00190     std::cerr « "Waiting update thread" « std::endl;
00191     if (cloudx1_WaitUpdateThreadReady(pInstance, 5000)<0) {
00192         std::cerr « "Timeout to create the process instance"« std::endl;
00193     }
00194     std::cerr « "Waiting update thread DONE" « std::endl;
00195
00196 #if (CLOUDX1_HAS_WEBSERVER)
00198     // Starts a web server, listening on port http://localhost:8080, https://localhost:8443
00199     std::cerr « "Starting web server" « std::endl;
00200     int listenport= 8080;
00201     int listenport_secure= 8443;
00202     uint64_t webserver= SOUND4_INVALID_WEBSERVER_ID;
00203     if (listenport || listenport_secure) {
00204         webserver = cloudx1_Webserver(listenport,listenport_secure,pInstance);
```

```
00205         if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
00206             std::cerr « "Starting web server FAILED" « std::endl;
00207         } else {
00208             int web_status=cloudx1_Webserver_Status(webserver);
00209             if (listenport) {
00210                 if (web_status & SOUND4_WEBSERVER_HTTP_OK) {
00211                     std::cerr « "Web server listening on port " « listenport;
00212                 } else {
00213                     std::cerr « "Web server failed to listen on port " « listenport;
00214                 }
00215             }
00216             if (listenport_secure) {
00217                 if (web_status & SOUND4_WEBSERVER_HTTPS_OK) {
00218                     std::cerr « "Web server listening on secure port " « listenport_secure;
00219                 } else {
00220                     std::cerr « "Web server failed to listen on secure port " « listenport_secure;
00221                 }
00222             }
00223             std::cerr « "Starting web server DONE" « std::endl;
00224         }
00225     }
00227 #endif // (CLOUDX1_HAS_WEBSERVER)
00228
00229      // Force load a factory preset now
00230      // Could be used instead of setting a store_path
00231      /*{
00232          cloudx1_CClientInstance *pClient=cloudx1_NewClient(pInstance);
00233          const char *answer=cloudx1_ProcessJson(pClient, "{ \"factoryload\": \"All Programs\" }",
      NULL);
00234          std::cerr « "Loaded factory preset answer: " « answer« std::endl;
00235          cloudx1_FreeJsonAnswer(answer);
00236          cloudx1_DeleteClient(pClient);
00237      }*/
00239
00240     std::cerr « "Estimated delay " « ( cloudx1_GetEstimatedDelay(pInstance)*1000.0/SAMPLE_RATE ) « "
      ms" « std::endl;
00241
00242     ProcessLoop(pInstance);
00243
00245 #if (CLOUDX1_HAS_WEBSERVER)
00246     // Stopping the webserver
00247     std::cerr « "Stopping web server" « std::endl;
00248     cloudx1_Webserver_Stop(webserver, 1000);
00249     std::cerr « "Stopping web server DONE" « std::endl;
00250 #endif // (CLOUDX1_HAS_WEBSERVER)
00251
00252     // Stopping the processing instance
00253     std::cerr « "Stopping Update thread" « std::endl;
00254     cloudx1_StopUpdateThread(pInstance); // this will exit the update thread
00255     std::cerr « "Stopping Update thread DONE" « std::endl;
00256
00257     updater.join();
00258
00259     cloudx1_ExitProcess(pInstance);
00261
00262     return 0;
00263 }
```

11.7 sound4.x1.cloud.h File Reference

C interface for library.

```
#include <stdint.h>
```

Classes

- struct SOUND4_ProcessInfo

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 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_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)
- 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)

11.7.1 Macro Definition Documentation

11.7.1.1 CLOUDX1_DECL

```
#define CLOUDX1_DECL __declspec(dllimport)
```

Definition at line 14 of file sound4.x1.cloud.h.

11.7.1.2 CLOUDX1_HAS_CLOUDBUS

```
#define CLOUDX1_HAS_CLOUDBUS 0
```

Definition at line 19 of file sound4.x1.cloud.h.

11.7.1.3 CLOUDX1_HAS_WEBSERVER

```
#define CLOUDX1_HAS_WEBSERVER 1
```

Definition at line 18 of file sound4.x1.cloud.h.

11.8 sound4.x1.cloud.h

```
00001
00004 #pragma once
00005
00006 #include <stdint.h>
00007 #ifdef __unix__
00008     #include <sys/types.h>
00009     #define CLOUDX1_DECL        __attribute__ ((visibility ("default")))
00010 #elif defined(_WIN32) || defined(WIN32)
00011     #ifdef BUILDING_CLOUDX1_DLL
00012         #define CLOUDX1_DECL    __declspec(dllexport)
00013     #else
00014         #define CLOUDX1_DECL    __declspec(dllimport)
00015     #endif
00016 #endif
00017
00018 #define CLOUDX1_HAS_WEBSERVER 1
00019 #define CLOUDX1_HAS_CLOUDBUS 0
00020
00021 #ifdef __cplusplus
00022 extern "C" {
00023 #endif // __cplusplus
00024
00070 // ------------------------------------------------------------
00089 // ------------------------------------------------------------
00142 // ------------------------------------------------------------
00143
00144 // ------------------------------------------------------------
00156 #define CLOUDX1_AUDIOFRAME_COUNT      64
00162 #define CLOUDX1_CHANNEL_COUNT          2
00168 #define CLOUDX1_AUDIO_INPUT_COUNT      1
00174 #define CLOUDX1_AUDIO_OUTPUT_COUNT     1
00180 #define CLOUDX1_SAMPLE_RATE            48000
00181
00187 struct SOUND4_ProcessInfo {
00188     size_t struct_size;
00189     const char *name;
00190     const char *prefix;
00191     const char *shortname;
00192     const char *version;
00193 };
00194
00202 CLOUDX1_DECL const struct SOUND4_ProcessInfo* SOUND4_GetProcessInfo();
00203
00209 CLOUDX1_DECL const char *cloudx1_GetVersion();
00210
00223 CLOUDX1_DECL unsigned int cloudx1_GetChunkSizeInFrames();
00224
00233 CLOUDX1_DECL unsigned int* cloudx1_GetPossibleChunkSizeInFrames();
00234
00242 CLOUDX1_DECL unsigned int cloudx1_GetChannelCount();
00243
00252 CLOUDX1_DECL unsigned int cloudx1_GetAudioInputCount();
00253
00262 CLOUDX1_DECL unsigned int cloudx1_GetAudioOutputCount();
00263
00271 CLOUDX1_DECL unsigned int cloudx1_GetSampleRate();
00272
00276 enum cloudx1_LogSeverity {
00277     none = 0,
00278     fatal = 1,
00279     error = 2,
00280     warning = 3,
00281     info = 4,
00282     verbose = 5,
00283     verbose2 = 6,
00284     verbose3 = 7,
00285     verbose4 = 8,
00286     verbose5 = 9,
00287 };
00288
00295 typedef void (*cloudx1_loggerfn) (enum cloudx1_LogSeverity, const char *);
00296
00306 CLOUDX1_DECL void cloudx1_SetLoggerCallback( cloudx1_loggerfn logger );
00307
00315 CLOUDX1_DECL void cloudx1_SetLogSeverity( enum cloudx1_LogSeverity severity );
00316
00319 // ------------------------------------------------------------
00325 // ------------------------------------------------------------
00329 struct cloudx1_CInstance;
00330
00334 struct cloudx1_CParameters;
00335
00343 CLOUDX1_DECL struct cloudx1_CParameters *cloudx1_NewParameters();
00344
00348 CLOUDX1_DECL void cloudx1_FreeParameters(struct cloudx1_CParameters *params);
```

```
00349
00361 CLOUDX1_DECL void cloudx1_SetParameter(struct cloudx1_CParameters *params, const char *name, const
      char *value);
00362
00368 CLOUDX1_DECL const char *cloudx1_GetParameter(struct cloudx1_CParameters *params, const char *name);
00369
00375 CLOUDX1_DECL void cloudx1_FreeParameterValue(const char *value);
00376
00384 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess(
00385         const char *LoginKey,
00386         const char *RadioName,
00387         const char *Access_Key_ID,
00388         const char *Access_Key_Secret,
00389         const char *save_path
00390     );
00391
00399 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess2(
00400         const char *LoginKey,
00401         const char *RadioName,
00402         const char *Access_Key_ID,
00403         const char *Access_Key_Secret,
00404         const char *save_path,
00405         const struct cloudx1_CParameters *parameters
00406     );
00407
00452 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess3(
00453         const char *LoginKey,
00454         const char *RadioName,
00455         const char *Access_Key_ID,
00456         const char *Access_Key_Secret,
00457         const char *save_path,
00458         const struct cloudx1_CParameters *parameters,
00459         unsigned int frames_per_chunk
00460     );
00461
00473 CLOUDX1_DECL unsigned int cloudx1_GetProcessChunkFrames(struct cloudx1_CInstance *instance);
00474
00484 CLOUDX1_DECL int cloudx1_TerminateProcess(struct cloudx1_CInstance *instance);
00485
00491 CLOUDX1_DECL void cloudx1_ExitProcess(struct cloudx1_CInstance *instance);
00492
00495 #if CLOUDX1_HAS_CLOUDBUS
00496 // ---------------------------------------------------------------
00505 struct cloudx1_CBus;
00506
00512 CLOUDX1_DECL struct cloudx1_CBus* cloudx1_NewBus();
00513
00519 CLOUDX1_DECL void cloudx1_FreeBus(struct cloudx1_CBus *bus);
00520
00530 CLOUDX1_DECL void cloudx1_SetInstanceBus(struct cloudx1_CParameters *params, struct cloudx1_CBus
      *bus);
00531
00532
00534 #endif // CLOUDX1_HAS_CLOUDBUS
00535
00536 // ---------------------------------------------------------------
00559 // ---------------------------------------------------------------
00560
00561 // OS dependent filesystem path char type
00562 #ifdef _WIN32
00563     typedef wchar_t fs_char;
00564 #else // !_WIN32
00565     typedef char fs_char;
00566 #endif // !_WIN32
00567
00575 typedef char * (*cloudx1_storage_reader) (const fs_char *filename, void* userdata);
00576
00583 typedef void (*cloudx1_storage_reader_free) (char *content, void* userdata);
00584
00593 typedef int (*cloudx1_storage_writer) (const fs_char *filename, const char *content, void* userdata);
00594
00602 typedef int (*cloudx1_storage_exists) (const fs_char *filename, void* userdata);
00603
00611 typedef fs_char** (*cloudx1_storage_getall) (void* userdata);
00612
00619 typedef void (*cloudx1_storage_getall_free) (fs_char**all, void* userdata);
00620
00628 typedef int (*cloudx1_storage_remove) (const fs_char *filename, void* userdata);
00629
00638 typedef int (*cloudx1_storage_rename) (const fs_char *from, const fs_char *to, void* userdata);
00639
00657 CLOUDX1_DECL void cloudx1_SetPresetManager(struct cloudx1_CParameters *params
00658     , cloudx1_storage_reader reader, cloudx1_storage_reader_free
00659     , cloudx1_storage_writer writer
00660     , cloudx1_storage_exists exists
00661     , cloudx1_storage_getall getall, cloudx1_storage_getall_free getall_free
00662     , cloudx1_storage_remove remove
```

```
00663     , cloudx1_storage_rename rename
00664     , int IsReadOnly
00665     , void* userdata
00666     );
00667
00671 enum cloudx1_PresetChange_Kind {
00672     change_kind_created = 1,
00673     change_kind_modified   ,
00674     change_kind_deleted    ,
00675 };
00676
00685 CLOUDX1_DECL void cloudx1_PresetManager_InformChange(struct cloudx1_CInstance *instance, const fs_char
       *relative_path, enum cloudx1_PresetChange_Kind change_kind);
00686
00689 // ------------------------------------------------------------
00697 // ------------------------------------------------------------
00698
00715 CLOUDX1_DECL void cloudx1_SetMetadata(struct cloudx1_CInstance *instance, const char* key, const char*
       value);
00716
00727 CLOUDX1_DECL void cloudx1_SetMetadataMulti(struct cloudx1_CInstance *instance, const char** keyvalue);
00728
00736 CLOUDX1_DECL const char** cloudx1_GetMetadataInfos(struct cloudx1_CInstance *instance);
00737
00744 CLOUDX1_DECL void cloudx1_FreeMetadataInfos(struct cloudx1_CInstance *instance, const char** infos);
00745
00748 // ------------------------------------------------------------
00753 // ------------------------------------------------------------
00754
00767 CLOUDX1_DECL void cloudx1_StartUpdateThread(struct cloudx1_CInstance *instance, unsigned int port);
00768
00774 CLOUDX1_DECL void cloudx1_StopUpdateThread(struct cloudx1_CInstance *instance);
00775
00783 CLOUDX1_DECL int cloudx1_WaitUpdateThreadReady(struct cloudx1_CInstance *instance, int milliseconds);
00784
00787 // ------------------------------------------------------------
00792 // ------------------------------------------------------------
00814 CLOUDX1_DECL void cloudx1_ProcessAudio(struct cloudx1_CInstance *instance, const float *input, float
       *output );
00815
00834 CLOUDX1_DECL void cloudx1_ProcessAudio_Planar(struct cloudx1_CInstance *instance
00835     , float const * const *input
00836     , float * const *output);
00837
00850 CLOUDX1_DECL float *cloudx1_GetBufferIn(struct cloudx1_CInstance *instance);
00851
00864 CLOUDX1_DECL float *cloudx1_GetBufferOut(struct cloudx1_CInstance *instance);
00865
00873 CLOUDX1_DECL unsigned int cloudx1_GetEstimatedDelay(struct cloudx1_CInstance *instance);
00874
00877 // ------------------------------------------------------------
00884 // ------------------------------------------------------------
00885     #ifdef _MSC_VER
00886         #define __BYTE_ORDER__  REG_DWORD
00887         #define __ORDER_LITTLE_ENDIAN__ REG_DWORD_LITTLE_ENDIAN
00888         #define __ORDER_BIG_ENDIAN__    REG_DWORD_BIG_ENDIAN
00889     #endif
00890
00894 enum cloudx1_SampleFormat {
00895     INVALID_FORMAT=0,
00896     S16_LE,
00897     S16_BE,
00898     S24_LE,
00899     S24_BE,
00900     S32_LE,
00901     S32_BE,
00902     F32_LE,
00903     F32_BE,
00904
00905     // Native definitions, only links to the physical ones
00906     #if __BYTE_ORDER__ == __ORDER_LITTLE_ENDIAN__
00907         S16_NATIVE=S16_LE,
00908         S24_NATIVE=S24_LE,
00909         S32_NATIVE=S32_LE,
00910         F32_NATIVE=F32_LE,
00911     #else
00912         S16_NATIVE=S16_BE,
00913         S24_NATIVE=S24_BE,
00914         S32_NATIVE=S32_BE,
00915         F32_NATIVE=F32_BE,
00916     #endif
00917 };
00918
00925 CLOUDX1_DECL const char *cloudx1_GetFormatName(const enum cloudx1_SampleFormat fmt);
00926
00933 CLOUDX1_DECL enum cloudx1_SampleFormat cloudx1_GetFormatFromName(const char *name);
00934
```

```
00941 CLOUDX1_DECL unsigned int cloudx1_GetBytesFromFormat(const enum cloudx1_SampleFormat fmt);
00942
00943
00950 CLOUDX1_DECL unsigned int cloudx1_GetMaxPacketFrame(struct cloudx1_CInstance *instance);
00951
00962 CLOUDX1_DECL unsigned int cloudx1_AddAudio(struct cloudx1_CInstance *instance, const uint8_t *payload,
      unsigned int nFrame, enum cloudx1_SampleFormat fmt );
00963
00970 CLOUDX1_DECL unsigned int cloudx1_AddPadAudio(struct cloudx1_CInstance *instance);
00971
00978 CLOUDX1_DECL unsigned int cloudx1_GetOutputCount(struct cloudx1_CInstance *instance);
00979
00989 CLOUDX1_DECL unsigned int cloudx1_GetAudio(struct cloudx1_CInstance *instance, uint8_t *payload,
      unsigned int max_nFrame, enum cloudx1_SampleFormat fmt );
00990
00994 // ------------------------------------------------------------
00998 // ------------------------------------------------------------
01009 CLOUDX1_DECL void cloudx1_AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl, enum
      cloudx1_SampleFormat fmt);
01010
01021 CLOUDX1_DECL void cloudx1_AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl, enum
      cloudx1_SampleFormat fmt);
01022
01032 CLOUDX1_DECL void cloudx1_StereoToMono(const float *input, float *output, size_t nFrame);
01033
01043 CLOUDX1_DECL void cloudx1_MonoToStereo(const float *input, float *output, size_t nFrame);
01044
01055 CLOUDX1_DECL void cloudx1_StereoToMono_Planar(const float *inputL, const float *inputR, float *output,
      size_t nFrame);
01056
01067 CLOUDX1_DECL void cloudx1_MonoToStereo_Planar(const float *input, float *outputL, float *outputR,
      size_t nFrame);
01068
01075 CLOUDX1_DECL void cloudx1_AudioMonoFromLiveStereo(const uint8_t *payload, float *output);
01076
01083 CLOUDX1_DECL void cloudx1_AudioMonoToLiveStereo(const float *input, uint8_t *payload);
01084
01087 // ------------------------------------------------------------
01092 // ------------------------------------------------------------
01096 struct cloudx1_CClientInstance;
01097
01106 CLOUDX1_DECL struct cloudx1_CClientInstance *cloudx1_NewClient(struct cloudx1_CInstance *instance);
01107
01113 CLOUDX1_DECL void cloudx1_DeleteClient(struct cloudx1_CClientInstance *client);
01114
01128 CLOUDX1_DECL const char *cloudx1_ProcessJson(struct cloudx1_CClientInstance *client, const char
      *json_str, int *need_save);
01129
01135 CLOUDX1_DECL void cloudx1_FreeJsonAnswer(const char *json_str);
01136
01148 CLOUDX1_DECL int cloudx1_SaveState(struct cloudx1_CInstance *instance);
01149
01445 #if CLOUDX1_HAS_WEBSERVER
01446 // ------------------------------------------------------------
01454 // ------------------------------------------------------------
01473 CLOUDX1_DECL uint64_t cloudx1_Webserver_tcp(unsigned int listenport, unsigned int listenport_secure,
      const char *socket_ip, unsigned int socket_port);
01474
01475 // ------------------------------------------------------------
01495 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);
01496
01514 CLOUDX1_DECL uint64_t cloudx1_Webserver(unsigned int listenport, unsigned int listenport_secure,
      struct cloudx1_CInstance *instance);
01515
01525 CLOUDX1_DECL int cloudx1_Webserver_Stop(uint64_t id, int timeout_ms);
01526
01535 CLOUDX1_DECL int cloudx1_Webserver_Status(uint64_t id);
01536
01541 #define SOUND4_INVALID_WEBSERVER_ID            ((uint64_t)-1)
01542
01546 #define SOUND4_WEBSERVER_HTTP_OK               (1<<0)
01550 #define SOUND4_WEBSERVER_HTTPS_OK              (1<<1)
01551
01553 #endif // CLOUDX1_HAS_WEBSERVER
01554
01555 #ifdef __cplusplus
01556 } // extern "C"
01557 #endif // __cplusplus
```

11.9 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::cloudx1::helper::SampleFormat< T >

  Helper for Sample format types.
- struct sound4::cloudx1::helper::SampleFormat< int16_t >
- struct sound4::cloudx1::helper::SampleFormat< int32_t >
- struct sound4::cloudx1::helper::SampleFormat< float >
- class sound4::cloudx1::CPresetLoader
- class sound4::cloudx1::CInstance
- class sound4::cloudx1::CInstance::CClient

Namespaces

- sound4
- sound4::cloudx1
- sound4::cloudx1::helper

Macros

- #define fs_strdup wcsdup

  helper for OS dependant file name copy

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

Variables

- const size_t sound4::cloudx1::ChunkFrames =CLOUDX1_AUDIOFRAME_COUNT
- const size_t sound4::cloudx1::InputChannels =CLOUDX1_CHANNEL_COUNT∗CLOUDX1_AUDIO_INPUT_COUNT
- const size_t sound4::cloudx1::OutputChannels =CLOUDX1_CHANNEL_COUNT∗CLOUDX1_AUDIO_OUTPUT_COUNT
- const size_t sound4::cloudx1::InputSampleSize =ChunkFrames∗InputChannels
- const size_t sound4::cloudx1::OutputSampleSize =ChunkFrames∗OutputChannels
- const size_t sound4::cloudx1::SampleRate =CLOUDX1_SAMPLE_RATE

11.9.1 Macro Definition Documentation

11.9.1.1 fs_strdup

```
#define fs_strdup wcsdup
```

Definition at line 25 of file sound4.x1.cloud.hpp.

11.10 sound4.x1.cloud.hpp

```
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 #else // !_WIN32
00028     #define fs_strdup strdup
00029 #endif // !_WIN32
00030
00031 // bridge C callbacks to CPresetLoader
00032 extern "C" {
00033     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata);
00034     static void cloudx1_custom_reader_free(char *content, void* userdata);
00035     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata);
00036     static int cloudx1_custom_exists(const fs_char *filename, void* userdata);
00037     static fs_char** cloudx1_custom_getall(void* userdata);
00038     static void cloudx1_custom_getall_free(fs_char** all, void* userdata);
00039     static int cloudx1_custom_remove(const fs_char *filename, void* userdata);
00040     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00041 };
00042
00046 namespace sound4 {
00050 namespace cloudx1 {
00051     static constexpr const char *process_name = "SOUND4 x1.CLOUD";
00052     static constexpr const char *process_shortname = "x1";
00053     using SampleFormat = cloudx1_SampleFormat;
00057     const size_t ChunkFrames=CLOUDX1_AUDIOFRAME_COUNT;
00061     const size_t InputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_INPUT_COUNT;
00065     const size_t OutputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_OUTPUT_COUNT;
00069     const size_t InputSampleSize=ChunkFrames*InputChannels;
00073     const size_t OutputSampleSize=ChunkFrames*OutputChannels;
00077     const size_t SampleRate=CLOUDX1_SAMPLE_RATE;
00078
00082     namespace helper {
00083         #ifdef _WIN32
00089         static inline std::string WStringToUTF8(const std::wstring& wstr) {
00090             if (wstr.empty()) return {};
00091             int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL,
      NULL);
00092             std::string str(size, 0);
00093             WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00094             return str;
00095         }
00101         static inline std::wstring UTF8ToWString(const std::string& str) {
00102             if (str.empty()) return std::wstring();
00103             int size = MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), NULL, 0);
00104             std::wstring wstr(size, 0);
```

```
00105             MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), &wstr[0], size);
00106             return wstr;
00107         }
00108         #endif // _WIN32
00109
00115             template<typename T>
00116         struct SampleFormat {
00117         };
00118             template<>
00119         struct SampleFormat<int16_t> {
00120             const cloudx1_SampleFormat format = S16_NATIVE;
00121         };
00122             template<>
00123         struct SampleFormat<int32_t> {
00124             const cloudx1_SampleFormat format = S32_NATIVE;
00125         };
00126             template<>
00127         struct SampleFormat<float> {
00128             const cloudx1_SampleFormat format = F32_NATIVE;
00129         };
00130
00131
00136         static inline void AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl,
    cloudx1_SampleFormat fmt) {
00137             cloudx1_AudioConvertFrom(payload, output, nSpl, fmt);
00138         }
00139         static inline void AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl,
    cloudx1_SampleFormat fmt) {
00140             cloudx1_AudioConvertTo(input, payload, nSpl, fmt);
00141         }
00142         static inline void StereoToMono(const float *input, float *output, size_t nSpl) {
00143             cloudx1_StereoToMono(input, output, nSpl);
00144         }
00145         static inline void MonoToStereo(const float *input, float *output, size_t nSpl) {
00146             cloudx1_MonoToStereo(input, output, nSpl);
00147         }
00148         static inline void StereoToMono_Planar(const float *inputL, const float *inputR, float
    *output, size_t nSpl) {
00149             cloudx1_StereoToMono_Planar(inputL, inputR, output, nSpl);
00150         }
00151         static inline void MonoToStereo_Planar(const float *input, float *outputL, float *outputR,
    size_t nSpl) {
00152             cloudx1_MonoToStereo_Planar(input, outputL, outputR, nSpl);
00153         }
00154         static inline void AudioMonoFromLiveStereo(const uint8_t *payload, float *output) {
00155             cloudx1_AudioMonoFromLiveStereo(payload, output);
00156         }
00157         static inline void AudioMonoToLiveStereo(const float *input, uint8_t *payload) {
00158             cloudx1_AudioMonoToLiveStereo(input, payload);
00159         }
00160
00161     }; // namespace helper
00162
00168     static inline std::string GetVersion()
00169         {
00170             return std::string(cloudx1_GetVersion());
00171         }
00172
00183     static inline unsigned int GetChunkSizeInFrames()
00184         {
00185             return cloudx1_GetChunkSizeInFrames();
00186         }
00187
00196     static inline std::vector<unsigned int> GetPossibleChunkSizeInFrames()
00197         {
00198             std::vector<unsigned int> list;
00199             for (unsigned int* src=cloudx1_GetPossibleChunkSizeInFrames();*src;src++) {
00200                 list.push_back(*src);
00201             }
00202             return list;
00203         }
00204
00212     static inline unsigned int GetChannelCount()
00213         {
00214             return cloudx1_GetChannelCount();
00215         }
00216
00225     static inline unsigned int GetAudioInputCount()
00226         {
00227             return cloudx1_GetAudioInputCount();
00228         }
00229
00238     static inline unsigned int GetAudioOutputCount()
00239         {
00240             return cloudx1_GetAudioOutputCount();
00241         }
00242
```

```
00250     static inline unsigned int GetSampleRate()
00251         {
00252             return cloudx1_GetSampleRate();
00253         }
00254 
00260     static inline void SanityCheck(bool a_bCheckFrames = true)
00261     {
00262         // Do some sanity checks
00263         if (cloudx1_GetSampleRate()!=CLOUDX1_SAMPLE_RATE) {
00264             throw std::runtime_error("Bad library sampling rate");
00265         }
00266         if (a_bCheckFrames && cloudx1_GetChunkSizeInFrames()!=ChunkFrames) {
00267             throw std::runtime_error("Bad library frame size");
00268         }
00269         if (cloudx1_GetChannelCount()!=CLOUDX1_CHANNEL_COUNT) {
00270             throw std::runtime_error("Bad library channel count");
00271         }
00272         if (cloudx1_GetAudioInputCount()!=CLOUDX1_AUDIO_INPUT_COUNT) {
00273             throw std::runtime_error("Bad library input count");
00274         }
00275         if (cloudx1_GetAudioOutputCount()!=CLOUDX1_AUDIO_OUTPUT_COUNT) {
00276             throw std::runtime_error("Bad library output count");
00277         }
00278     }
00279 
00286     static inline std::string GetFormatName(const SampleFormat fmt)
00287         {
00288             return std::string(cloudx1_GetFormatName(fmt));
00289         }
00290 
00297     static inline SampleFormat GetFormatFromName(const std::string& name)
00298         {
00299             return cloudx1_GetFormatFromName(name.c_str());
00300         }
00301 
00308     static inline unsigned int GetBytesFromFormat(const SampleFormat fmt)
00309         {
00310             return cloudx1_GetBytesFromFormat(fmt);
00311         }
00312 
00316     using LogSeverity = cloudx1_LogSeverity;
00320     using log_cb_t = std::function<void(LogSeverity,const std::string&)>;
00321 
00325     static log_cb_t _log_cb;
00326     extern "C" {
00327         static inline void _log_cb_c(cloudx1_LogSeverity severity, const char *c_msg) {
00328             _log_cb(severity, std::string(c_msg));
00329         }
00330     }
00334     static inline void SetLogSeverity(LogSeverity severity)
00335         {
00336             cloudx1_SetLogSeverity(severity);
00337         }
00341     static inline void SetLoggerCallback(log_cb_t cb)
00342         {
00343             _log_cb=cb;
00344             cloudx1_SetLoggerCallback(&_log_cb_c);
00345         }
00346 
00347 #if CLOUDX1_HAS_CLOUDBUS
00348     class CBus {
00349         public:
00350             CBus()
00351                 : m_bus(cloudx1_NewBus()) {}
00352             ~CBus()
00353                 {
00354                     cloudx1_FreeBus(m_bus);
00355                     m_bus = nullptr;
00356                 }
00357             cloudx1_CBus *Get() const { return m_bus; }
00358         private:
00359             cloudx1_CBus *m_bus;
00360     };
00361 #endif // CLOUDX1_HAS_CLOUDBUS
00362 
00367     class CPresetLoader {
00368     public:
00369         CPresetLoader() = default;
00370         virtual ~CPresetLoader() = default;
00371 
00372         virtual bool IsReadOnly() = 0;
00373         virtual bool Exists(const std::filesystem::path &name) = 0;
00374         virtual bool Remove(const std::filesystem::path &name) = 0;
00375         virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) = 0;
00376         virtual std::vector<std::filesystem::path> GetAll() = 0;
00377         virtual std::string Read(const std::filesystem::path &filename) = 0;
00378         virtual bool Write(const std::filesystem::path &filename, const std::string &content) =0;
```

```
00379     };
00380     using PresetChange_Kind = cloudx1_PresetChange_Kind;
00381
00385     class CInstance {
00386     public:
00390         CInstance()
00391             {
00392                 params = cloudx1_NewParameters();
00393                 if (!params) throw std::bad_alloc();
00394             }
00395         // non-copyable
00396         CInstance( const CInstance& ) = delete;
00397         CInstance& operator=( const CInstance& ) = delete;
00401         ~CInstance()
00402             {
00403                 Stop();
00404                 if (params) cloudx1_FreeParameters(params);
00405             }
00409        bool IsOk() const { return instance!=nullptr; }
00417         void SetParam(const std::string& name, const std::string& value)
00418             {
00419                 assert(params);
00420                 cloudx1_SetParameter(params, name.c_str(), value.c_str());
00421             }
00427         std::string GetParam(const std::string& name)
00428             {
00429                 assert(params);
00430                 auto c_value=cloudx1_GetParameter(params, name.c_str());
00431                 std::string ret(c_value);
00432                 cloudx1_FreeParameterValue(c_value);
00433                 return ret;
00434             }
00435
00445         void SetPresetManager(CPresetLoader *preset_manager)
00446             {
00447                 if (!preset_manager) return;
00448                 assert(params);
00449                 cloudx1_SetPresetManager(params,
00450                     cloudx1_custom_reader,
00451                     cloudx1_custom_reader_free,
00452                     cloudx1_custom_writer,
00453                     cloudx1_custom_exists,
00454                     cloudx1_custom_getall,
00455                     cloudx1_custom_getall_free,
00456                     cloudx1_custom_remove,
00457                     cloudx1_custom_rename,
00458                     preset_manager->IsReadOnly(),
00459                     preset_manager
00460                 );
00461             }
00462
00463 #if CLOUDX1_HAS_CLOUDBUS
00467             void SetBus(const CBus& bus) {
00468                 assert(params);
00469                 cloudx1_SetInstanceBus(params,bus.Get());
00470             }
00471 #endif // CLOUDX1_HAS_CLOUDBUS
00472
00487         bool Create(const std::string& LoginKey, const std::string& RadioName, const std::string&
      AWS_Access_ID, const std::string& AWS_Access_Secret, const std::filesystem::path& save_path, int
      json_port = 0, unsigned int frames_per_chunk=64)
00488             {
00489                 assert(!instance);
00490                 std::string l_save_path;
00491                 if (!save_path.empty()) {
00492                     l_save_path = save_path.u8string();
00493                 }
00494                 instance = cloudx1_InitProcess3(LoginKey.c_str(), RadioName.c_str(),
      AWS_Access_ID.c_str(), AWS_Access_Secret.c_str(), l_save_path.c_str(), params, frames_per_chunk);
00495                 if (!instance) return false;
00496                 if (!init_metadata.empty()) {
00497                     for (auto&& [key,value]: init_metadata) {
00498                         cloudx1_SetMetadata(instance, key.c_str(), value.c_str());
00499                     }
00500                     init_metadata.clear();
00501                 }
00502                 update_thread = std::thread([this, json_port](){
00503                     OnUpdateThreadStart();
00504                     cloudx1_StartUpdateThread(instance, json_port);
00505                     OnUpdateThreadStop();
00506                 });
00507                 int timeout=5000;
00508                 #ifdef DEBUG
00509                     timeout=60*1000; // For debugger pauses
00510                 #endif
00511                 if (cloudx1_WaitUpdateThreadReady(instance, timeout)<0) {
00512                     return false;
```

```
00513                 }
00514                 return true;
00515             }
00516
00524         unsigned int GetChunkFrames() {
00525             if (instance) {
00526                 return cloudx1_GetProcessChunkFrames(instance);
00527             }
00528             return 0;
00529         }
00530
00538         void PresetManager_InformChange(const std::filesystem::path& relative_path, PresetChange_Kind
    change_kind)
00539             {
00540                 cloudx1_PresetManager_InformChange(instance, relative_path.c_str(),
    (cloudx1_PresetChange_Kind) change_kind);
00541             }
00542
00554         void SetMetadata(const std::string& key, const char* value)
00555             {
00556                 if (instance) {
00557                     cloudx1_SetMetadata(instance, key.c_str(), value);
00558                 } else {
00559                     init_metadata.push_back( {key, value} );
00560                 }
00561             }
00562
00572         void SetMetadataMulti(const std::unordered_map<std::string, const char*>& list)
00573             {
00574                 if (instance) {
00575                     typedef const char* pchar;
00576                     pchar* keyvalue=new pchar[2*list.size()+1];
00577                     size_t n=0;
00578                     for (auto&& [key,value]: list) {
00579                         keyvalue[2*n+0]=key.c_str();
00580                         keyvalue[2*n+1]=value;
00581                         n++;
00582                     }
00583                     keyvalue[2*n+0]=nullptr;
00584
00585                     cloudx1_SetMetadataMulti(instance, keyvalue);
00586
00587                     delete[] keyvalue;
00588                 } else {
00589                     for (auto&& [key,value]: list) {
00590                         if (value) {
00591                             init_metadata.push_back( {key, value} );
00592                         }
00593                     }
00594                 }
00595             }
00596
00602         std::vector< std::tuple<std::string,std::string> > GetMetadataInfos()
00603             {
00604                 std::vector< std::tuple<std::string,std::string> > values;
00605                 const char** c_values = cloudx1_GetMetadataInfos(instance);
00606                 if (c_values) {
00607                     for (const char** c_value=c_values; *c_value; ) {
00608                         std::string key(*c_value);
00609                         c_value++;
00610                         if (*c_value) {
00611                             std::string descr(*c_value);
00612                             c_value++;
00613                             values.push_back( {key,descr} );
00614                         }
00615                     }
00616                     cloudx1_FreeMetadataInfos(instance, c_values);
00617                 }
00618                 return values;
00619             }
00620
00621         // Can be overloaded, called at start of UpdateThread in the thread
00622         virtual void OnUpdateThreadStart() {}
00623         // Can be overloaded to call at end of UpdateThread in the thread
00624         virtual void OnUpdateThreadStop() {}
00625
00626 #if CLOUDX1_HAS_WEBSERVER
00632         bool StartWebServer(int http_port, int https_port=0)
00633             {
00634                 assert(instance);
00635                 assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
00636                 webserver = cloudx1_Webserver(http_port,https_port,instance);
00637                 if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
00638                     return false;
00639                 }
00640                 int web_status=cloudx1_Webserver_Status(webserver);
00641                 if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
```

```
00642                     return false;
00643                 }
00644                 if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
00645                     return false;
00646                 }
00647                 return true;
00648             }
00654         void StopWebServer()
00655             {
00656                 if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
00657                     cloudx1_Webserver_Stop(webserver, 1000);
00658                     webserver = SOUND4_INVALID_WEBSERVER_ID;
00659                 }
00660             }
00661 #endif // CLOUDX1_HAS_WEBSERVER
00662
00669         int Terminate()
00670             {
00671                 if (!instance) return 0;
00672                 return cloudx1_TerminateProcess(instance);
00673             }
00674
00680         void Stop()
00681             {
00682                 if (!instance) return;
00683 #if CLOUDX1_HAS_WEBSERVER
00684                 StopWebServer();
00685 #endif // CLOUDX1_HAS_WEBSERVER
00686                 if (update_thread.joinable()) {
00687                     cloudx1_StopUpdateThread(instance); // this will exit the update thread
00688                     update_thread.join();
00689                 }
00690                 cloudx1_ExitProcess(instance);
00691                 instance=nullptr;
00692             }
00693
00699         unsigned int GetEstimatedDelay()
00700             {
00701                 assert(instance);
00702                 return cloudx1_GetEstimatedDelay(instance);
00703             }
00704
00715         std::array<float,InputSampleSize>& GetBufferIn()
00716             {
00717                 assert(instance);
00718                 float *buf=cloudx1_GetBufferIn(instance);
00719                 return reinterpret_cast< std::array<float,InputSampleSize>& >(*buf);
00720
00721             }
00732         std::array<float,OutputSampleSize>& GetBufferOut()
00733             {
00734                 assert(instance);
00735                 float *buf= cloudx1_GetBufferOut(instance);
00736                 return reinterpret_cast< std::array<float,OutputSampleSize>& >(*buf);
00737             }
00743         void ProcessAudio()
00744             {
00745                 assert(instance);
00746                 cloudx1_ProcessAudio(instance, cloudx1_GetBufferIn(instance),
    cloudx1_GetBufferOut(instance));
00747             }
00761         // void ProcessAudio_Planar(const std::array< const std::array<const float,ChunkFrames>,
    InputChannels>& input, std::array< std::array<float,ChunkFrames>, OutputChannels>& output)
00762         void ProcessAudio_Planar(float const * const *input, float * const *output)
00763             {
00764                 assert(instance);
00765                 cloudx1_ProcessAudio_Planar(instance, input, output);
00766             }
00767
00779             template<typename T>
00780         std::vector<T> ProcessAnyAudio(const std::vector<T> input)
00781             {
00782                 assert(instance);
00783                 std::vector<T> output;
00784                 unsigned int out_offset=0;
00785                 unsigned int in_offset=0;
00786                 unsigned int todo = input.size();
00787                 while (todo>0) {
00788                     unsigned int left = AddAudio(&input[in_offset], todo);
00789                     unsigned int out_avail = cloudx1_GetOutputCount(instance);
00790                     output.resize(out_offset + out_avail);
00791                     GetAudio(&output[out_offset], out_avail);
00792                     out_offset+=out_avail;
00793                     in_offset += todo-left;
00794                     todo=left;
00795                 }
00796                 return output;
```

```
00797             }
00798
00804         class CClient {
00805             public:
00806                 CClient(cloudx1_CInstance* instance)
00807                     {
00808                         assert(instance);
00809                         client=cloudx1_NewClient(instance);
00810                         if (!client) throw std::bad_alloc();
00811                     }
00812                 // non-copyable
00813                 CClient( const CInstance& ) = delete;
00814                 CClient& operator=( const CInstance& ) = delete;
00815                 ~CClient()
00816                     {
00817                         if (client) {
00818                             cloudx1_DeleteClient(client);
00819                             client=nullptr;
00820                         }
00821                     }
00829                 std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
00830                     {
00831                         assert(client);
00832                         int need_save=0;
00833                         const char *canswer = cloudx1_ProcessJson(client, request.c_str(),
    &need_save);
00834                         if (!canswer) return {};
00835                         std::string answer(canswer);
00836                         cloudx1_FreeJsonAnswer (canswer);
00837                         if (NeedSave) {
00838                             *NeedSave=(need_save!=0);
00839                         }
00840                         return answer;
00841                     }
00842             private:
00843                 cloudx1_CClientInstance *client = nullptr;
00844         };
00852         std::shared_ptr<CClient> NewClient()
00853             {
00854                 assert(instance);
00855                 return std::make_shared<CClient>(instance);
00856             }
00857
00858     protected:
00859             template<typename T>
00860         unsigned int AddAudio(const T* payload, unsigned int nFrame)
00861             {
00862                 assert(instance);
00863                 return cloudx1_AddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
    helper::SampleFormat<T>::format);
00864             }
00865             template<typename T>
00866         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
00867             {
00868                 assert(instance);
00869                 return cloudx1_GetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
    helper::SampleFormat<T>::format);
00870             }
00871
00872     private:
00873         cloudx1_CParameters* params = nullptr;
00874         cloudx1_CInstance* instance = nullptr;
00875         std::thread update_thread;
00876         std::vector< std::pair<std::string,std::string> > init_metadata;
00877 #if CLOUDX1_HAS_WEBSERVER
00878         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
00879 #endif // CLOUDX1_HAS_WEBSERVER
00880     };
00881
00882 }; // namespace cloudx1
00883 }; // namespace sound4
00884
00885 // bridge C callbacks to CPresetLoader
00886 extern "C" {
00887     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata) {
00888         sound4::cloudx1::CPresetLoader
    *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00889         std::string content=preset_loader->Read(filename);
00890         return strdup(content.c_str());
00891     }
00892     static void cloudx1_custom_reader_free(char *content, void* userdata) {
00893         if (!content) return;
00894         free(content);
00895     }
00896     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata) {
00897         sound4::cloudx1::CPresetLoader
    *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
```

```
00898         auto res=preset_loader->Write(filename,content);
00899         return res?0:-1;
00900     }
00901     static int cloudx1_custom_exists(const fs_char *filename, void* userdata) {
00902         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00903         auto res=preset_loader->Exists(filename);
00904         return res?0:-1;
00905     }
00906     static fs_char** cloudx1_custom_getall(void* userdata) {
00907         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00908         auto res=preset_loader->GetAll();
00909         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
00910         for (size_t n=0;n<res.size();n++) {
00911             all[n]=fs_strdup(res[n].c_str());
00912         }
00913         all[res.size()]=nullptr;
00914         return all;
00915     }
00916     static void cloudx1_custom_getall_free(fs_char** all, void* userdata) {
00917         if (!all) return;
00918         for (fs_char** one=all;*one;one++) {
00919             free(*one);
00920         }
00921         free(all);
00922     }
00923     static int cloudx1_custom_remove(const fs_char *filename, void* userdata) {
00924         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00925         auto res=preset_loader->Remove(filename);
00926         return res?0:-1;
00927     }
00928     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
00929         sound4::cloudx1::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00930         auto res=preset_loader->Rename(from,to);
00931         return res?0:-1;
00932     }
00933
00934 };
```

11.11 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.

- struct sound4::cloudx1::dyn::helper::SampleFormat< int16_t >
- struct sound4::cloudx1::dyn::helper::SampleFormat< int32_t >
- struct sound4::cloudx1::dyn::helper::SampleFormat< float >
- class sound4::cloudx1::dyn::CPresetLoader
- class sound4::cloudx1::dyn::CInstance
- class sound4::cloudx1::dyn::CInstance::CClient

Namespaces

- sound4
- sound4::cloudx1
- dyn
- sound4::cloudx1::dyn
- sound4::cloudx1::dyn::helper

Macros

- #define fs_strdup wcsdup

  helper for OS dependant file name copy

Typedefs

- using sound4::cloudx1::dyn::helper::DynLib_t = HMODULE
- using sound4::cloudx1::dyn::helper::DynFunc_t = FARPROC
- 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

Variables

- const size_t sound4::cloudx1::dyn::ChunkFrames =CLOUDX1_AUDIOFRAME_COUNT
- const size_t sound4::cloudx1::dyn::InputChannels =CLOUDX1_CHANNEL_COUNT∗CLOUDX1_AUDIO_INPUT_COUNT
- const size_t sound4::cloudx1::dyn::OutputChannels =CLOUDX1_CHANNEL_COUNT∗CLOUDX1_AUDIO_OUTPUT_COUNT
- 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 =CLOUDX1_SAMPLE_RATE

11.11.1 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.

11.11.2 Macro Definition Documentation

11.11.2.1 fs_strdup

```
#define fs_strdup wcsdup
```

Definition at line 36 of file sound4.x1.cloud_dyn.hpp.

11.12 sound4.x1.cloud_dyn.hpp

```
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 #ifdef __unix__
00021     #include <dlfcn.h>
00022 #elif defined(_WIN32)
00023     #include <libloaderapi.h>
00024 #else
00025     #error "Unsupported OS"
00026 #endif
00027
00028 // Needed to have function declarations
00029 #include "sound4.x1.cloud.h"
00030
00031
00032 #ifdef _WIN32
00033     #include <stringapiset.h>
00034     #include <wchar.h>
00036     #define fs_strdup wcsdup
00037 #else // !_WIN32
00039     #define fs_strdup strdup
00040 #endif // !_WIN32
00041
00042 // bridge C callbacks to CPresetLoader
00043 extern "C" {
00044     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata);
00045     static void cloudx1_custom_reader_free(char *content, void* userdata);
00046     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata);
00047     static int cloudx1_custom_exists(const fs_char *filename, void* userdata);
00048     static fs_char** cloudx1_custom_getall(void* userdata);
00049     static void cloudx1_custom_getall_free(fs_char** all, void* userdata);
00050     static int cloudx1_custom_remove(const fs_char *filename, void* userdata);
00051     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00052 };
00053
00057 namespace sound4 {
00061 namespace cloudx1 {
00065 namespace dyn {
00066
00070     namespace helper {
00071         // Storage definition, depending on OS
00072         #ifdef __unix__
00073             using DynLib_t = void *;
00074             using DynFunc_t = void *;
00075         #else
00076             using DynLib_t = HMODULE;
00077             using DynFunc_t = FARPROC;
00078         #endif
00079
00085             template <typename T>
00086         class DynFuncHolder {
00087         private:
00088             DynFunc_t m_ptr = NULL;
```

```
00089         public:
00090             DynFuncHolder() = default;
00091             DynFuncHolder(DynFunc_t a_ptr) : m_ptr(a_ptr) {}
00092             operator bool() const { return (m_ptr!=NULL); }
00093             bool IsOk() const { return m_ptr!=NULL; }
00094             operator T* () const { return reinterpret_cast<T*>(m_ptr); }
00095         };
00096 
00101         class CDynLoader {
00102             private:
00103                 DynLib_t m_lib {};
00104             public:
00105                 CDynLoader() = default;
00106                 CDynLoader(CDynLoader&&) = default;
00107                 // No copy allowed
00108                 CDynLoader(const CDynLoader&) = delete;
00109                 CDynLoader& operator=(CDynLoader const&) = delete;
00110                 operator bool() const {
00111                     return (m_lib!=NULL);
00112                 }
00113                 bool IsOk() const {
00114                     return (m_lib!=NULL);
00115                 }
00116                 #ifdef __unix__
00117                     void Close() {
00118                         if (IsOk()) {
00119                             #ifndef __SANITIZE_ADDRESS__ // avoid unloading to keep call stack
00120                             dlclose(m_lib);
00121                             #endif // __SANITIZE_ADDRESS__
00122                             m_lib=NULL;
00123                         }
00124                     }
00125                     bool Load(const std::filesystem::path& dynlib)
00126                     {
00127                         Close();
00128                         m_lib=dlopen(dynlib.c_str(), RTLD_NOW|RTLD_LOCAL);
00129                         return IsOk();
00130                     }
00131                         template <typename T>
00132                     DynFuncHolder<T> GetSymbol(const std::string& name) {
00133                         auto ptr=dlsym(m_lib, name.c_str());
00134                         if (!ptr) {
00135                             throw std::runtime_error("Missing function in library");
00136                         }
00137                         return DynFuncHolder<T>(ptr);
00138                     }
00139                         template <typename T>
00140                     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00141                         auto ptr=dlsym(m_lib, name.c_str());
00142                         return DynFuncHolder<T>(ptr);
00143                     }
00144                     static std::filesystem::path GetThisLibraryPath(void) {
00145                         static Dl_info info;
00146                         if (! dladdr((void *) GetThisLibraryPath, & info)) return {};
00147                         auto rp=realpath(info.dli_fname, NULL);
00148                         std::filesystem::path p(rp);
00149                         free(rp);
00150                         return p;
00151                     }
00152                 #else
00153                     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_
00154                     {
00155                         Close();
00156                         m_lib=LoadLibraryExW(dynlib.c_str(), NULL, loadflags);
00157                         return IsOk();
00158                     }
00159                     void Close() {
00160                         if (IsOk()) {
00161                             // NOTE: On Windows, FreeLibrary may create a lot of troubles, should use
    FreeLibraryAndExitThread but...
00162                             // So define SOUND4_CALL_FREELIBRARY before including this file if you
    really want to unload the library dynamically
00163                             #if defined(SOUND4_CALL_FREELIBRARYANDEXITTHREAD)
00164                                 FreeLibraryAndExitThread(m_lib, 0);
00165                             #elif defined(SOUND4_CALL_FREELIBRARY)
00166                                 FreeLibrary(m_lib);
00167                             #endif // SOUND4_CALL_FREELIBRARY
00168                             m_lib=NULL;
00169                         }
00170                     }
00171                         template <typename T>
00172                     DynFuncHolder<T> GetSymbol(const std::string& name) {
00173                         auto ptr=GetProcAddress(m_lib, name.c_str());
00174                         if (!ptr) {
00175                             throw std::runtime_error("Missing function in library");
00176                         }
```

```
00177                       return DynFuncHolder<T>(ptr);
00178                   }
00179                       template <typename T>
00180                   DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00181                       auto ptr=GetProcAddress(m_lib, name.c_str());
00182                       return DynFuncHolder<T>(ptr);
00183                   }
00184                   static std::filesystem::path GetThisLibraryPath(void) {
00185                       static wchar_t path[MAX_PATH]={};
00186                       HMODULE hm = NULL;
00187                       if (GetModuleHandleExW(GET_MODULE_HANDLE_EX_FLAG_FROM_ADDRESS |
00188                               GET_MODULE_HANDLE_EX_FLAG_UNCHANGED_REFCOUNT,
00189                               (LPCWSTR) &GetThisLibraryPath, &hm))
00190                       {
00191                           if (GetModuleFileNameW(hm, path, MAX_PATH) > 0) {
00192                               return std::filesystem::path(path);
00193                           }
00194                       }
00195                       return {};
00196                   }
00197               #endif
00198               virtual ~CDynLoader() {
00199                   Close();
00200               }
00201       }; // class CDynLoader
00202   }; // namespace helper
00203
00210   class CDynLib {
00211   private:
00212       helper::CDynLoader m_lib;
00213       bool m_bOK = false;
00214   public:
00215       CDynLib() = default;
00216
00217       // All those wrapped functions have the same signature as there C cloudx1_XXX
00218       helper::DynFuncHolder< decltype(cloudx1_GetVersion             ) > GetVersion             ;
00219       helper::DynFuncHolder< decltype(cloudx1_GetChunkSizeInFrames   ) > GetChunkSizeInFrames   ;
00220       helper::DynFuncHolder< decltype(cloudx1_GetChannelCount        ) > GetChannelCount        ;
00221       helper::DynFuncHolder< decltype(cloudx1_GetAudioInputCount     ) > GetAudioInputCount     ;
00222       helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount    ) > GetAudioOutputCount    ;
00223       helper::DynFuncHolder< decltype(cloudx1_GetSampleRate          ) > GetSampleRate          ;
00224       helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback      ) > SetLoggerCallback      ;
00225       helper::DynFuncHolder< decltype(cloudx1_SetLogSeverity         ) > SetLogSeverity         ;
00226       helper::DynFuncHolder< decltype(cloudx1_NewParameters          ) > NewParameters          ;
00227       helper::DynFuncHolder< decltype(cloudx1_FreeParameters         ) > FreeParameters         ;
00228       helper::DynFuncHolder< decltype(cloudx1_SetParameter           ) > SetParameter           ;
00229       helper::DynFuncHolder< decltype(cloudx1_GetParameter           ) > GetParameter           ;
00230       helper::DynFuncHolder< decltype(cloudx1_FreeParameterValue     ) > FreeParameterValue     ;
00231       helper::DynFuncHolder< decltype(cloudx1_InitProcess            ) > InitProcess            ;
00232       helper::DynFuncHolder< decltype(cloudx1_InitProcess2           ) > InitProcess2           ;
00233       helper::DynFuncHolder< decltype(cloudx1_TerminateProcess       ) > TerminateProcess       ;
00234       helper::DynFuncHolder< decltype(cloudx1_ExitProcess            ) > ExitProcess            ;
00235       helper::DynFuncHolder< decltype(cloudx1_StartUpdateThread      ) > StartUpdateThread      ;
00236       helper::DynFuncHolder< decltype(cloudx1_StopUpdateThread       ) > StopUpdateThread       ;
00237       helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady  ) > WaitUpdateThreadReady  ;
00238       helper::DynFuncHolder< decltype(cloudx1_ProcessAudio           ) > ProcessAudio           ;
00239       helper::DynFuncHolder< decltype(cloudx1_ProcessAudio_Planar    ) > ProcessAudio_Planar    ;
00240       helper::DynFuncHolder< decltype(cloudx1_GetBufferIn            ) > GetBufferIn            ;
00241       helper::DynFuncHolder< decltype(cloudx1_GetBufferOut           ) > GetBufferOut           ;
00242       helper::DynFuncHolder< decltype(cloudx1_GetEstimatedDelay      ) > GetEstimatedDelay      ;
00243       helper::DynFuncHolder< decltype(cloudx1_GetFormatName          ) > GetFormatName          ;
00244       helper::DynFuncHolder< decltype(cloudx1_GetFormatFromName      ) > GetFormatFromName      ;
00245       helper::DynFuncHolder< decltype(cloudx1_GetBytesFromFormat     ) > GetBytesFromFormat     ;
00246       helper::DynFuncHolder< decltype(cloudx1_GetMaxPacketFrame      ) > GetMaxPacketFrame      ;
00247       helper::DynFuncHolder< decltype(cloudx1_AddAudio               ) > AddAudio               ;
00248       helper::DynFuncHolder< decltype(cloudx1_AddPadAudio            ) > AddPadAudio            ;
00249       helper::DynFuncHolder< decltype(cloudx1_GetOutputCount         ) > GetOutputCount         ;
00250       helper::DynFuncHolder< decltype(cloudx1_GetAudio               ) > GetAudio               ;
00251       helper::DynFuncHolder< decltype(cloudx1_AudioConvertFrom       ) > AudioConvertFrom       ;
00252       helper::DynFuncHolder< decltype(cloudx1_AudioConvertTo         ) > AudioConvertTo         ;
00253       helper::DynFuncHolder< decltype(cloudx1_StereoToMono           ) > StereoToMono           ;
00254       helper::DynFuncHolder< decltype(cloudx1_MonoToStereo           ) > MonoToStereo           ;
00255       helper::DynFuncHolder< decltype(cloudx1_AudioMonoFromLiveStereo) > AudioMonoFromLiveStereo;
00256       helper::DynFuncHolder< decltype(cloudx1_AudioMonoToLiveStereo  ) > AudioMonoToLiveStereo  ;
00257       helper::DynFuncHolder< decltype(cloudx1_NewClient              ) > NewClient              ;
00258       helper::DynFuncHolder< decltype(cloudx1_DeleteClient           ) > DeleteClient           ;
00259       helper::DynFuncHolder< decltype(cloudx1_ProcessJson            ) > ProcessJson            ;
00260       helper::DynFuncHolder< decltype(cloudx1_FreeJsonAnswer         ) > FreeJsonAnswer         ;
00261       helper::DynFuncHolder< decltype(cloudx1_SaveState              ) > SaveState              ;
00262 #if CLOUDX1_HAS_WEBSERVER
00263       helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp          ) > Webserver_tcp          ;
00264       helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp2         ) > Webserver_tcp2         ;
00265       helper::DynFuncHolder< decltype(cloudx1_Webserver              ) > Webserver              ;
00266       helper::DynFuncHolder< decltype(cloudx1_Webserver_Stop         ) > Webserver_Stop         ;
00267       helper::DynFuncHolder< decltype(cloudx1_Webserver_Status       ) > Webserver_Status       ;
00268 #endif // CLOUDX1_HAS_WEBSERVER
00269
```

```
00270         // added 2023-03-22
00271         helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar    ) > StereoToMono_Planar    ;
00272         helper::DynFuncHolder< decltype(cloudx1_MonoToStereo_Planar    ) > MonoToStereo_Planar    ;
00273 
00274         // added 2023-05-22
00275         helper::DynFuncHolder< decltype(cloudx1_SetMetadata            ) > SetMetadata            ;
00276         helper::DynFuncHolder< decltype(cloudx1_GetMetadataInfos       ) > GetMetadataInfos       ;
00277         helper::DynFuncHolder< decltype(cloudx1_FreeMetadataInfos      ) > FreeMetadataInfos      ;
00278 
00279         // added 2023-06-20
00280         helper::DynFuncHolder< decltype(cloudx1_SetPresetManager               ) > SetPresetManager
     ;
00281         helper::DynFuncHolder< decltype(cloudx1_PresetManager_InformChange     ) >
    PresetManager_InformChange      ;
00282 
00283         // added 2023-09-21
00284         helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames    ) >
    GetPossibleChunkSizeInFrames   ;
00285         helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames          ) >
    GetProcessChunkFrames   ;
00286         helper::DynFuncHolder< decltype(cloudx1_InitProcess3                   ) > InitProcess3
     ;
00287 
00288 #if CLOUDX1_HAS_CLOUDBUS
00289         // added 2023-06-26
00290         helper::DynFuncHolder< decltype(cloudx1_NewBus                 ) > NewBus      ;
00291         helper::DynFuncHolder< decltype(cloudx1_FreeBus                ) > FreeBus      ;
00292         helper::DynFuncHolder< decltype(cloudx1_SetInstanceBus         ) > SetInstanceBus      ;
00293 #endif // CLOUDX1_HAS_CLOUDBUS
00294 
00295         // added 2024-02-19
00296         helper::DynFuncHolder< decltype(cloudx1_SetMetadataMulti       ) > SetMetadataMulti         ;
00297 
00305         bool Load(const std::filesystem::path& path = {}) {
00306             std::string filename;
00307             #ifdef __unix__
00308                 filename="libsound4.x1.cloud.so";
00309             #else
00310                 filename="sound4.x1.cloud.dll";
00311             #endif
00312             m_lib.Close();
00313             // If a path is given, use it directly and do not try other path
00314             if (!path.empty() && !m_lib.Load(path / filename)) {
00315                 return false;
00316             } else if (!m_lib.IsOk()) {
00317                 auto thisdir=helper::CDynLoader::GetThisLibraryPath().parent_path();
00318                 #ifndef _WIN32
00319                 // Linux: if in a bin directory, try ../lib first
00320                 if (!m_lib.IsOk() && thisdir.filename()=="bin") {
00321                     auto libdir = thisdir.parent_path() / "lib";
00322                     m_lib.Load(libdir / filename);
00323                 }
00324                 #endif // !_WIN32
00325                 if (!m_lib.IsOk()) {
00326                     // Search in the same directory this code is in
00327                     m_lib.Load(thisdir / filename);
00328                 }
00329                 if (!m_lib.IsOk()) {
00330                     // Try current path
00331                     m_lib.Load(std::filesystem::current_path() / filename);
00332                 }
00333                 if (!m_lib.IsOk()) {
00334                     return false;
00335                 }
00336             }
00337             // Load all C functions
00338             try {
00339                 GetVersion              = m_lib.GetSymbol< decltype(cloudx1_GetVersion             )
    >("cloudx1_GetVersion"            );
00340                 GetChunkSizeInFrames    = m_lib.GetSymbol< decltype(cloudx1_GetChunkSizeInFrames   )
    >("cloudx1_GetChunkSizeInFrames"   );
00341                 GetChannelCount         = m_lib.GetSymbol< decltype(cloudx1_GetChannelCount        )
    >("cloudx1_GetChannelCount"        );
00342                 GetAudioInputCount      = m_lib.GetSymbol< decltype(cloudx1_GetAudioInputCount     )
    >("cloudx1_GetAudioInputCount"     );
00343                 GetAudioOutputCount     = m_lib.GetSymbol< decltype(cloudx1_GetAudioOutputCount    )
    >("cloudx1_GetAudioOutputCount"    );
00344                 GetSampleRate           = m_lib.GetSymbol< decltype(cloudx1_GetSampleRate          )
    >("cloudx1_GetSampleRate"          );
00345                 SetLoggerCallback       = m_lib.GetSymbol< decltype(cloudx1_SetLoggerCallback      )
    >("cloudx1_SetLoggerCallback"      );
00346                 SetLogSeverity          = m_lib.GetSymbol< decltype(cloudx1_SetLogSeverity         )
    >("cloudx1_SetLogSeverity"         );
00347                 NewParameters           = m_lib.GetSymbol< decltype(cloudx1_NewParameters          )
    >("cloudx1_NewParameters"          );
00348                 FreeParameters          = m_lib.GetSymbol< decltype(cloudx1_FreeParameters         )
    >("cloudx1_FreeParameters"         );
```

```
00349                 SetParameter            = m_lib.GetSymbol< decltype(cloudx1_SetParameter           )
      >("cloudx1_SetParameter"           );
00350                 GetParameter            = m_lib.GetSymbol< decltype(cloudx1_GetParameter           )
      >("cloudx1_GetParameter"           );
00351                 FreeParameterValue      = m_lib.GetSymbol< decltype(cloudx1_FreeParameterValue     )
      >("cloudx1_FreeParameterValue"     );
00352                 InitProcess             = m_lib.GetSymbol< decltype(cloudx1_InitProcess            )
      >("cloudx1_InitProcess"            );
00353                 InitProcess2            = m_lib.GetSymbol< decltype(cloudx1_InitProcess2           )
      >("cloudx1_InitProcess2"           );
00354                 TerminateProcess        = m_lib.GetSymbol< decltype(cloudx1_TerminateProcess       )
      >("cloudx1_TerminateProcess"       );
00355                 ExitProcess             = m_lib.GetSymbol< decltype(cloudx1_ExitProcess            )
      >("cloudx1_ExitProcess"            );
00356                 StartUpdateThread       = m_lib.GetSymbol< decltype(cloudx1_StartUpdateThread      )
      >("cloudx1_StartUpdateThread"      );
00357                 StopUpdateThread        = m_lib.GetSymbol< decltype(cloudx1_StopUpdateThread       )
      >("cloudx1_StopUpdateThread"       );
00358                 WaitUpdateThreadReady   = m_lib.GetSymbol< decltype(cloudx1_WaitUpdateThreadReady  )
      >("cloudx1_WaitUpdateThreadReady"  );
00359                 ProcessAudio            = m_lib.GetSymbol< decltype(cloudx1_ProcessAudio           )
      >("cloudx1_ProcessAudio"           );
00360                 ProcessAudio_Planar     = m_lib.GetSymbol< decltype(cloudx1_ProcessAudio_Planar    )
      >("cloudx1_ProcessAudio_Planar"    );
00361                 GetBufferIn             = m_lib.GetSymbol< decltype(cloudx1_GetBufferIn            )
      >("cloudx1_GetBufferIn"            );
00362                 GetBufferOut            = m_lib.GetSymbol< decltype(cloudx1_GetBufferOut           )
      >("cloudx1_GetBufferOut"           );
00363                 GetEstimatedDelay       = m_lib.GetSymbol< decltype(cloudx1_GetEstimatedDelay      )
      >("cloudx1_GetEstimatedDelay"      );
00364                 GetFormatName           = m_lib.GetSymbol< decltype(cloudx1_GetFormatName          )
      >("cloudx1_GetFormatName"          );
00365                 GetFormatFromName       = m_lib.GetSymbol< decltype(cloudx1_GetFormatFromName      )
      >("cloudx1_GetFormatFromName"      );
00366                 GetBytesFromFormat      = m_lib.GetSymbol< decltype(cloudx1_GetBytesFromFormat     )
      >("cloudx1_GetBytesFromFormat"     );
00367                 GetMaxPacketFrame       = m_lib.GetSymbol< decltype(cloudx1_GetMaxPacketFrame      )
      >("cloudx1_GetMaxPacketFrame"      );
00368                 AddAudio                = m_lib.GetSymbol< decltype(cloudx1_AddAudio               )
      >("cloudx1_AddAudio"               );
00369                 AddPadAudio             = m_lib.GetSymbol< decltype(cloudx1_AddPadAudio            )
      >("cloudx1_AddPadAudio"            );
00370                 GetOutputCount          = m_lib.GetSymbol< decltype(cloudx1_GetOutputCount         )
      >("cloudx1_GetOutputCount"         );
00371                 GetAudio                = m_lib.GetSymbol< decltype(cloudx1_GetAudio               )
      >("cloudx1_GetAudio"               );
00372                 AudioConvertFrom        = m_lib.GetSymbol< decltype(cloudx1_AudioConvertFrom       )
      >("cloudx1_AudioConvertFrom"       );
00373                 AudioConvertTo          = m_lib.GetSymbol< decltype(cloudx1_AudioConvertTo         )
      >("cloudx1_AudioConvertTo"         );
00374                 StereoToMono            = m_lib.GetSymbol< decltype(cloudx1_StereoToMono           )
      >("cloudx1_StereoToMono"           );
00375                 MonoToStereo            = m_lib.GetSymbol< decltype(cloudx1_MonoToStereo           )
      >("cloudx1_MonoToStereo"           );
00376                 AudioMonoFromLiveStereo = m_lib.GetSymbol< decltype(cloudx1_AudioMonoFromLiveStereo)
      >("cloudx1_AudioMonoFromLiveStereo");
00377                 AudioMonoToLiveStereo   = m_lib.GetSymbol< decltype(cloudx1_AudioMonoToLiveStereo  )
      >("cloudx1_AudioMonoToLiveStereo"  );
00378                 NewClient               = m_lib.GetSymbol< decltype(cloudx1_NewClient              )
      >("cloudx1_NewClient"              );
00379                 DeleteClient            = m_lib.GetSymbol< decltype(cloudx1_DeleteClient           )
      >("cloudx1_DeleteClient"           );
00380                 ProcessJson             = m_lib.GetSymbol< decltype(cloudx1_ProcessJson            )
      >("cloudx1_ProcessJson"            );
00381                 FreeJsonAnswer          = m_lib.GetSymbol< decltype(cloudx1_FreeJsonAnswer         )
      >("cloudx1_FreeJsonAnswer"         );
00382                 SaveState               = m_lib.GetSymbol< decltype(cloudx1_SaveState              )
      >("cloudx1_SaveState"              );
00383 #if CLOUDX1_HAS_WEBSERVER
00384                 Webserver_tcp           = m_lib.GetSymbol< decltype(cloudx1_Webserver_tcp          )
      >("cloudx1_Webserver_tcp"          );
00385                 Webserver_tcp2          = m_lib.GetSymbol< decltype(cloudx1_Webserver_tcp2         )
      >("cloudx1_Webserver_tcp2"         );
00386                 Webserver               = m_lib.GetSymbol< decltype(cloudx1_Webserver              )
      >("cloudx1_Webserver"              );
00387                 Webserver_Stop          = m_lib.GetSymbol< decltype(cloudx1_Webserver_Stop         )
      >("cloudx1_Webserver_Stop"         );
00388                 Webserver_Status        = m_lib.GetSymbol< decltype(cloudx1_Webserver_Status       )
      >("cloudx1_Webserver_Status"       );
00389 #endif // CLOUDX1_HAS_WEBSERVER
00390
00391                 // added 2023-03-22
00392                 StereoToMono_Planar     = m_lib.GetSymbol< decltype(cloudx1_StereoToMono_Planar    )
      >("cloudx1_StereoToMono_Planar"    );
00393                 MonoToStereo_Planar     = m_lib.GetSymbol< decltype(cloudx1_MonoToStereo_Planar    )
      >("cloudx1_MonoToStereo_Planar"    );
00394
```

```
00395             } catch (std::runtime_error& ) {
00396                 return false;
00397             }
00398             // C functions allowed to be missing
00399             try {
00400                 // added 2023-05-22
00401                 SetMetadata             = m_lib.GetSymbol< decltype(cloudx1_SetMetadata            )
      >("cloudx1_SetMetadata"           );
00402                 GetMetadataInfos        = m_lib.GetSymbol< decltype(cloudx1_GetMetadataInfos       )
      >("cloudx1_GetMetadataInfos"      );
00403                 FreeMetadataInfos       = m_lib.GetSymbol< decltype(cloudx1_FreeMetadataInfos      )
      >("cloudx1_FreeMetadataInfos"     );
00404                 // added 2023-06-20
00405                 SetPresetManager            = m_lib.GetSymbol< decltype(cloudx1_SetPresetManager
          ) >("cloudx1_SetPresetManager"            );
00406                 PresetManager_InformChange  = m_lib.GetSymbol<
      decltype(cloudx1_PresetManager_InformChange     ) >("cloudx1_PresetManager_InformChange"    );
00407
00408                 // added 2023-09-21
00409                 GetPossibleChunkSizeInFrames = m_lib.GetSymbol<
      decltype(cloudx1_GetPossibleChunkSizeInFrames  ) >("cloudx1_GetPossibleChunkSizeInFrames"  );
00410                 GetProcessChunkFrames        = m_lib.GetSymbol< decltype(cloudx1_GetProcessChunkFrames
          ) >("cloudx1_GetProcessChunkFrames"       );
00411                 InitProcess3                 = m_lib.GetSymbol< decltype(cloudx1_InitProcess3
          ) >("cloudx1_InitProcess3"                );
00412
00413 #if CLOUDX1_HAS_CLOUDBUS
00414                 // added 2023-06-26
00415                 NewBus                  = m_lib.GetSymbol< decltype(cloudx1_NewBus                 )
      >("cloudx1_NewBus"                );
00416                 FreeBus                 = m_lib.GetSymbol< decltype(cloudx1_FreeBus                )
      >("cloudx1_FreeBus"               );
00417                 SetInstanceBus          = m_lib.GetSymbol< decltype(cloudx1_SetInstanceBus         )
      >("cloudx1_SetInstanceBus"        );
00418 #endif // CLOUDX1_HAS_CLOUDBUS
00419
00420                 // added 2024-02-19
00421                 SetMetadataMulti        = m_lib.GetSymbol< decltype(cloudx1_SetMetadataMulti       )
      >("cloudx1_SetMetadataMulti"      );
00422
00423             }  catch (std::runtime_error& ) {
00424                 // Ignored, handler will take care
00425             }
00426
00427             m_bOK=true;
00428             return true;
00429         }
00436         bool IsOk() const {
00437             return m_bOK;
00438         }
00439
00440     };
00441
00442
00443
00444     static constexpr const char *process_name = "SOUND4 x1.CLOUD";
00445     static constexpr const char *process_shortname = "x1";
00446     using SampleFormat = cloudx1_SampleFormat;
00450     const size_t ChunkFrames=CLOUDX1_AUDIOFRAME_COUNT;
00454     const size_t InputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_INPUT_COUNT;
00458     const size_t OutputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_OUTPUT_COUNT;
00462     const size_t InputSampleSize=ChunkFrames*InputChannels;
00466     const size_t OutputSampleSize=ChunkFrames*OutputChannels;
00470     const size_t SampleRate=CLOUDX1_SAMPLE_RATE;
00471
00475     namespace helper {
00476         #ifdef _WIN32
00482         static inline std::string WStringToUTF8(const std::wstring& wstr) {
00483             if (wstr.empty()) return {};
00484             int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL,
      NULL);
00485             std::string str(size, 0);
00486             WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00487             return str;
00488         }
00494         static inline std::wstring UTF8ToWString(const std::string& str) {
00495             if (str.empty()) return std::wstring();
00496             int size = MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), NULL, 0);
00497             std::wstring wstr(size, 0);
00498             MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), &wstr[0], size);
00499             return wstr;
00500         }
00501         #endif // _WIN32
00502
00508             template<typename T>
00509         struct SampleFormat {
00510         };
```

```
00511             template<>
00512         struct SampleFormat<int16_t> {
00513             const cloudx1_SampleFormat format = S16_NATIVE;
00514         };
00515             template<>
00516         struct SampleFormat<int32_t> {
00517             const cloudx1_SampleFormat format = S32_NATIVE;
00518         };
00519             template<>
00520         struct SampleFormat<float> {
00521             const cloudx1_SampleFormat format = F32_NATIVE;
00522         };
00523 
00524 
00529         static inline void AudioConvertFrom(CDynLib& dynlib, const uint8_t *payload, float *output,
      size_t nSpl, cloudx1_SampleFormat fmt) {
00530             dynlib.AudioConvertFrom(payload, output, nSpl, fmt);
00531         }
00532         static inline void AudioConvertTo(CDynLib& dynlib, const float *input, uint8_t *payload,
      size_t nSpl, cloudx1_SampleFormat fmt) {
00533             dynlib.AudioConvertTo(input, payload, nSpl, fmt);
00534         }
00535         static inline void StereoToMono(CDynLib& dynlib, const float *input, float *output, size_t
      nSpl) {
00536             dynlib.StereoToMono(input, output, nSpl);
00537         }
00538         static inline void MonoToStereo(CDynLib& dynlib, const float *input, float *output, size_t
      nSpl) {
00539             dynlib.MonoToStereo(input, output, nSpl);
00540         }
00541         static inline void StereoToMono_Planar(CDynLib& dynlib, const float *inputL, const float
     *inputR, float *output, size_t nSpl) {
00542             dynlib.StereoToMono_Planar(inputL, inputR, output, nSpl);
00543         }
00544         static inline void MonoToStereo_Planar(CDynLib& dynlib, const float *input, float *outputL,
      float *outputR, size_t nSpl) {
00545             dynlib.MonoToStereo_Planar(input, outputL, outputR, nSpl);
00546         }
00547         static inline void AudioMonoFromLiveStereo(CDynLib& dynlib, const uint8_t *payload, float
     *output) {
00548             dynlib.AudioMonoFromLiveStereo(payload, output);
00549         }
00550         static inline void AudioMonoToLiveStereo(CDynLib& dynlib, const float *input, uint8_t
     *payload) {
00551             dynlib.AudioMonoToLiveStereo(input, payload);
00552         }
00553 
00554     }; // namespace helper
00555 
00561     static inline std::string GetVersion(CDynLib& dynlib)
00562         {
00563             return std::string(dynlib.GetVersion());
00564         }
00565 
00576     static inline unsigned int GetChunkSizeInFrames(CDynLib& dynlib)
00577         {
00578             return dynlib.GetChunkSizeInFrames();
00579         }
00580 
00589     static inline std::vector<unsigned int> GetPossibleChunkSizeInFrames(CDynLib& dynlib)
00590         {
00591             std::vector<unsigned int> list;
00592             if (dynlib.GetPossibleChunkSizeInFrames) {
00593                 for (unsigned int* src=dynlib.GetPossibleChunkSizeInFrames();*src;src++) {
00594                     list.push_back(*src);
00595                 }
00596             } else {
00597                 list.push_back(64);
00598             }
00599             return list;
00600         }
00601 
00609     static inline unsigned int GetChannelCount(CDynLib& dynlib)
00610         {
00611             return dynlib.GetChannelCount();
00612         }
00613 
00622     static inline unsigned int GetAudioInputCount(CDynLib& dynlib)
00623         {
00624             return dynlib.GetAudioInputCount();
00625         }
00626 
00635     static inline unsigned int GetAudioOutputCount(CDynLib& dynlib)
00636         {
00637             return dynlib.GetAudioOutputCount();
00638         }
00639 
```

```
00647     static inline unsigned int GetSampleRate(CDynLib& dynlib)
00648         {
00649             return dynlib.GetSampleRate();
00650         }
00651
00657     static inline void SanityCheck(CDynLib& dynlib, bool a_bCheckFrames = true)
00658     {
00659         // Do some sanity checks
00660         if (dynlib.GetSampleRate()!=CLOUDX1_SAMPLE_RATE) {
00661             throw std::runtime_error("Bad library sampling rate");
00662         }
00663         if (a_bCheckFrames && dynlib.GetChunkSizeInFrames()!=ChunkFrames) {
00664             throw std::runtime_error("Bad library frame size");
00665         }
00666         if (dynlib.GetChannelCount()!=CLOUDX1_CHANNEL_COUNT) {
00667             throw std::runtime_error("Bad library channel count");
00668         }
00669         if (dynlib.GetAudioInputCount()!=CLOUDX1_AUDIO_INPUT_COUNT) {
00670             throw std::runtime_error("Bad library input count");
00671         }
00672         if (dynlib.GetAudioOutputCount()!=CLOUDX1_AUDIO_OUTPUT_COUNT) {
00673             throw std::runtime_error("Bad library output count");
00674         }
00675     }
00676
00683     static inline std::string GetFormatName(CDynLib& dynlib, const SampleFormat fmt)
00684         {
00685             return std::string(dynlib.GetFormatName(fmt));
00686         }
00687
00694     static inline SampleFormat GetFormatFromName(CDynLib& dynlib, const std::string& name)
00695         {
00696             return dynlib.GetFormatFromName(name.c_str());
00697         }
00698
00705     static inline unsigned int GetBytesFromFormat(CDynLib& dynlib, const SampleFormat fmt)
00706         {
00707             return dynlib.GetBytesFromFormat(fmt);
00708         }
00709
00713     using LogSeverity = cloudx1_LogSeverity;
00717     using log_cb_t = std::function<void(LogSeverity,const std::string&)>;
00718
00722     static log_cb_t _log_cb;
00723     extern "C" {
00724         static inline void _log_cb_c(cloudx1_LogSeverity severity, const char *c_msg) {
00725             _log_cb(severity, std::string(c_msg));
00726         }
00727     }
00731     static inline void SetLogSeverity(CDynLib& dynlib, LogSeverity severity)
00732         {
00733             dynlib.SetLogSeverity(severity);
00734         }
00738     static inline void SetLoggerCallback(CDynLib& dynlib, log_cb_t cb)
00739         {
00740             _log_cb=cb;
00741             dynlib.SetLoggerCallback(&_log_cb_c);
00742         }
00743
00744 #if CLOUDX1_HAS_CLOUDBUS
00745     class CBus {
00746         public:
00747             CBus(CDynLib& dynlib)
00748                 : m_dynlib(dynlib)
00749                 {
00750                     if (m_dynlib.NewBus) {
00751                         m_bus=m_dynlib.NewBus();
00752                     }
00753                 }
00754             ~CBus()
00755                 {
00756                     if (m_bus && m_dynlib.FreeBus) {
00757                         m_dynlib.FreeBus(m_bus);
00758                     }
00759                     m_bus = nullptr;
00760                 }
00761             cloudx1_CBus *Get() const { return m_bus; }
00762         private:
00763             CDynLib& m_dynlib;
00764             cloudx1_CBus *m_bus;
00765     };
00766 #endif // CLOUDX1_HAS_CLOUDBUS
00767
00772     class CPresetLoader {
00773     public:
00774         CPresetLoader() = default;
00775         virtual ~CPresetLoader() = default;
```

```
00776
00777         virtual bool IsReadOnly() = 0;
00778         virtual bool Exists(const std::filesystem::path &name) = 0;
00779         virtual bool Remove(const std::filesystem::path &name) = 0;
00780         virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) = 0;
00781         virtual std::vector<std::filesystem::path> GetAll() = 0;
00782         virtual std::string Read(const std::filesystem::path &filename) = 0;
00783         virtual bool Write(const std::filesystem::path &filename, const std::string &content) =0;
00784     };
00785     using PresetChange_Kind = cloudx1_PresetChange_Kind;
00786
00790     class CInstance {
00791     public:
00795         CInstance(CDynLib& dynlib)
00796         : m_dynlib(dynlib)
00797             {
00798                 params = m_dynlib.NewParameters();
00799                 if (!params) throw std::bad_alloc();
00800             }
00801         // non-copyable
00802         CInstance( const CInstance& ) = delete;
00803         CInstance& operator=( const CInstance& ) = delete;
00807         ~CInstance()
00808             {
00809                 Stop();
00810                 if (params) m_dynlib.FreeParameters(params);
00811             }
00815        bool IsOk() const { return instance!=nullptr; }
00823         void SetParam(const std::string& name, const std::string& value)
00824             {
00825                 assert(params);
00826                 m_dynlib.SetParameter(params, name.c_str(), value.c_str());
00827             }
00833         std::string GetParam(const std::string& name)
00834             {
00835                 assert(params);
00836                 auto c_value=m_dynlib.GetParameter(params, name.c_str());
00837                 std::string ret(c_value);
00838                 m_dynlib.FreeParameterValue(c_value);
00839                 return ret;
00840             }
00841 #if CLOUDX1_HAS_CLOUDBUS
00845             void SetBus(const CBus& bus) {
00846                 assert(params);
00847                 if (m_dynlib.SetInstanceBus) {
00848                     m_dynlib.SetInstanceBus(params,bus.Get());
00849                 }
00850             }
00851 #endif // CLOUDX1_HAS_CLOUDBUS
00852
00862         void SetPresetManager(CPresetLoader *preset_manager)
00863             {
00864                 if (!preset_manager) return;
00865                 if (!m_dynlib.SetPresetManager) return;
00866                 assert(params);
00867                 m_dynlib.SetPresetManager(params,
00868                     cloudx1_custom_reader,
00869                     cloudx1_custom_reader_free,
00870                     cloudx1_custom_writer,
00871                     cloudx1_custom_exists,
00872                     cloudx1_custom_getall,
00873                     cloudx1_custom_getall_free,
00874                     cloudx1_custom_remove,
00875                     cloudx1_custom_rename,
00876                     preset_manager->IsReadOnly(),
00877                     preset_manager
00878                 );
00879             }
00880
00895         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)
00896             {
00897                 assert(!instance);
00898                 std::string l_save_path;
00899                 if (!save_path.empty()) {
00900                     l_save_path = save_path.u8string();
00901                 }
00902                 if (m_dynlib.InitProcess3) {
00903                     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);
00904                 } else if (frames_per_chunk!=64) {
00905                     return false;
00906                 } else {
00907                     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);
00908                 }
```

```
00909                 if (!instance) return false;
00910                 if (!init_metadata.empty()) {
00911                     for (auto&& [key,value]: init_metadata) {
00912                         m_dynlib.SetMetadata(instance, key.c_str(), value.c_str());
00913                     }
00914                     init_metadata.clear();
00915                 }
00916                 update_thread = std::thread([this, json_port](){
00917                     OnUpdateThreadStart();
00918                     m_dynlib.StartUpdateThread(instance, json_port);
00919                     OnUpdateThreadStop();
00920                 });
00921                 int timeout=5000;
00922                 #ifdef DEBUG
00923                     timeout=60*1000; // For debugger pauses
00924                 #endif
00925                 if (m_dynlib.WaitUpdateThreadReady(instance, timeout)<0) {
00926                     return false;
00927                 }
00928                 return true;
00929             }
00930
00938         unsigned int GetChunkFrames() {
00939             if (instance && m_dynlib.GetProcessChunkFrames) {
00940                 return m_dynlib.GetProcessChunkFrames(instance);
00941             }
00942             return 64;
00943         }
00944
00952         void PresetManager_InformChange(const std::filesystem::path& relative_path, PresetChange_Kind
    change_kind)
00953             {
00954                 if (m_dynlib.PresetManager_InformChange) {
00955                     m_dynlib.PresetManager_InformChange(instance, relative_path.c_str(),
    (cloudx1_PresetChange_Kind) change_kind);
00956                 }
00957             }
00958
00970         void SetMetadata(const std::string& key, const char* value)
00971             {
00972                 if (m_dynlib.SetMetadata) {
00973                     if (instance) {
00974                         m_dynlib.SetMetadata(instance, key.c_str(), value);
00975                     } else {
00976                         init_metadata.push_back( {key, value} );
00977                     }
00978                 }
00979             }
00980
00981
00991         void SetMetadataMulti(const std::unordered_map<std::string, const char*>& list)
00992             {
00993                 if (instance) {
00994                     if (m_dynlib.SetMetadataMulti) {
00995                         typedef const char* pchar;
00996                         pchar* keyvalue=new pchar[2*list.size()+1];
00997                         size_t n=0;
00998                         for (auto&& [key,value]: list) {
00999                             keyvalue[2*n+0]=key.c_str();
01000                             keyvalue[2*n+1]=value;
01001                             n++;
01002                         }
01003                         keyvalue[2*n+0]=nullptr;
01004
01005                         cloudx1_SetMetadataMulti(instance, keyvalue);
01006
01007                         delete[] keyvalue;
01008                     } else {
01009                         for (auto&& [key,value]: list) {
01010                             SetMetadata(key, value);
01011                         }
01012                     }
01013                 } else {
01014                     for (auto&& [key,value]: list) {
01015                         if (value) {
01016                             init_metadata.push_back( {key, value} );
01017                         }
01018                     }
01019                 }
01020             }
01021
01027         std::vector< std::tuple<std::string,std::string> > GetMetadataInfos()
01028             {
01029                 std::vector< std::tuple<std::string,std::string> > values;
01030                 if (m_dynlib.GetMetadataInfos) {
01031                     const char** c_values = m_dynlib.GetMetadataInfos(instance);
01032                     if (c_values) {
```

```
01033                         for (const char** c_value=c_values; *c_value; ) {
01034                             std::string key(*c_value);
01035                             c_value++;
01036                             if (*c_value) {
01037                                 std::string descr(*c_value);
01038                                 c_value++;
01039                                 values.push_back( {key,descr} );
01040                             }
01041                         }
01042                         m_dynlib.FreeMetadataInfos(instance, c_values);
01043                     }
01044                 }
01045                 return values;
01046             }
01047
01048         // Can be overloaded, called at start of UpdateThread in the thread
01049         virtual void OnUpdateThreadStart() {}
01050         // Can be overloaded to call at end of UpdateThread in the thread
01051         virtual void OnUpdateThreadStop() {}
01052
01053 #if CLOUDX1_HAS_WEBSERVER
01059         bool StartWebServer(int http_port, int https_port=0)
01060             {
01061                 assert(instance);
01062                 assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
01063                 webserver = m_dynlib.Webserver(http_port,https_port,instance);
01064                 if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
01065                     return false;
01066                 }
01067                 int web_status=m_dynlib.Webserver_Status(webserver);
01068                 if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
01069                     return false;
01070                 }
01071                 if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
01072                     return false;
01073                 }
01074                 return true;
01075             }
01081         void StopWebServer()
01082             {
01083                 if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
01084                     m_dynlib.Webserver_Stop(webserver, 1000);
01085                     webserver = SOUND4_INVALID_WEBSERVER_ID;
01086                 }
01087             }
01088 #endif // CLOUDX1_HAS_WEBSERVER
01089
01096         int Terminate()
01097             {
01098                 if (!instance) return 0;
01099                 return m_dynlib.TerminateProcess(instance);
01100             }
01101
01107         void Stop()
01108             {
01109                 if (!instance) return;
01110 #if CLOUDX1_HAS_WEBSERVER
01111                 StopWebServer();
01112 #endif // CLOUDX1_HAS_WEBSERVER
01113                 if (update_thread.joinable()) {
01114                     m_dynlib.StopUpdateThread(instance); // this will exit the update thread
01115                     update_thread.join();
01116                 }
01117                 m_dynlib.ExitProcess(instance);
01118                 instance=nullptr;
01119             }
01120
01126         unsigned int GetEstimatedDelay()
01127             {
01128                 assert(instance);
01129                 return m_dynlib.GetEstimatedDelay(instance);
01130             }
01131
01142         std::array<float,InputSampleSize>& GetBufferIn()
01143             {
01144                 assert(instance);
01145                 float *buf=m_dynlib.GetBufferIn(instance);
01146                 return reinterpret_cast< std::array<float,InputSampleSize>& >(*buf);
01147
01148             }
01159         std::array<float,OutputSampleSize>& GetBufferOut()
01160             {
01161                 assert(instance);
01162                 float *buf= m_dynlib.GetBufferOut(instance);
01163                 return reinterpret_cast< std::array<float,OutputSampleSize>& >(*buf);
01164             }
01170         void ProcessAudio()
```

```
01171             {
01172                 assert(instance);
01173                 m_dynlib.ProcessAudio(instance, m_dynlib.GetBufferIn(instance),
      m_dynlib.GetBufferOut(instance));
01174             }
01188         // void ProcessAudio_Planar(const std::array< const std::array<const float,ChunkFrames>,
      InputChannels>& input, std::array< std::array<float,ChunkFrames>, OutputChannels>& output)
01189         void ProcessAudio_Planar(float const * const *input, float * const *output)
01190             {
01191                 assert(instance);
01192                 m_dynlib.ProcessAudio_Planar(instance, input, output);
01193             }
01194 
01206             template<typename T>
01207         std::vector<T> ProcessAnyAudio(const std::vector<T> input)
01208             {
01209                 assert(instance);
01210                 std::vector<T> output;
01211                 unsigned int out_offset=0;
01212                 unsigned int in_offset=0;
01213                 unsigned int todo = input.size();
01214                 while (todo>0) {
01215                     unsigned int left = AddAudio(&input[in_offset], todo);
01216                     unsigned int out_avail = m_dynlib.GetOutputCount(instance);
01217                     output.resize(out_offset + out_avail);
01218                     GetAudio(&output[out_offset], out_avail);
01219                     out_offset+=out_avail;
01220                     in_offset += todo-left;
01221                     todo=left;
01222                 }
01223                 return output;
01224             }
01225 
01231         class CClient {
01232             public:
01233                 CClient(cloudx1_CInstance* instance, CDynLib& dynlib)
01234                 : m_dynlib(dynlib)
01235                     {
01236                         assert(instance);
01237                         client=m_dynlib.NewClient(instance);
01238                         if (!client) throw std::bad_alloc();
01239                     }
01240                 // non-copyable
01241                 CClient( const CInstance& ) = delete;
01242                 CClient& operator=( const CInstance& ) = delete;
01243                 ~CClient()
01244                     {
01245                         if (client) {
01246                             m_dynlib.DeleteClient(client);
01247                             client=nullptr;
01248                         }
01249                     }
01257                 std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
01258                     {
01259                         assert(client);
01260                         int need_save=0;
01261                         const char *canswer = m_dynlib.ProcessJson(client, request.c_str(),
      &need_save);
01262                         if (!canswer) return {};
01263                         std::string answer(canswer);
01264                         m_dynlib.FreeJsonAnswer (canswer);
01265                         if (NeedSave) {
01266                             *NeedSave=(need_save!=0);
01267                         }
01268                         return answer;
01269                     }
01270             private:
01271                 CDynLib& m_dynlib;
01272                 cloudx1_CClientInstance *client = nullptr;
01273         };
01281         std::shared_ptr<CClient> NewClient()
01282             {
01283                 assert(instance);
01284                 return std::make_shared<CClient>(instance, m_dynlib);
01285             }
01286 
01287     protected:
01288             template<typename T>
01289         unsigned int AddAudio(const T* payload, unsigned int nFrame)
01290             {
01291                 assert(instance);
01292                 return m_dynlib.AddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
      helper::SampleFormat<T>::format);
01293             }
01294             template<typename T>
01295         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
01296             {
```

```
01297                 assert(instance);
01298                 return m_dynlib.GetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
      helper::SampleFormat<T>::format);
01299             }
01300
01301     private:
01302         CDynLib& m_dynlib;
01303         cloudx1_CParameters* params = nullptr;
01304         cloudx1_CInstance* instance = nullptr;
01305         std::thread update_thread;
01306         std::vector< std::pair<std::string,std::string> > init_metadata;
01307 #if CLOUDX1_HAS_WEBSERVER
01308         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
01309 #endif // CLOUDX1_HAS_WEBSERVER
01310     };
01311
01312 }; // namespace dyn
01313 }; // namespace cloudx1
01314 }; // namespace sound4
01315
01316
01317 // bridge C callbacks to CPresetLoader
01318 extern "C" {
01319     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata) {
01320         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01321         std::string content=preset_loader->Read(filename);
01322         return strdup(content.c_str());
01323     }
01324     static void cloudx1_custom_reader_free(char *content, void* userdata) {
01325         if (!content) return;
01326         free(content);
01327     }
01328     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata) {
01329         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01330         auto res=preset_loader->Write(filename,content);
01331         return res?0:-1;
01332     }
01333     static int cloudx1_custom_exists(const fs_char *filename, void* userdata) {
01334         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01335         auto res=preset_loader->Exists(filename);
01336         return res?0:-1;
01337     }
01338     static fs_char** cloudx1_custom_getall(void* userdata) {
01339         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01340         auto res=preset_loader->GetAll();
01341         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
01342         for (size_t n=0;n<res.size();n++) {
01343             all[n]=fs_strdup(res[n].c_str());
01344         }
01345         all[res.size()]=nullptr;
01346         return all;
01347     }
01348     static void cloudx1_custom_getall_free(fs_char** all, void* userdata) {
01349         if (!all) return;
01350         for (fs_char** one=all;*one;one++) {
01351             free(*one);
01352         }
01353         free(all);
01354     }
01355     static int cloudx1_custom_remove(const fs_char *filename, void* userdata) {
01356         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01357         auto res=preset_loader->Remove(filename);
01358         return res?0:-1;
01359     }
01360     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
01361         sound4::cloudx1::dyn::CPresetLoader
      *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01362         auto res=preset_loader->Rename(from,to);
01363         return res?0:-1;
01364     }
01365
01366 };
```

11.13 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]

11.13.1 Function Documentation

11.13.1.1 GetEnv()

```
std::string GetEnv (
            const std::string & name )
```

Definition at line 60 of file sound4cl-pipe.cpp.

11.13.1.2 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 178 of file sound4cl-pipe.cpp.

11.13.1.3 ProcessLoop()

```
void ProcessLoop (
             sound4::CInstance & instance,
             sound4::CProcessor & processor )
```

[Processing Loop]

[Processing Loop]

Definition at line 69 of file sound4cl-pipe.cpp.

11.14 sound4cl-pipe.cpp

```
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 // ------------------------------------------------------------
00060 std::string GetEnv(const std::string& name)
00061 {
00062     char *data=getenv(name.c_str());
00063     if (!data) return {};
00064     return std::string(data);
00065 }
00066
00067
00068 // Reads from stdin, write to stdout
00069 void ProcessLoop(sound4::CInstance &instance, sound4::CProcessor &processor)
```

```
00070 {
00071 bool stopthread=false;
00072
00073     #if defined(_WIN32) || defined(WIN32)
00074         // Windows: The stdin, stdout, and stderr streams always open in text mode by default
00075         _setmode(_fileno(stdin), _O_BINARY);
00076         _setmode(_fileno(stdout), _O_BINARY);
00077     #endif
00078
00080     size_t input_sample_count = instance.GetChunkFrames() * processor.GetChannelCount();
00081     size_t output_sample_count = instance.GetChunkFrames() * processor.GetChannelCount();
00082     while (!stopthread)
00083     {
00084         // Read a chunk from stdin
00085         if (std::fread(instance.GetBufferIn(), sizeof(float), input_sample_count, stdin) !=
      input_sample_count) {
00086             std::cerr « "ProcessLoop: input stopped"« std::endl;
00087             stopthread=true;
00088             break;
00089         }
00090         if (stopthread) break;
00091         // Process it
00092         instance.ProcessAudio();
00093         // Write it to stdout
00094         if (fwrite(instance.GetBufferOut(), sizeof(float), output_sample_count, stdout) !=
      output_sample_count) {
00095             std::cerr « "Failed to write audio output" « std::endl;
00096             stopthread=true;
00097         }
00098     }
00100 }
00101
00103 class MyPresetManager : public sound4::CPresetLoader {
00104 public:
00105     MyPresetManager() = default;
00106     virtual ~MyPresetManager() = default;
00107
00108     bool SetupPath(const std::filesystem::path& a_preset_path)
00109         {
00110             m_preset_path=a_preset_path;
00111             if ( !std::filesystem::exists(m_preset_path ) ) {
00112                 return false;
00113             }
00114             std::error_code ec;
00115             if ( !std::filesystem::is_directory(m_preset_path, ec) ) {
00116                 return false;
00117             }
00118             return true;
00119         }
00120     virtual bool IsReadOnly() override { return false; };
00121     virtual bool Exists(const std::filesystem::path &name) override
00122         {
00123             std::error_code ec;
00124             return std::filesystem::exists(GetRealPath(name), ec);
00125         }
00126     virtual bool Remove(const std::filesystem::path &name) override
00127         {
00128             std::error_code ec;
00129             return std::filesystem::remove(GetRealPath(name), ec);
00130         }
00131     virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) override
00132         {
00133             std::error_code ec;
00134             std::filesystem::rename(GetRealPath(from), GetRealPath(to), ec);
00135             return (!ec);
00136         }
00137     virtual std::vector<std::filesystem::path> GetAll() override
00138         {
00139             std::vector<std::filesystem::path> list;
00140             for (const auto & entry : std::filesystem::directory_iterator(m_preset_path.c_str(),
      std::filesystem::directory_options::skip_permission_denied)) {
00141                 if (entry.is_regular_file()) {
00142                     list.push_back(entry.path().lexically_relative(m_preset_path));
00143                 }
00144             }
00145             return list;
00146         }
00147     virtual std::string Read(const std::filesystem::path &filename) override
00148         {
00149             std::ifstream f(GetRealPath(filename));
00150             if ( f.fail() ) {
00151                 return std::string();
00152             }
00153             std::ostringstream ss;
00154             ss « f.rdbuf();
00155             return ss.str();
00156         }
```

```
00157     virtual bool Write(const std::filesystem::path &filename, const std::string &content) override
00158         {
00159             std::ofstream f(GetRealPath(filename));
00160             if ( f.fail() ) {
00161                 return false;
00162             }
00163             f « content;
00164             if ( f.fail() ) {
00165                 return false;
00166             }
00167             return true;
00168         }
00169 private:
00170     std::filesystem::path m_preset_path;
00171     std::filesystem::path GetRealPath(const std::filesystem::path &name)
00172         {
00173             return m_preset_path / name;
00174         }
00175 };
00177
00178 int main(int argc, const char **argv)
00179 {
00180     int listen_port = 8080;
00181     auto store_path_str=GetEnv("S4STORE_PATH");
00183     std::string libname =  "libsound4.x1.cloud.so";
00185
00186
00187     // Get credentials from environment
00188     auto LoginKey=GetEnv("S4LOGINKEY");
00189     if (LoginKey.empty()) {
00190         LoginKey=GetEnv("S4USERID");
00191     }
00192     auto RadioName=GetEnv("RADIO_NAME");
00193     auto KeyId=GetEnv("ACCESS_KEY_ID");
00194     auto AccessKey=GetEnv("ACCESS_KEY_SECRET");
00195
00196     const char *progname=argv[0];
00197     for (int n=1;n<argc;n++) {
00198         std::string arg = argv[n];
00199         if (arg=="-p" || arg=="--port") {
00200             if (argc<n+1) {
00201                 std::cerr « "--port needs a number"« std::endl;
00202                 return 1;
00203             }
00204             n++;
00205             listen_port=atoi(argv[n]);
00206         } else if (arg=="-l" || arg=="--lib") {
00207             if (argc<n+1) {
00208                 std::cerr « "--port needs a number"« std::endl;
00209                 return 1;
00210             }
00211             n++;
00212             libname=argv[n];
00213         } else if (arg=="-h" || arg=="--help") {
00214             std::cerr « "Usage: " « progname « " [-p port] [-l libname.so]"«std::endl;;
00215             std::cerr « "  Reads audio from stdin and return processed audio in stdout" « std::endl;
00216             std::cerr « "   -l, --lib   : library to load ["«libname«"]" « std::endl;
00217             std::cerr « "   -p, --port  : port for web server ["«listen_port«"]" « std::endl;
00218             std::cerr « std::endl;
00219             std::cerr « "Environment:"« std::endl;;
00220             std::cerr « " - S4STORE_PATH            : path to store config [default: (no storage)]"«
      std::endl;;
00221             std::cerr « " - S4LOGINKEY              : SOUND4 Login key (or S4USERID)"« std::endl;;
00222             std::cerr « " - RADIO_NAME              : SOUND4 Radio Name"« std::endl;;
00223             std::cerr « " - ACCESS_KEY_ID           : SOUND4 Access Key ID"« std::endl;;
00224             std::cerr « " - ACCESS_KEY_SECRET       : SOUND4 Access Key Secret"« std::endl;
00225             std::cerr « std::endl;
00226             std::cerr « "Example:"« std::endl;
00227             std::cerr « "  ffmpeg -re -i file.wav -ar 48000 -ac 2 -f f32le - | "«progname«" | ffplay
      -f f32le -ar 48000 -ac 2 -i -" « std::endl;;
00228             #if defined(_WIN32) || defined(WIN32)
00229             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;;
00230             #else
00231             std::cerr « "  ffmpeg -f pulse -i default -ar 48000 -ac 2 -f f32le - | "«progname«" |
      ffplay -f f32le -ar 48000 -ac 2 -i -" « std::endl;;
00232             #endif
00233             return 0;
00234         } else {
00235             std::cerr « "unknown argument '"«arg«"'"« std::endl;
00236             return 1;
00237         }
00238     }
00239
00240
00242     sound4::CProcessor processor;
00243     if (!processor.Load(libname)) {
```

```
00244         std::cerr « "Failed to load processing library" « std::endl;
00245         return 1;
00246     }
00248
00249     if (LoginKey.empty() || RadioName.empty() || KeyId.empty() || AccessKey.empty()) {
00250         std::cerr « "Missing credentials in environment" « std::endl;
00251         return 1;
00252     }
00253     std::filesystem::path store_path;
00254     if (!store_path_str.empty()) {
00255         store_path = std::filesystem::path(store_path_str);
00256         if (!std::filesystem::exists(store_path) || !std::filesystem::is_directory(store_path)) {
00257             std::cerr « "Storage folder '"«store_path.c_str()«"' is not a valid directory" «
      std::endl;
00258             return 1;
00259         }
00260     }
00261
00263     processor.SetLogSeverity(sound4::verbose5);
00264     processor.SetLoggerCallback([](sound4::LogSeverity severity,const std::string& msg) {
00265             std::cerr « msg « std::endl;
00266         });
00267
00268     sound4::CInstance instance(processor);
00269     instance.SetParam("ADMIN_USER","admin");
00270     instance.SetParam("ADMIN_SECRET","admin");
00272
00274     MyPresetManager preset_manager;
00275     if (!store_path.empty()) {
00276         if (!preset_manager.SetupPath(store_path)) {
00277             std::cerr « "Failed to setup the custom preset manager on path " « store_path.c_str() «
      std::endl;
00278             return 1;
00279         }
00280         instance.SetPresetManager(&preset_manager);
00281     }
00283
00284     std::cerr « "Creating" « std::endl;
00286     if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, {})) {
00287         std::cerr « "Failed to create the processing instance" « std::endl;
00288         return 1;
00289     }
00291
00292     std::cerr « "Starting web server" « std::endl;
00294     if (!instance.StartWebServer(listen_port,0)) {
00295         std::cerr « "Failed to create the web server on port " « listen_port « std::endl;
00296         return 1;
00297     }
00299
00300     {
00302         auto client = instance.NewClient();
00303         auto answer = client->ProcessJson(R"JSON({"get":{"processorname":null}})JSON");
00304         std::cerr « "Request for processor name returned "«answer«std::endl;
00306     }
00307
00308     ProcessLoop(instance, processor);
00309
00310     std::cerr « "Stopping now" « std::endl;
00311     instance.Stop();
00312
00313     std::cerr « "End" « std::endl;
00314     return 0;
00315 }
```

11.15 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.
- struct sound4::helper::SampleFormat< int16_t >
- struct sound4::helper::SampleFormat< int32_t >
- struct sound4::helper::SampleFormat< float >
- 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

- sound4
- sound4::helper

Typedefs

- using sound4::helper::DynLib_t = HMODULE
- using sound4::helper::DynFunc_t = FARPROC
- using sound4::LogSeverity = sound4cl_LogSeverity
- using sound4::log_cb_t = std::function< void(LogSeverity, const std::string &)>
- using sound4::PresetChange_Kind = sound4cl_PresetChange_Kind

Variables

- const LogSeverity sound4::none = (LogSeverity) sound4cl_none
- const LogSeverity sound4::fatal = (LogSeverity) sound4cl_fatal
- const LogSeverity sound4::error = (LogSeverity) sound4cl_error
- const LogSeverity sound4::warning = (LogSeverity) sound4cl_warning
- const LogSeverity sound4::info = (LogSeverity) sound4cl_info
- const LogSeverity sound4::verbose = (LogSeverity) sound4cl_verbose
- const LogSeverity sound4::verbose2 = (LogSeverity) sound4cl_verbose2
- const LogSeverity sound4::verbose3 = (LogSeverity) sound4cl_verbose3
- const LogSeverity sound4::verbose4 = (LogSeverity) sound4cl_verbose4
- const LogSeverity sound4::verbose5 = (LogSeverity) sound4cl_verbose5

11.15.1 Detailed Description

You need to load the dynamic library, and if it succeed you can use it.

Definition in file sound4cl.hpp.

11.16 sound4cl.hpp

```
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 #ifdef __unix__
00022     #include <dlfcn.h>
00023 #elif defined(_WIN32)
00024     #include <libloaderapi.h>
00025 #else
00026     #error "Unsupported OS"
00027 #endif
00028
00029 #include "sound4cl_cdef.h"
00030
00031     // bridge C callbacks to CPresetLoader
00032     extern "C" {
00033         static char *sound4cl_custom_reader(const fs_char *filename, void* userdata);
00034         static void sound4cl_custom_reader_free(char *content, void* userdata);
00035         static int sound4cl_custom_writer(const fs_char *filename, const char *content, void*
      userdata);
00036         static int sound4cl_custom_exists(const fs_char *filename, void* userdata);
00037         static fs_char** sound4cl_custom_getall(void* userdata);
00038         static void sound4cl_custom_getall_free(fs_char** all, void* userdata);
00039         static int sound4cl_custom_remove(const fs_char *filename, void* userdata);
00040         static int sound4cl_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00041     };
00042
00046 namespace sound4 {
00047
00051     namespace helper {
00052         #ifdef _WIN32
00058         static inline std::string WStringToUTF8(const std::wstring& wstr) {
00059             if (wstr.empty()) return {};
00060             int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL,
      NULL);
00061             std::string str(size, 0);
00062             WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00063             return str;
00064         }
00070         static inline std::wstring UTF8ToWString(const std::string& str) {
00071             if (str.empty()) return std::wstring();
00072             int size = MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), NULL, 0);
00073             std::wstring wstr(size, 0);
00074             MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), &wstr[0], size);
00075             return wstr;
00076         }
00077         #endif // _WIN32
00078
00084             template<typename T>
00085         struct SampleFormat {
00086         };
00087             template<>
00088         struct SampleFormat<int16_t> {
00089             const sound4cl_SampleFormat format = S16_NATIVE;
00090         };
00091             template<>
00092         struct SampleFormat<int32_t> {
00093             const sound4cl_SampleFormat format = S32_NATIVE;
00094         };
00095             template<>
00096         struct SampleFormat<float> {
00097             const sound4cl_SampleFormat format = F32_NATIVE;
```

```
00098         };
00099
00100         // Storage definition, depending on OS
00101         #ifdef __unix__
00102             using DynLib_t = void *;
00103             using DynFunc_t = void *;
00104         #else
00105             using DynLib_t = HMODULE;
00106             using DynFunc_t = FARPROC;
00107         #endif
00108
00114             template <typename T>
00115         class DynFuncHolder {
00116         private:
00117             DynFunc_t m_ptr = NULL;
00118         public:
00119             DynFuncHolder() = default;
00120             DynFuncHolder(DynFunc_t a_ptr) : m_ptr(a_ptr) {}
00121             operator bool() const { return (m_ptr!=NULL); }
00122             bool IsOk() const { return m_ptr!=NULL; }
00123             operator T* () const { return reinterpret_cast<T*>(m_ptr); }
00124         };
00125
00130         class CDynLoader {
00131             private:
00132                 DynLib_t m_lib {};
00133             public:
00134                 CDynLoader() = default;
00135                 CDynLoader(CDynLoader&&) = default;
00136                 // No copy allowed
00137                 CDynLoader(const CDynLoader&) = delete;
00138                 CDynLoader& operator=(CDynLoader const&) = delete;
00139                 operator bool() const {
00140                     return (m_lib!=NULL);
00141                 }
00142                 bool IsOk() const {
00143                     return (m_lib!=NULL);
00144                 }
00145                 #ifdef __unix__
00146                     void Close() {
00147                         if (IsOk()) {
00148                             #ifndef __SANITIZE_ADDRESS__ // avoid unloading to keep call stack
00149                             dlclose(m_lib);
00150                             #endif // __SANITIZE_ADDRESS__
00151                             m_lib=NULL;
00152                         }
00153                     }
00154                     bool Load(const std::filesystem::path& dynlib)
00155                     {
00156                         Close();
00157                         m_lib=dlopen(dynlib.c_str(), RTLD_NOW|RTLD_LOCAL);
00158                         return IsOk();
00159                     }
00160                         template <typename T>
00161                     DynFuncHolder<T> GetSymbol(const std::string& name) {
00162                         auto ptr=dlsym(m_lib, name.c_str());
00163                         if (!ptr) {
00164                             throw std::runtime_error("Missing function in library");
00165                         }
00166                         return DynFuncHolder<T>(ptr);
00167                     }
00168                         template <typename T>
00169                     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00170                         auto ptr=dlsym(m_lib, name.c_str());
00171                         return DynFuncHolder<T>(ptr);
00172                     }
00173                     static std::filesystem::path GetThisLibraryPath(void) {
00174                         static Dl_info info;
00175                         if (! dladdr((void *) GetThisLibraryPath, & info)) return {};
00176                         auto rp=realpath(info.dli_fname, NULL);
00177                         std::filesystem::path p(rp);
00178                         free(rp);
00179                         return p;
00180                     }
00181                 #else
00182                     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_
00183                     {
00184                         Close();
00185                         m_lib=LoadLibraryExW(dynlib.c_str(), NULL, loadflags);
00186                         return IsOk();
00187                     }
00188                     void Close() {
00189                         if (IsOk()) {
00190                             // NOTE: On Windows, FreeLibrary may create a lot of troubles, should use
    FreeLibraryAndExitThread but...
00191                             // So define SOUND4_CALL_FREELIBRARY before including this file if you
```

```
      really want to unload the library dynamically
00192                             #if defined(SOUND4_CALL_FREELIBRARYANDEXITTHREAD)
00193                                 FreeLibraryAndExitThread(m_lib, 0);
00194                             #elif defined(SOUND4_CALL_FREELIBRARY)
00195                                 FreeLibrary(m_lib);
00196                             #endif // SOUND4_CALL_FREELIBRARY
00197                             m_lib=NULL;
00198                         }
00199                     }
00200                         template <typename T>
00201                     DynFuncHolder<T> GetSymbol(const std::string& name) {
00202                         auto ptr=GetProcAddress(m_lib, name.c_str());
00203                         if (!ptr) {
00204                             throw std::runtime_error("Missing function in library");
00205                         }
00206                         return DynFuncHolder<T>(ptr);
00207                     }
00208                         template <typename T>
00209                     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00210                         auto ptr=GetProcAddress(m_lib, name.c_str());
00211                         return DynFuncHolder<T>(ptr);
00212                     }
00213                     static std::filesystem::path GetThisLibraryPath(void) {
00214                         static wchar_t path[MAX_PATH]={};
00215                         HMODULE hm = NULL;
00216                         if (GetModuleHandleExW(GET_MODULE_HANDLE_EX_FLAG_FROM_ADDRESS |
00217                                 GET_MODULE_HANDLE_EX_FLAG_UNCHANGED_REFCOUNT,
00218                                 (LPCWSTR) &GetThisLibraryPath, &hm))
00219                         {
00220                             if (GetModuleFileNameW(hm, path, MAX_PATH) > 0) {
00221                                 return std::filesystem::path(path);
00222                             }
00223                         }
00224                         return {};
00225                     }
00226                 #endif
00227                 virtual ~CDynLoader() {
00228                     Close();
00229                 }
00230         }; // class CDynLoader
00231     }; // namespace helper
00232
00233
00237     using LogSeverity = sound4cl_LogSeverity;
00238     const LogSeverity none     = (LogSeverity) sound4cl_none;
00239     const LogSeverity fatal    = (LogSeverity) sound4cl_fatal;
00240     const LogSeverity error    = (LogSeverity) sound4cl_error;
00241     const LogSeverity warning  = (LogSeverity) sound4cl_warning;
00242     const LogSeverity info     = (LogSeverity) sound4cl_info;
00243     const LogSeverity verbose  = (LogSeverity) sound4cl_verbose;
00244     const LogSeverity verbose2 = (LogSeverity) sound4cl_verbose2;
00245     const LogSeverity verbose3 = (LogSeverity) sound4cl_verbose3;
00246     const LogSeverity verbose4 = (LogSeverity) sound4cl_verbose4;
00247     const LogSeverity verbose5 = (LogSeverity) sound4cl_verbose5;
00248
00252     using log_cb_t = std::function<void(LogSeverity,const std::string&)>;
00253
00257     static log_cb_t _log_cb;
00258     extern "C" {
00259         static inline void _log_cb_c(LogSeverity severity, const char *c_msg) {
00260             _log_cb(severity, std::string(c_msg));
00261         }
00262     }
00263
00270     class CProcessor {
00271     private:
00272         helper::CDynLoader m_lib;
00273         bool m_bOK = false;
00274         std::string m_prefix; // The prefix of functions, depends on the library (cloud_, impact_...)
00275     protected:
00276         friend class CBus;
00277         friend class CInstance;
00278
00279         // All those wrapped functions have the same signature as there C sound4cl_XXX
00280         helper::DynFuncHolder< decltype(sound4cl_GetVersion             ) > fnGetVersion             ;
00281         helper::DynFuncHolder< decltype(sound4cl_GetChunkSizeInFrames   ) > fnGetChunkSizeInFrames   ;
00282         helper::DynFuncHolder< decltype(sound4cl_GetChannelCount        ) > fnGetChannelCount        ;
00283         helper::DynFuncHolder< decltype(sound4cl_GetAudioInputCount     ) > fnGetAudioInputCount     ;
00284         helper::DynFuncHolder< decltype(sound4cl_GetAudioOutputCount    ) > fnGetAudioOutputCount    ;
00285         helper::DynFuncHolder< decltype(sound4cl_GetSampleRate          ) > fnGetSampleRate          ;
00286         helper::DynFuncHolder< decltype(sound4cl_SetLoggerCallback      ) > fnSetLoggerCallback      ;
00287         helper::DynFuncHolder< decltype(sound4cl_SetLogSeverity         ) > fnSetLogSeverity         ;
00288         helper::DynFuncHolder< decltype(sound4cl_NewParameters          ) > fnNewParameters          ;
00289         helper::DynFuncHolder< decltype(sound4cl_FreeParameters         ) > fnFreeParameters         ;
00290         helper::DynFuncHolder< decltype(sound4cl_SetParameter           ) > fnSetParameter           ;
00291         helper::DynFuncHolder< decltype(sound4cl_GetParameter           ) > fnGetParameter           ;
00292         helper::DynFuncHolder< decltype(sound4cl_FreeParameterValue     ) > fnFreeParameterValue     ;
```

```
00293         helper::DynFuncHolder< decltype(sound4cl_InitProcess            ) > fnInitProcess            ;
00294         helper::DynFuncHolder< decltype(sound4cl_InitProcess2           ) > fnInitProcess2           ;
00295         helper::DynFuncHolder< decltype(sound4cl_TerminateProcess       ) > fnTerminateProcess       ;
00296         helper::DynFuncHolder< decltype(sound4cl_ExitProcess            ) > fnExitProcess            ;
00297         helper::DynFuncHolder< decltype(sound4cl_StartUpdateThread      ) > fnStartUpdateThread      ;
00298         helper::DynFuncHolder< decltype(sound4cl_StopUpdateThread       ) > fnStopUpdateThread       ;
00299         helper::DynFuncHolder< decltype(sound4cl_WaitUpdateThreadReady  ) > fnWaitUpdateThreadReady  ;
00300         helper::DynFuncHolder< decltype(sound4cl_ProcessAudio           ) > fnProcessAudio           ;
00301         helper::DynFuncHolder< decltype(sound4cl_ProcessAudio_Planar    ) > fnProcessAudio_Planar    ;
00302         helper::DynFuncHolder< decltype(sound4cl_GetBufferIn            ) > fnGetBufferIn            ;
00303         helper::DynFuncHolder< decltype(sound4cl_GetBufferOut           ) > fnGetBufferOut           ;
00304         helper::DynFuncHolder< decltype(sound4cl_GetEstimatedDelay      ) > fnGetEstimatedDelay      ;
00305         helper::DynFuncHolder< decltype(sound4cl_GetFormatName          ) > fnGetFormatName          ;
00306         helper::DynFuncHolder< decltype(sound4cl_GetFormatFromName      ) > fnGetFormatFromName      ;
00307         helper::DynFuncHolder< decltype(sound4cl_GetBytesFromFormat     ) > fnGetBytesFromFormat     ;
00308         helper::DynFuncHolder< decltype(sound4cl_GetMaxPacketFrame      ) > fnGetMaxPacketFrame      ;
00309         helper::DynFuncHolder< decltype(sound4cl_AddAudio               ) > fnAddAudio               ;
00310         helper::DynFuncHolder< decltype(sound4cl_AddPadAudio            ) > fnAddPadAudio            ;
00311         helper::DynFuncHolder< decltype(sound4cl_GetOutputCount         ) > fnGetOutputCount         ;
00312         helper::DynFuncHolder< decltype(sound4cl_GetAudio               ) > fnGetAudio               ;
00313         helper::DynFuncHolder< decltype(sound4cl_AudioConvertFrom       ) > fnAudioConvertFrom       ;
00314         helper::DynFuncHolder< decltype(sound4cl_AudioConvertTo         ) > fnAudioConvertTo         ;
00315         helper::DynFuncHolder< decltype(sound4cl_StereoToMono           ) > fnStereoToMono           ;
00316         helper::DynFuncHolder< decltype(sound4cl_MonoToStereo           ) > fnMonoToStereo           ;
00317         helper::DynFuncHolder< decltype(sound4cl_AudioMonoFromLiveStereo) > fnAudioMonoFromLiveStereo;
00318         helper::DynFuncHolder< decltype(sound4cl_AudioMonoToLiveStereo  ) > fnAudioMonoToLiveStereo  ;
00319         helper::DynFuncHolder< decltype(sound4cl_NewClient              ) > fnNewClient              ;
00320         helper::DynFuncHolder< decltype(sound4cl_DeleteClient           ) > fnDeleteClient           ;
00321         helper::DynFuncHolder< decltype(sound4cl_ProcessJson            ) > fnProcessJson            ;
00322         helper::DynFuncHolder< decltype(sound4cl_FreeJsonAnswer         ) > fnFreeJsonAnswer         ;
00323         helper::DynFuncHolder< decltype(sound4cl_SaveState              ) > fnSaveState              ;
00324
00325         // only for processes supporting webserver
00326         helper::DynFuncHolder< decltype(sound4cl_Webserver_tcp          ) > fnWebserver_tcp          ;
00327         helper::DynFuncHolder< decltype(sound4cl_Webserver_tcp2         ) > fnWebserver_tcp2         ;
00328         helper::DynFuncHolder< decltype(sound4cl_Webserver              ) > fnWebserver              ;
00329         helper::DynFuncHolder< decltype(sound4cl_Webserver_Stop         ) > fnWebserver_Stop         ;
00330         helper::DynFuncHolder< decltype(sound4cl_Webserver_Status       ) > fnWebserver_Status       ;
00331
00332         // added 2023-03-22
00333         helper::DynFuncHolder< decltype(sound4cl_StereoToMono_Planar    ) > fnStereoToMono_Planar    ;
00334         helper::DynFuncHolder< decltype(sound4cl_MonoToStereo_Planar    ) > fnMonoToStereo_Planar    ;
00335
00336         // added 2023-05-22
00337         helper::DynFuncHolder< decltype(sound4cl_SetMetadata            ) > fnSetMetadata            ;
00338         helper::DynFuncHolder< decltype(sound4cl_GetMetadataInfos       ) > fnGetMetadataInfos       ;
00339         helper::DynFuncHolder< decltype(sound4cl_FreeMetadataInfos      ) > fnFreeMetadataInfos      ;
00340
00341         // added 2023-06-20
00342         helper::DynFuncHolder< decltype(sound4cl_SetPresetManager               ) >
    fnSetPresetManager      ;
00343         helper::DynFuncHolder< decltype(sound4cl_PresetManager_InformChange     ) >
    fnPresetManager_InformChange      ;
00344
00345         // added 2023-09-21
00346         helper::DynFuncHolder< decltype(sound4cl_GetPossibleChunkSizeInFrames   ) >
    fnGetPossibleChunkSizeInFrames   ;
00347         helper::DynFuncHolder< decltype(sound4cl_GetProcessChunkFrames          ) >
    fnGetProcessChunkFrames   ;
00348         helper::DynFuncHolder< decltype(sound4cl_InitProcess3                   ) > fnInitProcess3
        ;
00349
00350         // added 2023-06-26, only for processes supporting bus
00351         helper::DynFuncHolder< decltype(sound4cl_NewBus                 ) > fnNewBus      ;
00352         helper::DynFuncHolder< decltype(sound4cl_FreeBus                ) > fnFreeBus      ;
00353         helper::DynFuncHolder< decltype(sound4cl_SetInstanceBus         ) > fnSetInstanceBus      ;
00354
00355         // added 2024-02-19
00356         helper::DynFuncHolder< decltype(sound4cl_SetMetadataMulti       ) > fnSetMetadataMulti
    ;
00357
00358             template <typename T>
00359         helper::DynFuncHolder<T> GetPrefixSymbol(const std::string& name) {
00360             std::string prefix_name = m_prefix+name;
00361             return m_lib.GetSymbol<T>(prefix_name);
00362         }
00363
00364     public:
00365         CProcessor() = default;
00366
00374         bool Load(const std::filesystem::path& filepath) {
00375             m_lib.Close();
00376             // If a path is given, use it directly and do not try other path
00377             if (filepath.has_parent_path() && !m_lib.Load(filepath)) {
00378                 return false;
00379             } else if (!m_lib.IsOk()) {
00380                 auto thisdir=helper::CDynLoader::GetThisLibraryPath().parent_path();
```

```
00381                 auto filename = filepath.filename();
00382                 #ifndef _WIN32
00383                 // Linux: if in a bin directory, try ../lib first
00384                 if (!m_lib.IsOk() && thisdir.filename()=="bin") {
00385                     auto libdir = thisdir.parent_path() / "lib";
00386                     m_lib.Load(libdir / filename);
00387                 }
00388                 #endif // !_WIN32
00389                 if (!m_lib.IsOk()) {
00390                     // Search in the same directory this code is in
00391                     m_lib.Load(thisdir / filename);
00392                 }
00393                 if (!m_lib.IsOk()) {
00394                     // Try current path
00395                     m_lib.Load(std::filesystem::current_path() / filename);
00396                 }
00397                 if (!m_lib.IsOk()) {
00398                     return false;
00399                 }
00400             }
00401             // Get information from the library itself
00402             try {
00403                 auto GetInfo = m_lib.GetSymbol< decltype(sound4cl_SOUND4_GetProcessInfo             )
    >("SOUND4_GetProcessInfo"   );
00404                 auto info = GetInfo();
00405                 m_prefix = info->prefix;
00406             } catch (std::runtime_error& ) {
00407                 // Compatibility: search in known libraries without this function
00408                 #ifdef _WIN32
00409                     std::string filename = helper::WStringToUTF8(filepath.stem());
00410                 #else // !_WIN32
00411                     std::string filename = filepath.stem();
00412                     // remove lib prefix
00413                     filename=filename.substr(3);
00414                 #endif // ! _WIN32
00415                 if (filename=="sound4.x1.cloud") {
00416                     m_prefix="cloudx1_";
00417                 } else if (filename=="sound4.impact.cl") {
00418                     m_prefix="impact_";
00419                 } else if (filename=="sound4.bigvoice.cl") {
00420                     m_prefix="bigvoice_";
00421                 } else {
00422                     return false;
00423                 }
00424             }
00425
00426             // Load all C functions
00427             try {
00428                 fnGetVersion              = GetPrefixSymbol< decltype(sound4cl_GetVersion
    ) >("GetVersion"             );
00429                 fnGetChunkSizeInFrames    = GetPrefixSymbol< decltype(sound4cl_GetChunkSizeInFrames
    ) >("GetChunkSizeInFrames"   );
00430                 fnGetChannelCount         = GetPrefixSymbol< decltype(sound4cl_GetChannelCount
    ) >("GetChannelCount"        );
00431                 fnGetAudioInputCount      = GetPrefixSymbol< decltype(sound4cl_GetAudioInputCount
    ) >("GetAudioInputCount"     );
00432                 fnGetAudioOutputCount     = GetPrefixSymbol< decltype(sound4cl_GetAudioOutputCount
    ) >("GetAudioOutputCount"    );
00433                 fnGetSampleRate           = GetPrefixSymbol< decltype(sound4cl_GetSampleRate
    ) >("GetSampleRate"          );
00434                 fnSetLoggerCallback       = GetPrefixSymbol< decltype(sound4cl_SetLoggerCallback
    ) >("SetLoggerCallback"      );
00435                 fnSetLogSeverity          = GetPrefixSymbol< decltype(sound4cl_SetLogSeverity
    ) >("SetLogSeverity"         );
00436                 fnNewParameters           = GetPrefixSymbol< decltype(sound4cl_NewParameters
    ) >("NewParameters"          );
00437                 fnFreeParameters          = GetPrefixSymbol< decltype(sound4cl_FreeParameters
    ) >("FreeParameters"         );
00438                 fnSetParameter            = GetPrefixSymbol< decltype(sound4cl_SetParameter
    ) >("SetParameter"           );
00439                 fnGetParameter            = GetPrefixSymbol< decltype(sound4cl_GetParameter
    ) >("GetParameter"           );
00440                 fnFreeParameterValue      = GetPrefixSymbol< decltype(sound4cl_FreeParameterValue
    ) >("FreeParameterValue"     );
00441                 fnInitProcess             = GetPrefixSymbol< decltype(sound4cl_InitProcess
    ) >("InitProcess"            );
00442                 fnInitProcess2            = GetPrefixSymbol< decltype(sound4cl_InitProcess2
    ) >("InitProcess2"           );
00443                 fnTerminateProcess        = GetPrefixSymbol< decltype(sound4cl_TerminateProcess
    ) >("TerminateProcess"       );
00444                 fnExitProcess             = GetPrefixSymbol< decltype(sound4cl_ExitProcess
    ) >("ExitProcess"            );
00445                 fnStartUpdateThread       = GetPrefixSymbol< decltype(sound4cl_StartUpdateThread
    ) >("StartUpdateThread"      );
00446                 fnStopUpdateThread        = GetPrefixSymbol< decltype(sound4cl_StopUpdateThread
    ) >("StopUpdateThread"       );
00447                 fnWaitUpdateThreadReady   = GetPrefixSymbol< decltype(sound4cl_WaitUpdateThreadReady
```

```
    ) >("WaitUpdateThreadReady"  );
00448                   fnProcessAudio            = GetPrefixSymbol< decltype(sound4cl_ProcessAudio
    ) >("ProcessAudio"           );
00449                   fnProcessAudio_Planar     = GetPrefixSymbol< decltype(sound4cl_ProcessAudio_Planar
    ) >("ProcessAudio_Planar"    );
00450                   fnGetBufferIn             = GetPrefixSymbol< decltype(sound4cl_GetBufferIn
    ) >("GetBufferIn"            );
00451                   fnGetBufferOut            = GetPrefixSymbol< decltype(sound4cl_GetBufferOut
    ) >("GetBufferOut"           );
00452                   fnGetEstimatedDelay       = GetPrefixSymbol< decltype(sound4cl_GetEstimatedDelay
    ) >("GetEstimatedDelay"      );
00453                   fnGetFormatName           = GetPrefixSymbol< decltype(sound4cl_GetFormatName
    ) >("GetFormatName"          );
00454                   fnGetFormatFromName       = GetPrefixSymbol< decltype(sound4cl_GetFormatFromName
    ) >("GetFormatFromName"      );
00455                   fnGetBytesFromFormat      = GetPrefixSymbol< decltype(sound4cl_GetBytesFromFormat
    ) >("GetBytesFromFormat"     );
00456                   fnGetMaxPacketFrame       = GetPrefixSymbol< decltype(sound4cl_GetMaxPacketFrame
    ) >("GetMaxPacketFrame"      );
00457                   fnAddAudio                = GetPrefixSymbol< decltype(sound4cl_AddAudio
    ) >("AddAudio"               );
00458                   fnAddPadAudio             = GetPrefixSymbol< decltype(sound4cl_AddPadAudio
    ) >("AddPadAudio"            );
00459                   fnGetOutputCount          = GetPrefixSymbol< decltype(sound4cl_GetOutputCount
    ) >("GetOutputCount"         );
00460                   fnGetAudio                = GetPrefixSymbol< decltype(sound4cl_GetAudio
    ) >("GetAudio"               );
00461                   fnAudioConvertFrom        = GetPrefixSymbol< decltype(sound4cl_AudioConvertFrom
    ) >("AudioConvertFrom"       );
00462                   fnAudioConvertTo          = GetPrefixSymbol< decltype(sound4cl_AudioConvertTo
    ) >("AudioConvertTo"         );
00463                   fnStereoToMono            = GetPrefixSymbol< decltype(sound4cl_StereoToMono
    ) >("StereoToMono"           );
00464                   fnMonoToStereo            = GetPrefixSymbol< decltype(sound4cl_MonoToStereo
    ) >("MonoToStereo"           );
00465                   fnAudioMonoFromLiveStereo = GetPrefixSymbol<
    decltype(sound4cl_AudioMonoFromLiveStereo) >("AudioMonoFromLiveStereo");
00466                   fnAudioMonoToLiveStereo   = GetPrefixSymbol< decltype(sound4cl_AudioMonoToLiveStereo
    ) >("AudioMonoToLiveStereo"  );
00467                   fnNewClient               = GetPrefixSymbol< decltype(sound4cl_NewClient
    ) >("NewClient"              );
00468                   fnDeleteClient            = GetPrefixSymbol< decltype(sound4cl_DeleteClient
    ) >("DeleteClient"           );
00469                   fnProcessJson             = GetPrefixSymbol< decltype(sound4cl_ProcessJson
    ) >("ProcessJson"            );
00470                   fnFreeJsonAnswer          = GetPrefixSymbol< decltype(sound4cl_FreeJsonAnswer
    ) >("FreeJsonAnswer"         );
00471                   fnSaveState               = GetPrefixSymbol< decltype(sound4cl_SaveState
    ) >("SaveState"              );
00472               } catch (std::runtime_error& ) {
00473                   return false;
00474               }
00475               // Webserver : not for all projects
00476               try {
00477                   fnWebserver_tcp           = GetPrefixSymbol< decltype(sound4cl_Webserver_tcp
    ) >("Webserver_tcp"          );
00478                   fnWebserver_tcp2          = GetPrefixSymbol< decltype(sound4cl_Webserver_tcp2
    ) >("Webserver_tcp2"         );
00479                   fnWebserver               = GetPrefixSymbol< decltype(sound4cl_Webserver
    ) >("Webserver"              );
00480                   fnWebserver_Stop          = GetPrefixSymbol< decltype(sound4cl_Webserver_Stop
    ) >("Webserver_Stop"         );
00481                   fnWebserver_Status        = GetPrefixSymbol< decltype(sound4cl_Webserver_Status
    ) >("Webserver_Status"       );
00482               } catch (std::runtime_error& ) {
00483                   // Ignored, handler will take care
00484               }
00485               // Stereo/Mono conversion : must be present
00486               try {
00487                   // added 2023-03-22
00488                   fnStereoToMono_Planar     = GetPrefixSymbol< decltype(sound4cl_StereoToMono_Planar
    ) >("StereoToMono_Planar"    );
00489                   fnMonoToStereo_Planar     = GetPrefixSymbol< decltype(sound4cl_MonoToStereo_Planar
    ) >("MonoToStereo_Planar"    );
00490
00491               } catch (std::runtime_error& ) {
00492                   return false;
00493               }
00494               // C functions allowed to be missing
00495               try {
00496                   // added 2023-05-22
00497                   fnSetMetadata             = GetPrefixSymbol< decltype(sound4cl_SetMetadata
    ) >("SetMetadata"            );
00498                   fnGetMetadataInfos        = GetPrefixSymbol< decltype(sound4cl_GetMetadataInfos
    ) >("GetMetadataInfos"       );
00499                   fnFreeMetadataInfos       = GetPrefixSymbol< decltype(sound4cl_FreeMetadataInfos
    ) >("FreeMetadataInfos"      );
```

```
00500                 // added 2023-06-20
00501                 fnSetPresetManager            = GetPrefixSymbol< decltype(sound4cl_SetPresetManager
              ) >("SetPresetManager"              );
00502                 fnPresetManager_InformChange  = GetPrefixSymbol<
      decltype(sound4cl_PresetManager_InformChange     ) >("PresetManager_InformChange"    );
00503
00504                 // added 2023-09-21
00505                 fnGetPossibleChunkSizeInFrames = GetPrefixSymbol<
      decltype(sound4cl_GetPossibleChunkSizeInFrames  ) >("GetPossibleChunkSizeInFrames"  );
00506                 fnGetProcessChunkFrames        = GetPrefixSymbol<
      decltype(sound4cl_GetProcessChunkFrames         ) >("GetProcessChunkFrames"         );
00507                 fnInitProcess3                 = GetPrefixSymbol< decltype(sound4cl_InitProcess3
              ) >("InitProcess3"                  );
00508             }  catch (std::runtime_error& ) {
00509                 // Ignored, handler will take care
00510             }
00511
00512             // bus: not for all projects
00513             try {
00514                 // added 2023-06-26
00515                 fnNewBus                    = GetPrefixSymbol< decltype(sound4cl_NewBus
      ) >("NewBus"                );
00516                 fnFreeBus                   = GetPrefixSymbol< decltype(sound4cl_FreeBus
      ) >("FreeBus"               );
00517                 fnSetInstanceBus            = GetPrefixSymbol< decltype(sound4cl_SetInstanceBus
      ) >("SetInstanceBus"        );
00518             }  catch (std::runtime_error& ) {
00519                 // Ignored, handler will take care
00520             }
00521
00522             // Other optional
00523             try {
00524                 // added 2024-02-19
00525                 fnSetMetadataMulti          = GetPrefixSymbol< decltype(sound4cl_SetMetadataMulti
      ) >("SetMetadataMulti"      );
00526
00527             }  catch (std::runtime_error& ) {
00528                 // Ignored, handler will take care
00529             }
00530
00531             m_bOK=true;
00532             return true;
00533         }
00540         bool IsOk() const {
00541             return m_bOK;
00542         }
00543
00548         void AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl,
      sound4cl_SampleFormat fmt)
00549             { fnAudioConvertFrom(payload, output, nSpl, fmt); }
00550         void AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl, sound4cl_SampleFormat
      fmt)
00551             { fnAudioConvertTo(input, payload, nSpl, fmt); }
00552         void StereoToMono(const float *input, float *output, size_t nSpl)
00553             { fnStereoToMono(input, output, nSpl); }
00554         void MonoToStereo(const float *input, float *output, size_t nSpl)
00555             { fnMonoToStereo(input, output, nSpl); }
00556         void StereoToMono_Planar(const float *inputL, const float *inputR, float *output, size_t nSpl)
00557             { fnStereoToMono_Planar(inputL, inputR, output, nSpl); }
00558         void MonoToStereo_Planar(const float *input, float *outputL, float *outputR, size_t nSpl)
00559             { fnMonoToStereo_Planar(input, outputL, outputR, nSpl); }
00560         void AudioMonoFromLiveStereo(const uint8_t *payload, float *output)
00561             { fnAudioMonoFromLiveStereo(payload, output); }
00562         void AudioMonoToLiveStereo(const float *input, uint8_t *payload)
00563             { fnAudioMonoToLiveStereo(input, payload); }
00564
00570         std::string GetVersion()
00571             { return std::string(fnGetVersion()); }
00572
00581         unsigned int GetChunkSizeInFrames()
00582             { return fnGetChunkSizeInFrames(); }
00583
00592         std::vector<unsigned int> GetPossibleChunkSizeInFrames()
00593             {
00594                 std::vector<unsigned int> list;
00595                 if (fnGetPossibleChunkSizeInFrames) {
00596                     for (unsigned int* src=fnGetPossibleChunkSizeInFrames();*src;src++) {
00597                         list.push_back(*src);
00598                     }
00599                 } else {
00600                     list.push_back(fnGetChunkSizeInFrames());
00601                 }
00602                 return list;
00603             }
00604
00610         unsigned int GetChannelCount()
00611             { return fnGetChannelCount(); }
```

```
00612
00620         unsigned int GetAudioInputCount()
00621             { return fnGetAudioInputCount(); }
00622
00630         unsigned int GetAudioOutputCount()
00631             { return fnGetAudioOutputCount(); }
00632
00640         unsigned int GetSampleRate()
00641             { return fnGetSampleRate(); }
00642
00649         std::string GetFormatName( const sound4cl_SampleFormat fmt)
00650             { return std::string(fnGetFormatName(fmt)); }
00651
00658         sound4cl_SampleFormat GetFormatFromName( const std::string& name)
00659             { return fnGetFormatFromName(name.c_str()); }
00660
00667         unsigned int GetBytesFromFormat( const sound4cl_SampleFormat fmt)
00668             { return fnGetBytesFromFormat(fmt); }
00669
00673         void SetLogSeverity(LogSeverity severity)
00674             { fnSetLogSeverity(severity); }
00675
00679         void SetLoggerCallback(log_cb_t cb)
00680             { _log_cb=cb; fnSetLoggerCallback(&_log_cb_c); }
00681     };
00682
00688     class CBus {
00689         public:
00690             CBus(CProcessor& dynlib)
00691                 : m_dynlib(dynlib)
00692                 {
00693                     if (m_dynlib.fnNewBus) {
00694                         m_bus=m_dynlib.fnNewBus();
00695                     }
00696                 }
00697             ~CBus()
00698                 {
00699                     if (m_bus && m_dynlib.fnFreeBus) {
00700                         m_dynlib.fnFreeBus(m_bus);
00701                     }
00702                     m_bus = nullptr;
00703                 }
00704             sound4cl_CBus *Get() const { return m_bus; }
00705         private:
00706             CProcessor& m_dynlib;
00707             sound4cl_CBus *m_bus;
00708     };
00709
00715     class CPresetLoader {
00716     public:
00717         CPresetLoader() = default;
00718         virtual ~CPresetLoader() = default;
00719
00720         virtual bool IsReadOnly() = 0;
00721         virtual bool Exists(const std::filesystem::path &name) = 0;
00722         virtual bool Remove(const std::filesystem::path &name) = 0;
00723         virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) = 0;
00724         virtual std::vector<std::filesystem::path> GetAll() = 0;
00725         virtual std::string Read(const std::filesystem::path &filename) = 0;
00726         virtual bool Write(const std::filesystem::path &filename, const std::string &content) =0;
00727     };
00728     using PresetChange_Kind = sound4cl_PresetChange_Kind;
00729
00735     class CInstance {
00736     public:
00740         CInstance(CProcessor& dynlib)
00741         : m_dynlib(dynlib)
00742             {
00743                 params = m_dynlib.fnNewParameters();
00744                 if (!params) throw std::bad_alloc();
00745             }
00746         // non-copyable
00747         CInstance( const CInstance& ) = delete;
00748         CInstance& operator=( const CInstance& ) = delete;
00752         ~CInstance()
00753             {
00754                 Stop();
00755                 if (params) m_dynlib.fnFreeParameters(params);
00756             }
00760        bool IsOk() const { return instance!=nullptr; }
00768         void SetParam(const std::string& name, const std::string& value)
00769             {
00770                 assert(params);
00771                 m_dynlib.fnSetParameter(params, name.c_str(), value.c_str());
00772             }
00778         std::string GetParam(const std::string& name)
00779             {
```

```
00780                 assert(params);
00781                 auto c_value=m_dynlib.fnGetParameter(params, name.c_str());
00782                 std::string ret(c_value);
00783                 m_dynlib.fnFreeParameterValue(c_value);
00784                 return ret;
00785             }
00786
00790         void SetBus(const CBus& bus) {
00791             assert(params);
00792             if (m_dynlib.fnSetInstanceBus) {
00793                 m_dynlib.fnSetInstanceBus(params,bus.Get());
00794             }
00795         }
00796
00806         void SetPresetManager(CPresetLoader *preset_manager)
00807             {
00808                 if (!preset_manager) return;
00809                 if (!m_dynlib.fnSetPresetManager) return;
00810                 assert(params);
00811                 m_dynlib.fnSetPresetManager(params,
00812                     sound4cl_custom_reader,
00813                     sound4cl_custom_reader_free,
00814                     sound4cl_custom_writer,
00815                     sound4cl_custom_exists,
00816                     sound4cl_custom_getall,
00817                     sound4cl_custom_getall_free,
00818                     sound4cl_custom_remove,
00819                     sound4cl_custom_rename,
00820                     preset_manager->IsReadOnly(),
00821                     preset_manager
00822                 );
00823             }
00824
00839         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)
00840             {
00841                 assert(!instance);
00842                 std::string l_save_path;
00843                 if (!save_path.empty()) {
00844                     l_save_path = save_path.u8string();
00845                 }
00846                 if (frames_per_chunk==0) {
00847                     frames_per_chunk=m_dynlib.GetChunkSizeInFrames();
00848                 }
00849                 if (m_dynlib.fnInitProcess3) {
00850                     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);
00851                 } else if (frames_per_chunk!=m_dynlib.GetChunkSizeInFrames()) {
00852                     return false;
00853                 } else {
00854                     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);
00855                 }
00856                 if (!instance) return false;
00857                 if (!init_metadata.empty()) {
00858                     for (auto&& [key,value]: init_metadata) {
00859                         m_dynlib.fnSetMetadata(instance, key.c_str(), value.c_str());
00860                     }
00861                     init_metadata.clear();
00862                 }
00863                 update_thread = std::thread([this, json_port](){
00864                     OnUpdateThreadStart();
00865                     m_dynlib.fnStartUpdateThread(instance, json_port);
00866                     OnUpdateThreadStop();
00867                 });
00868                 int timeout=5000;
00869                 #ifdef DEBUG
00870                     timeout=60*1000; // For debugger pauses
00871                 #endif
00872                 if (m_dynlib.fnWaitUpdateThreadReady(instance, timeout)<0) {
00873                     return false;
00874                 }
00875                 return true;
00876             }
00877
00885         unsigned int GetChunkFrames() {
00886             if (instance && m_dynlib.fnGetProcessChunkFrames) {
00887                 return m_dynlib.fnGetProcessChunkFrames(instance);
00888             }
00889             return m_dynlib.fnGetChunkSizeInFrames();
00890         }
00891
00899         void PresetManager_InformChange(const std::filesystem::path& relative_path, PresetChange_Kind
      change_kind)
00900             {
00901                 if (m_dynlib.fnPresetManager_InformChange) {
```

```
00902                   m_dynlib.fnPresetManager_InformChange(instance, relative_path.c_str(),
      (sound4cl_PresetChange_Kind) change_kind);
00903               }
00904           }
00905
00917       void SetMetadata(const std::string& key, const char* value)
00918           {
00919               if (m_dynlib.fnSetMetadata) {
00920                   if (instance) {
00921                       m_dynlib.fnSetMetadata(instance, key.c_str(), value);
00922                   } else {
00923                       init_metadata.push_back( {key, value} );
00924                   }
00925               }
00926           }
00927
00928
00938       void SetMetadataMulti(const std::unordered_map<std::string, const char*>& list)
00939           {
00940               if (instance) {
00941                   if (m_dynlib.fnSetMetadataMulti) {
00942                       typedef const char* pchar;
00943                       pchar* keyvalue=new pchar[2*list.size()+1];
00944                       size_t n=0;
00945                       for (auto&& [key,value]: list) {
00946                           keyvalue[2*n+0]=key.c_str();
00947                           keyvalue[2*n+1]=value;
00948                           n++;
00949                       }
00950                       keyvalue[2*n+0]=nullptr;
00951
00952                       sound4cl_SetMetadataMulti(instance, keyvalue);
00953
00954                       delete[] keyvalue;
00955                   } else {
00956                       for (auto&& [key,value]: list) {
00957                           SetMetadata(key, value);
00958                       }
00959                   }
00960               } else {
00961                   for (auto&& [key,value]: list) {
00962                       if (value) {
00963                           init_metadata.push_back( {key, value} );
00964                       }
00965                   }
00966               }
00967           }
00968
00974       std::vector< std::tuple<std::string,std::string> > GetMetadataInfos()
00975           {
00976               std::vector< std::tuple<std::string,std::string> > values;
00977               if (m_dynlib.fnGetMetadataInfos) {
00978                   const char** c_values = m_dynlib.fnGetMetadataInfos(instance);
00979                   if (c_values) {
00980                       for (const char** c_value=c_values; *c_value; ) {
00981                           std::string key(*c_value);
00982                           c_value++;
00983                           if (*c_value) {
00984                               std::string descr(*c_value);
00985                               c_value++;
00986                               values.push_back( {key,descr} );
00987                           }
00988                       }
00989                       m_dynlib.fnFreeMetadataInfos(instance, c_values);
00990                   }
00991               }
00992               return values;
00993           }
00994
00995       // Can be overloaded, called at start of UpdateThread in the thread
00996       virtual void OnUpdateThreadStart() {}
00997       // Can be overloaded to call at end of UpdateThread in the thread
00998       virtual void OnUpdateThreadStop() {}
00999
01005       bool StartWebServer(int http_port, int https_port=0)
01006           {
01007               assert(instance);
01008               assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
01009               if (!m_dynlib.fnWebserver) {
01010                   return false;
01011               }
01012               webserver = m_dynlib.fnWebserver(http_port,https_port,instance);
01013               if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
01014                   return false;
01015               }
01016               int web_status=m_dynlib.fnWebserver_Status(webserver);
01017               if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
```

```
01018                     return false;
01019                 }
01020                 if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
01021                     return false;
01022                 }
01023                 return true;
01024             }
01030         void StopWebServer()
01031             {
01032                 if (!m_dynlib.fnWebserver_Stop) return;
01033                 if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
01034                     m_dynlib.fnWebserver_Stop(webserver, 1000);
01035                     webserver = SOUND4_INVALID_WEBSERVER_ID;
01036                 }
01037             }
01038
01045         int Terminate()
01046             {
01047                 if (!instance) return 0;
01048                 return m_dynlib.fnTerminateProcess(instance);
01049             }
01050
01056         void Stop()
01057             {
01058                 if (!instance) return;
01059                 StopWebServer();
01060                 if (update_thread.joinable()) {
01061                     m_dynlib.fnStopUpdateThread(instance); // this will exit the update thread
01062                     update_thread.join();
01063                 }
01064                 m_dynlib.fnExitProcess(instance);
01065                 instance=nullptr;
01066             }
01067
01073         unsigned int GetEstimatedDelay()
01074             {
01075                 assert(instance);
01076                 return m_dynlib.fnGetEstimatedDelay(instance);
01077             }
01078
01089         float* GetBufferIn()
01090             {
01091                 assert(instance);
01092                 return m_dynlib.fnGetBufferIn(instance);
01093
01094             }
01105         float* GetBufferOut()
01106             {
01107                 assert(instance);
01108                 return m_dynlib.fnGetBufferOut(instance);
01109             }
01115         void ProcessAudio()
01116             {
01117                 assert(instance);
01118                 m_dynlib.fnProcessAudio(instance, m_dynlib.fnGetBufferIn(instance),
    m_dynlib.fnGetBufferOut(instance));
01119             }
01133         // void ProcessAudio_Planar(const std::array< const std::array<const float,ChunkFrames>,
    InputChannels>& input, std::array< std::array<float,ChunkFrames>, OutputChannels>& output)
01134         void ProcessAudio_Planar(float const * const *input, float * const *output)
01135             {
01136                 assert(instance);
01137                 m_dynlib.fnProcessAudio_Planar(instance, input, output);
01138             }
01139
01151             template<typename T>
01152         std::vector<T> ProcessAnyAudio(const std::vector<T> input)
01153             {
01154                 assert(instance);
01155                 std::vector<T> output;
01156                 unsigned int out_offset=0;
01157                 unsigned int in_offset=0;
01158                 unsigned int todo = input.size();
01159                 while (todo>0) {
01160                     unsigned int left = AddAudio(&input[in_offset], todo);
01161                     unsigned int out_avail = m_dynlib.fnGetOutputCount(instance);
01162                     output.resize(out_offset + out_avail);
01163                     GetAudio(&output[out_offset], out_avail);
01164                     out_offset+=out_avail;
01165                     in_offset += todo-left;
01166                     todo=left;
01167                 }
01168                 return output;
01169             }
01170
01176         class CClient {
01177             public:
```

```
01178                 CClient(sound4cl_CInstance* instance, CProcessor& dynlib)
01179                 : m_dynlib(dynlib)
01180                     {
01181                         assert(instance);
01182                         client=m_dynlib.fnNewClient(instance);
01183                         if (!client) throw std::bad_alloc();
01184                     }
01185                 // non-copyable
01186                 CClient( const CInstance& ) = delete;
01187                 CClient& operator=( const CInstance& ) = delete;
01188                 ~CClient()
01189                     {
01190                         if (client) {
01191                             m_dynlib.fnDeleteClient(client);
01192                             client=nullptr;
01193                         }
01194                     }
01202                 std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
01203                     {
01204                         assert(client);
01205                         int need_save=0;
01206                         const char *canswer = m_dynlib.fnProcessJson(client, request.c_str(),
      &need_save);
01207                         if (!canswer) return {};
01208                         std::string answer(canswer);
01209                         m_dynlib.fnFreeJsonAnswer (canswer);
01210                         if (NeedSave) {
01211                             *NeedSave=(need_save!=0);
01212                         }
01213                         return answer;
01214                     }
01215             private:
01216                 CProcessor& m_dynlib;
01217                 sound4cl_CClientInstance *client = nullptr;
01218         };
01226         std::shared_ptr<CClient> NewClient()
01227             {
01228                 assert(instance);
01229                 return std::make_shared<CClient>(instance, m_dynlib);
01230             }
01231
01232     protected:
01233             template<typename T>
01234         unsigned int AddAudio(const T* payload, unsigned int nFrame)
01235             {
01236                 assert(instance);
01237                 return m_dynlib.fnAddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
      helper::SampleFormat<T>::format);
01238             }
01239             template<typename T>
01240         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
01241             {
01242                 assert(instance);
01243                 return m_dynlib.fnGetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
      helper::SampleFormat<T>::format);
01244             }
01245
01246     private:
01247         CProcessor& m_dynlib;
01248         sound4cl_CParameters* params = nullptr;
01249         sound4cl_CInstance* instance = nullptr;
01250         std::thread update_thread;
01251         std::vector< std::pair<std::string,std::string> > init_metadata;
01252         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
01253     };
01254
01255 }; // namespace sound4
01256
01257
01258 // bridge C callbacks to CPresetLoader
01259 extern "C" {
01260     static char *sound4cl_custom_reader(const fs_char *filename, void* userdata) {
01261         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01262         std::string content=preset_loader->Read(filename);
01263         return strdup(content.c_str());
01264     }
01265     static void sound4cl_custom_reader_free(char *content, void* userdata) {
01266         if (!content) return;
01267         free(content);
01268     }
01269     static int sound4cl_custom_writer(const fs_char *filename, const char *content, void* userdata) {
01270         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01271         auto res=preset_loader->Write(filename,content);
01272         return res?0:-1;
01273     }
01274     static int sound4cl_custom_exists(const fs_char *filename, void* userdata) {
01275         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
```

```
01276         auto res=preset_loader->Exists(filename);
01277         return res?0:-1;
01278     }
01279     static fs_char** sound4cl_custom_getall(void* userdata) {
01280         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01281         auto res=preset_loader->GetAll();
01282         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
01283         for (size_t n=0;n<res.size();n++) {
01284             all[n]=fs_strdup(res[n].c_str());
01285         }
01286         all[res.size()]=nullptr;
01287         return all;
01288     }
01289     static void sound4cl_custom_getall_free(fs_char** all, void* userdata) {
01290         if (!all) return;
01291         for (fs_char** one=all;*one;one++) {
01292             free(*one);
01293         }
01294         free(all);
01295     }
01296     static int sound4cl_custom_remove(const fs_char *filename, void* userdata) {
01297         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01298         auto res=preset_loader->Remove(filename);
01299         return res?0:-1;
01300     }
01301     static int sound4cl_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
01302         sound4::CPresetLoader *preset_loader=reinterpret_cast<sound4::CPresetLoader*>(userdata);
01303         auto res=preset_loader->Rename(from,to);
01304         return res?0:-1;
01305     }
01306
01307 };
```

11.17 sound4cl_cdef.h File Reference

C function signature definition for all sound4.cl libraries.

```
#include <stdint.h>
#include <stringapiset.h>
#include <wchar.h>
```

Classes

- struct sound4cl_SOUND4_ProcessInfo

Macros

- #define fs_strdup wcsdup

  helper for OS dependant file name copy
- #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 void(* sound4cl_loggerfn) (enum sound4cl_LogSeverity, const char *)
- typedef char *(* sound4cl_storage_reader) (const fs_char *filename, void *userdata)
- typedef void(* sound4cl_storage_reader_free) (char *content, void *userdata)
- typedef int(* sound4cl_storage_writer) (const fs_char *filename, const char *content, void *userdata)
- typedef int(* sound4cl_storage_exists) (const fs_char *filename, void *userdata)
- typedef fs_char **(* sound4cl_storage_getall) (void *userdata)
- typedef void(* sound4cl_storage_getall_free) (fs_char **all, void *userdata)
- typedef int(* sound4cl_storage_remove) (const fs_char *filename, void *userdata)
- typedef int(* sound4cl_storage_rename) (const fs_char *from, const fs_char *to, void *userdata)

Enumerations

- enum sound4cl_LogSeverity {
  sound4cl_none = 0 , sound4cl_fatal = 1 , sound4cl_error = 2 , sound4cl_warning = 3 ,
  sound4cl_info = 4 , sound4cl_verbose = 5 , sound4cl_verbose2 = 6 , sound4cl_verbose3 = 7 ,
  sound4cl_verbose4 = 8 , sound4cl_verbose5 = 9 }
- enum sound4cl_PresetChange_Kind { change_kind_created = 1 , change_kind_modified , change_kind_deleted }
- enum sound4cl_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 sound4cl_SOUND4_ProcessInfo * sound4cl_SOUND4_GetProcessInfo ()
- const char * sound4cl_GetVersion ()
- unsigned int sound4cl_GetChunkSizeInFrames ()
- unsigned int * sound4cl_GetPossibleChunkSizeInFrames ()
- unsigned int sound4cl_GetChannelCount ()
- unsigned int sound4cl_GetAudioInputCount ()
- unsigned int sound4cl_GetAudioOutputCount ()
- unsigned int sound4cl_GetSampleRate ()
- void sound4cl_SetLoggerCallback (sound4cl_loggerfn logger)
- void sound4cl_SetLogSeverity (enum sound4cl_LogSeverity severity)
- struct sound4cl_CParameters * sound4cl_NewParameters ()
- void sound4cl_FreeParameters (struct sound4cl_CParameters *params)
- void sound4cl_SetParameter (struct sound4cl_CParameters *params, const char *name, const char *value)
- const char * sound4cl_GetParameter (struct sound4cl_CParameters *params, const char *name)
- void sound4cl_FreeParameterValue (const char *value)
- struct sound4cl_CInstance * sound4cl_InitProcess (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path)
- struct sound4cl_CInstance * sound4cl_InitProcess2 (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path, const struct sound4cl_↩ CParameters *parameters)
- struct sound4cl_CInstance * sound4cl_InitProcess3 (const char *LoginKey, const char *RadioName, const char *Access_Key_ID, const char *Access_Key_Secret, const char *save_path, const struct sound4cl_↩ CParameters *parameters, unsigned int frames_per_chunk)
- unsigned int sound4cl_GetProcessChunkFrames (struct sound4cl_CInstance *instance)
- int sound4cl_TerminateProcess (struct sound4cl_CInstance *instance)
- void sound4cl_ExitProcess (struct sound4cl_CInstance *instance)
- struct sound4cl_CBus * sound4cl_NewBus ()
- void sound4cl_FreeBus (struct sound4cl_CBus *bus)
- void sound4cl_SetInstanceBus (struct sound4cl_CParameters *params, struct sound4cl_CBus *bus)
- void sound4cl_SetPresetManager (struct sound4cl_CParameters *params, sound4cl_storage_reader reader, sound4cl_storage_reader_free, sound4cl_storage_writer writer, sound4cl_storage_exists exists, sound4cl_storage_getall getall, sound4cl_storage_getall_free getall_free, sound4cl_storage_remove remove, sound4cl_storage_rename rename, int IsReadOnly, void *userdata)
- void sound4cl_PresetManager_InformChange (struct sound4cl_CInstance *instance, const fs_char *relative_path, enum sound4cl_PresetChange_Kind change_kind)
- void sound4cl_SetMetadata (struct sound4cl_CInstance *instance, const char *key, const char *value)
- void sound4cl_SetMetadataMulti (struct sound4cl_CInstance *instance, const char **keyvalue)
- const char ** sound4cl_GetMetadataInfos (struct sound4cl_CInstance *instance)
- void sound4cl_FreeMetadataInfos (struct sound4cl_CInstance *instance, const char **infos)

- void sound4cl_StartUpdateThread (struct sound4cl_CInstance *instance, unsigned int port)
- void sound4cl_StopUpdateThread (struct sound4cl_CInstance *instance)
- int sound4cl_WaitUpdateThreadReady (struct sound4cl_CInstance *instance, int milliseconds)
- void sound4cl_ProcessAudio (struct sound4cl_CInstance *instance, const float *input, float *output)
- void sound4cl_ProcessAudio_Planar (struct sound4cl_CInstance *instance, float const *const *input, float *const *output)
- float * sound4cl_GetBufferIn (struct sound4cl_CInstance *instance)
- float * sound4cl_GetBufferOut (struct sound4cl_CInstance *instance)
- unsigned int sound4cl_GetEstimatedDelay (struct sound4cl_CInstance *instance)
- const char * sound4cl_GetFormatName (const enum sound4cl_SampleFormat fmt)
- enum sound4cl_SampleFormat sound4cl_GetFormatFromName (const char *name)
- unsigned int sound4cl_GetBytesFromFormat (const enum sound4cl_SampleFormat fmt)
- unsigned int sound4cl_GetMaxPacketFrame (struct sound4cl_CInstance *instance)
- unsigned int sound4cl_AddAudio (struct sound4cl_CInstance *instance, const uint8_t *payload, unsigned int nFrame, enum sound4cl_SampleFormat fmt)
- unsigned int sound4cl_AddPadAudio (struct sound4cl_CInstance *instance)
- unsigned int sound4cl_GetOutputCount (struct sound4cl_CInstance *instance)
- unsigned int sound4cl_GetAudio (struct sound4cl_CInstance *instance, uint8_t *payload, unsigned int max↩ _nFrame, enum sound4cl_SampleFormat fmt)
- void sound4cl_AudioConvertFrom (const uint8_t *payload, float *output, size_t nSpl, enum sound4cl_SampleFormat fmt)
- void sound4cl_AudioConvertTo (const float *input, uint8_t *payload, size_t nSpl, enum sound4cl_SampleFormat fmt)
- void sound4cl_StereoToMono (const float *input, float *output, size_t nFrame)
- void sound4cl_MonoToStereo (const float *input, float *output, size_t nFrame)
- void sound4cl_StereoToMono_Planar (const float *inputL, const float *inputR, float *output, size_t nFrame)
- void sound4cl_MonoToStereo_Planar (const float *input, float *outputL, float *outputR, size_t nFrame)
- void sound4cl_AudioMonoFromLiveStereo (const uint8_t *payload, float *output)
- void sound4cl_AudioMonoToLiveStereo (const float *input, uint8_t *payload)
- struct sound4cl_CClientInstance * sound4cl_NewClient (struct sound4cl_CInstance *instance)
- void sound4cl_DeleteClient (struct sound4cl_CClientInstance *client)
- const char * sound4cl_ProcessJson (struct sound4cl_CClientInstance *client, const char *json_str, int *need_save)
- void sound4cl_FreeJsonAnswer (const char *json_str)
- int sound4cl_SaveState (struct sound4cl_CInstance *instance)
- uint64_t sound4cl_Webserver_tcp (unsigned int listenport, unsigned int listenport_secure, const char *socket_ip, unsigned int socket_port)
- 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)
- uint64_t sound4cl_Webserver (unsigned int listenport, unsigned int listenport_secure, struct sound4cl_↩ CInstance *instance)
- int sound4cl_Webserver_Stop (uint64_t id, int timeout_ms)
- int sound4cl_Webserver_Status (uint64_t id)

11.17.1 Macro Definition Documentation

11.17.1.1 fs_strdup

```
#define fs_strdup wcsdup
```

Definition at line 17 of file sound4cl_cdef.h.

11.17.1.2 SOUND4_INVALID_WEBSERVER_ID

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

Definition at line 62 of file sound4cl_cdef.h.

11.17.1.3 SOUND4_WEBSERVER_HTTP_OK

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

Definition at line 63 of file sound4cl_cdef.h.

11.17.1.4 SOUND4_WEBSERVER_HTTPS_OK

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

Definition at line 64 of file sound4cl_cdef.h.

11.17.2 Typedef Documentation

11.17.2.1 fs_char

```
typedef wchar_t fs_char
```

Definition at line 18 of file sound4cl_cdef.h.

11.17.2.2 sound4cl_loggerfn

```
typedef void(* sound4cl_loggerfn) (enum sound4cl_LogSeverity, const char *)
```

Definition at line 102 of file sound4cl_cdef.h.

11.17.2.3 sound4cl_storage_exists

```
typedef int(* sound4cl_storage_exists) (const fs_char *filename, void *userdata)
```

Definition at line 143 of file sound4cl_cdef.h.

11.17.2.4 sound4cl_storage_getall

```
typedef fs_char**(* sound4cl_storage_getall) (void *userdata)
```

Definition at line 144 of file sound4cl_cdef.h.

11.17.2.5 sound4cl_storage_getall_free

```
typedef void(* sound4cl_storage_getall_free) (fs_char **all, void *userdata)
```

Definition at line 145 of file sound4cl_cdef.h.

11.17.2.6 sound4cl_storage_reader

```
typedef char*(* sound4cl_storage_reader) (const fs_char *filename, void *userdata)
```

Definition at line 140 of file sound4cl_cdef.h.

11.17.2.7 sound4cl_storage_reader_free

```
typedef void(* sound4cl_storage_reader_free) (char *content, void *userdata)
```

Definition at line 141 of file sound4cl_cdef.h.

11.17.2.8 sound4cl_storage_remove

```
typedef int(* sound4cl_storage_remove) (const fs_char *filename, void *userdata)
```

Definition at line 146 of file sound4cl_cdef.h.

11.17.2.9 sound4cl_storage_rename

```
typedef int(* sound4cl_storage_rename) (const fs_char *from, const fs_char *to, void *userdata)
```

Definition at line 147 of file sound4cl_cdef.h.

11.17.2.10 sound4cl_storage_writer

```
typedef int(* sound4cl_storage_writer) (const fs_char *filename, const char *content, void
*userdata)
```

Definition at line 142 of file sound4cl_cdef.h.

11.17.3 Enumeration Type Documentation

11.17.3.1 sound4cl_LogSeverity

```
enum sound4cl_LogSeverity
```

Enumerator

sound4cl_none	
sound4cl_fatal	
sound4cl_error	
sound4cl_warning	
sound4cl_info	
sound4cl_verbose	
sound4cl_verbose2	
sound4cl_verbose3	
sound4cl_verbose4	
sound4cl_verbose5	

Definition at line 41 of file sound4cl_cdef.h.

11.17.3.2 sound4cl_PresetChange_Kind

```
enum sound4cl_PresetChange_Kind
```

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 57 of file sound4cl_cdef.h.

11.17.3.3 sound4cl_SampleFormat

```
enum sound4cl_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

Enumerator

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 69 of file sound4cl_cdef.h.

11.17.4 Function Documentation

11.17.4.1 sound4cl_AddAudio()

```
unsigned int sound4cl_AddAudio (
            struct sound4cl_CInstance * instance,
            const uint8_t * payload,
            unsigned int nFrame,
            enum sound4cl_SampleFormat fmt )
```

11.17.4.2 sound4cl_AddPadAudio()

```
unsigned int sound4cl_AddPadAudio (
            struct sound4cl_CInstance * instance )
```

11.17.4.3 sound4cl_AudioConvertFrom()

```
void sound4cl_AudioConvertFrom (
            const uint8_t * payload,
            float * output,
            size_t nSpl,
            enum sound4cl_SampleFormat fmt )
```

11.17.4.4 sound4cl_AudioConvertTo()

```
void sound4cl_AudioConvertTo (
            const float * input,
            uint8_t * payload,
            size_t nSpl,
            enum sound4cl_SampleFormat fmt )
```

11.17.4.5 sound4cl_AudioMonoFromLiveStereo()

```
void sound4cl_AudioMonoFromLiveStereo (
            const uint8_t * payload,
            float * output )
```

11.17.4.6 sound4cl_AudioMonoToLiveStereo()

```
void sound4cl_AudioMonoToLiveStereo (
            const float * input,
            uint8_t * payload )
```

11.17.4.7 sound4cl_DeleteClient()

```
void sound4cl_DeleteClient (
            struct sound4cl_CClientInstance * client )
```

11.17.4.8 sound4cl_ExitProcess()

```
void sound4cl_ExitProcess (
            struct sound4cl_CInstance * instance )
```

11.17.4.9 sound4cl_FreeBus()

```
void sound4cl_FreeBus (
            struct sound4cl_CBus * bus )
```

11.17.4.10 sound4cl_FreeJsonAnswer()

```
void sound4cl_FreeJsonAnswer (
            const char * json_str )
```

11.17.4.11 sound4cl_FreeMetadataInfos()

```
void sound4cl_FreeMetadataInfos (
            struct sound4cl_CInstance * instance,
            const char ** infos )
```

11.17.4.12 sound4cl_FreeParameters()

```
void sound4cl_FreeParameters (
            struct sound4cl_CParameters * params )
```

11.17.4.13 sound4cl_FreeParameterValue()

```
void sound4cl_FreeParameterValue (
            const char * value )
```

11.17.4.14 sound4cl_GetAudio()

```
unsigned int sound4cl_GetAudio (
            struct sound4cl_CInstance * instance,
            uint8_t * payload,
            unsigned int max_nFrame,
            enum sound4cl_SampleFormat fmt )
```

11.17.4.15 sound4cl_GetAudioInputCount()

```
unsigned int sound4cl_GetAudioInputCount ( )
```

11.17.4.16 sound4cl_GetAudioOutputCount()

```
unsigned int sound4cl_GetAudioOutputCount ( )
```

11.17.4.17 sound4cl_GetBufferIn()

```
float* sound4cl_GetBufferIn (
            struct sound4cl_CInstance * instance )
```

11.17.4.18 sound4cl_GetBufferOut()

```
float* sound4cl_GetBufferOut (
            struct sound4cl_CInstance * instance )
```

11.17.4.19 sound4cl_GetBytesFromFormat()

```
unsigned int sound4cl_GetBytesFromFormat (
            const enum sound4cl_SampleFormat fmt )
```

11.17.4.20 sound4cl_GetChannelCount()

```
unsigned int sound4cl_GetChannelCount ( )
```

11.17.4.21 sound4cl_GetChunkSizeInFrames()

```
unsigned int sound4cl_GetChunkSizeInFrames ( )
```

11.17.4.22 sound4cl_GetEstimatedDelay()

```
unsigned int sound4cl_GetEstimatedDelay (
            struct sound4cl_CInstance * instance )
```

11.17.4.23 sound4cl_GetFormatFromName()

```
enum sound4cl_SampleFormat sound4cl_GetFormatFromName (
            const char * name )
```

11.17.4.24 sound4cl_GetFormatName()

```
const char* sound4cl_GetFormatName (
            const enum sound4cl_SampleFormat fmt )
```

11.17.4.25 sound4cl_GetMaxPacketFrame()

```
unsigned int sound4cl_GetMaxPacketFrame (
            struct sound4cl_CInstance * instance )
```

11.17.4.26 sound4cl_GetMetadataInfos()

```
const char** sound4cl_GetMetadataInfos (
            struct sound4cl_CInstance * instance )
```

11.17.4.27 sound4cl_GetOutputCount()

```
unsigned int sound4cl_GetOutputCount (
            struct sound4cl_CInstance * instance )
```

11.17.4.28 sound4cl_GetParameter()

```
const char* sound4cl_GetParameter (
            struct sound4cl_CParameters * params,
            const char * name )
```

11.17.4.29 sound4cl_GetPossibleChunkSizeInFrames()

```
unsigned int* sound4cl_GetPossibleChunkSizeInFrames ( )
```

11.17.4.30 sound4cl_GetProcessChunkFrames()

```
unsigned int sound4cl_GetProcessChunkFrames (
            struct sound4cl_CInstance * instance )
```

11.17.4.31 sound4cl_GetSampleRate()

```
unsigned int sound4cl_GetSampleRate ( )
```

11.17.4.32 sound4cl_GetVersion()

```
const char* sound4cl_GetVersion ( )
```

11.17.4.33 sound4cl_InitProcess()

```
struct sound4cl_CInstance* sound4cl_InitProcess (
            const char * LoginKey,
            const char * RadioName,
            const char * Access_Key_ID,
            const char * Access_Key_Secret,
            const char * save_path )
```

11.17.4.34 sound4cl_InitProcess2()

```
struct sound4cl_CInstance* sound4cl_InitProcess2 (
            const char * LoginKey,
            const char * RadioName,
            const char * Access_Key_ID,
            const char * Access_Key_Secret,
            const char * save_path,
            const struct sound4cl_CParameters * parameters )
```

11.17.4.35 sound4cl_InitProcess3()

```
struct sound4cl_CInstance* sound4cl_InitProcess3 (
            const char * LoginKey,
            const char * RadioName,
            const char * Access_Key_ID,
            const char * Access_Key_Secret,
            const char * save_path,
            const struct sound4cl_CParameters * parameters,
            unsigned int frames_per_chunk )
```

11.17.4.36 sound4cl_MonoToStereo()

```
void sound4cl_MonoToStereo (
            const float * input,
            float * output,
            size_t nFrame )
```

11.17.4.37 sound4cl_MonoToStereo_Planar()

```
void sound4cl_MonoToStereo_Planar (
            const float * input,
            float * outputL,
            float * outputR,
            size_t nFrame )
```

11.17.4.38 sound4cl_NewBus()

```
struct sound4cl_CBus* sound4cl_NewBus ( )
```

11.17.4.39 sound4cl_NewClient()

```
struct sound4cl_CClientInstance* sound4cl_NewClient (
            struct sound4cl_CInstance * instance )
```

11.17.4.40 sound4cl_NewParameters()

```
struct sound4cl_CParameters* sound4cl_NewParameters ( )
```

11.17.4.41 sound4cl_PresetManager_InformChange()

```
void sound4cl_PresetManager_InformChange (
            struct sound4cl_CInstance * instance,
            const fs_char * relative_path,
            enum sound4cl_PresetChange_Kind change_kind )
```

11.17.4.42 sound4cl_ProcessAudio()

```
void sound4cl_ProcessAudio (
            struct sound4cl_CInstance * instance,
            const float * input,
            float * output )
```

11.17.4.43 sound4cl_ProcessAudio_Planar()

```
void sound4cl_ProcessAudio_Planar (
            struct sound4cl_CInstance * instance,
            float const *const * input,
            float *const * output )
```

11.17.4.44 sound4cl_ProcessJson()

```
const char* sound4cl_ProcessJson (
            struct sound4cl_CClientInstance * client,
            const char * json_str,
            int * need_save )
```

11.17.4.45 sound4cl_SaveState()

```
int sound4cl_SaveState (
            struct sound4cl_CInstance * instance )
```

11.17.4.46 sound4cl_SetInstanceBus()

```
void sound4cl_SetInstanceBus (
            struct sound4cl_CParameters * params,
            struct sound4cl_CBus * bus )
```

11.17.4.47 sound4cl_SetLoggerCallback()

```
void sound4cl_SetLoggerCallback (
            sound4cl_loggerfn logger )
```

11.17.4.48 sound4cl_SetLogSeverity()

```
void sound4cl_SetLogSeverity (
            enum sound4cl_LogSeverity severity )
```

11.17.4.49 sound4cl_SetMetadata()

```
void sound4cl_SetMetadata (
            struct sound4cl_CInstance * instance,
            const char * key,
            const char * value )
```

11.17.4.50 sound4cl_SetMetadataMulti()

```
void sound4cl_SetMetadataMulti (
            struct sound4cl_CInstance * instance,
            const char ** keyvalue )
```

11.17.4.51 sound4cl_SetParameter()

```
void sound4cl_SetParameter (
            struct sound4cl_CParameters * params,
            const char * name,
            const char * value )
```

11.17.4.52 sound4cl_SetPresetManager()

```
void sound4cl_SetPresetManager (
            struct sound4cl_CParameters * params,
            sound4cl_storage_reader reader,
            sound4cl_storage_reader_free ,
            sound4cl_storage_writer writer,
            sound4cl_storage_exists exists,
            sound4cl_storage_getall getall,
            sound4cl_storage_getall_free getall_free,
            sound4cl_storage_remove remove,
            sound4cl_storage_rename rename,
            int IsReadOnly,
            void * userdata )
```

11.17.4.53 sound4cl_SOUND4_GetProcessInfo()

```
const struct sound4cl_SOUND4_ProcessInfo* sound4cl_SOUND4_GetProcessInfo ( )
```

11.17.4.54 sound4cl_StartUpdateThread()

```
void sound4cl_StartUpdateThread (
            struct sound4cl_CInstance * instance,
            unsigned int port )
```

11.17.4.55 sound4cl_StereoToMono()

```
void sound4cl_StereoToMono (
            const float * input,
            float * output,
            size_t nFrame )
```

11.17.4.56 sound4cl_StereoToMono_Planar()

```
void sound4cl_StereoToMono_Planar (
            const float * inputL,
            const float * inputR,
            float * output,
            size_t nFrame )
```

11.17.4.57 sound4cl_StopUpdateThread()

```
void sound4cl_StopUpdateThread (
            struct sound4cl_CInstance * instance )
```

11.17.4.58 sound4cl_TerminateProcess()

```
int sound4cl_TerminateProcess (
            struct sound4cl_CInstance * instance )
```

11.17.4.59 sound4cl_WaitUpdateThreadReady()

```
int sound4cl_WaitUpdateThreadReady (
            struct sound4cl_CInstance * instance,
            int milliseconds )
```

11.17.4.60 sound4cl_Webserver()

```
uint64_t sound4cl_Webserver (
            unsigned int listenport,
            unsigned int listenport_secure,
            struct sound4cl_CInstance * instance )
```

11.17.4.61 sound4cl_Webserver_Status()

```
int sound4cl_Webserver_Status (
            uint64_t id )
```

11.17.4.62 sound4cl_Webserver_Stop()

```
int sound4cl_Webserver_Stop (
            uint64_t id,
            int timeout_ms )
```

11.17.4.63 sound4cl_Webserver_tcp()

```
uint64_t sound4cl_Webserver_tcp (
            unsigned int listenport,
            unsigned int listenport_secure,
            const char * socket_ip,
            unsigned int socket_port )
```

11.17.4.64 sound4cl_Webserver_tcp2()

```
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 )
```

11.18 sound4cl_cdef.h

```
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 #else // !_WIN32
00026     #define fs_strdup strdup
00027     typedef char fs_char;
00028 #endif // !_WIN32
00029
00030 #ifdef __cplusplus
00031 extern "C" {
00032 #endif // __cplusplus
00033
00034 struct sound4cl_SOUND4_ProcessInfo {
00035     size_t struct_size;
00036     const char *name;
00037     const char *prefix;
00038     const char *shortname;
00039     const char *version;
00040 };
00041 enum sound4cl_LogSeverity {
00042     sound4cl_none = 0,
00043     sound4cl_fatal = 1,
00044     sound4cl_error = 2,
00045     sound4cl_warning = 3,
00046     sound4cl_info = 4,
00047     sound4cl_verbose = 5,
00048     sound4cl_verbose2 = 6,
00049     sound4cl_verbose3 = 7,
00050     sound4cl_verbose4 = 8,
00051     sound4cl_verbose5 = 9,
00052 };
00053 struct sound4cl_CInstance;
00054 struct sound4cl_CParameters;
00055 struct sound4cl_CBus;
00056 struct sound4cl_CClientInstance;
00057 enum sound4cl_PresetChange_Kind {
00058     change_kind_created = 1,
00059     change_kind_modified   ,
00060     change_kind_deleted    ,
00061 };
00062 #define SOUND4_INVALID_WEBSERVER_ID            ((uint64_t)-1)
00063 #define SOUND4_WEBSERVER_HTTP_OK               (1<<0)
00064 #define SOUND4_WEBSERVER_HTTPS_OK              (1<<1)
00065
00069 enum sound4cl_SampleFormat {
00070     INVALID_FORMAT=0,
00071     S16_LE,
00072     S16_BE,
00073     S24_LE,
00074     S24_BE,
00075     S32_LE,
00076     S32_BE,
00077     F32_LE,
00078     F32_BE,
00079
00080     // Native definitions, only links to the physical ones
00081     #if __BYTE_ORDER__ == __ORDER_LITTLE_ENDIAN__
00082         S16_NATIVE=S16_LE,
00083         S24_NATIVE=S24_LE,
00084         S32_NATIVE=S32_LE,
00085         F32_NATIVE=F32_LE,
00086     #else
00087         S16_NATIVE=S16_BE,
00088         S24_NATIVE=S24_BE,
00089         S32_NATIVE=S32_BE,
00090         F32_NATIVE=F32_BE,
00091     #endif
00092 };
00093
00094 const struct sound4cl_SOUND4_ProcessInfo* sound4cl_SOUND4_GetProcessInfo();
```

```
00095 const char *sound4cl_GetVersion();
00096 unsigned int sound4cl_GetChunkSizeInFrames();
00097 unsigned int* sound4cl_GetPossibleChunkSizeInFrames();
00098 unsigned int sound4cl_GetChannelCount();
00099 unsigned int sound4cl_GetAudioInputCount();
00100 unsigned int sound4cl_GetAudioOutputCount();
00101 unsigned int sound4cl_GetSampleRate();
00102 typedef void (*sound4cl_loggerfn) (enum sound4cl_LogSeverity, const char *);
00103 void sound4cl_SetLoggerCallback( sound4cl_loggerfn logger );
00104 void sound4cl_SetLogSeverity( enum sound4cl_LogSeverity severity );
00105 struct sound4cl_CParameters *sound4cl_NewParameters();
00106 void sound4cl_FreeParameters(struct sound4cl_CParameters *params);
00107 void sound4cl_SetParameter(struct sound4cl_CParameters *params, const char *name, const char *value);
00108 const char *sound4cl_GetParameter(struct sound4cl_CParameters *params, const char *name);
00109 void sound4cl_FreeParameterValue(const char *value);
00110 struct sound4cl_CInstance *sound4cl_InitProcess(
00111         const char *LoginKey,
00112         const char *RadioName,
00113         const char *Access_Key_ID,
00114         const char *Access_Key_Secret,
00115         const char *save_path
00116     );
00117 struct sound4cl_CInstance *sound4cl_InitProcess2(
00118         const char *LoginKey,
00119         const char *RadioName,
00120         const char *Access_Key_ID,
00121         const char *Access_Key_Secret,
00122         const char *save_path,
00123         const struct sound4cl_CParameters *parameters
00124     );
00125 struct sound4cl_CInstance *sound4cl_InitProcess3(
00126         const char *LoginKey,
00127         const char *RadioName,
00128         const char *Access_Key_ID,
00129         const char *Access_Key_Secret,
00130         const char *save_path,
00131         const struct sound4cl_CParameters *parameters,
00132         unsigned int frames_per_chunk
00133     );
00134 unsigned int sound4cl_GetProcessChunkFrames(struct sound4cl_CInstance *instance);
00135 int sound4cl_TerminateProcess(struct sound4cl_CInstance *instance);
00136 void sound4cl_ExitProcess(struct sound4cl_CInstance *instance);
00137 struct sound4cl_CBus* sound4cl_NewBus();
00138 void sound4cl_FreeBus(struct sound4cl_CBus *bus);
00139 void sound4cl_SetInstanceBus(struct sound4cl_CParameters *params, struct sound4cl_CBus *bus);
00140 typedef char * (*sound4cl_storage_reader) (const fs_char *filename, void* userdata);
00141 typedef void (*sound4cl_storage_reader_free) (char *content, void* userdata);
00142 typedef int (*sound4cl_storage_writer) (const fs_char *filename, const char *content, void* userdata);
00143 typedef int (*sound4cl_storage_exists) (const fs_char *filename, void* userdata);
00144 typedef fs_char** (*sound4cl_storage_getall) (void* userdata);
00145 typedef void (*sound4cl_storage_getall_free) (fs_char**all, void* userdata);
00146 typedef int (*sound4cl_storage_remove) (const fs_char *filename, void* userdata);
00147 typedef int (*sound4cl_storage_rename) (const fs_char *from, const fs_char *to, void* userdata);
00148 void sound4cl_SetPresetManager(struct sound4cl_CParameters *params
00149     , sound4cl_storage_reader reader, sound4cl_storage_reader_free
00150     , sound4cl_storage_writer writer
00151     , sound4cl_storage_exists exists
00152     , sound4cl_storage_getall getall, sound4cl_storage_getall_free getall_free
00153     , sound4cl_storage_remove remove
00154     , sound4cl_storage_rename rename
00155     , int IsReadOnly
00156     , void* userdata
00157     );
00158 void sound4cl_PresetManager_InformChange(struct sound4cl_CInstance *instance, const fs_char
       *relative_path, enum sound4cl_PresetChange_Kind change_kind);
00159 void sound4cl_SetMetadata(struct sound4cl_CInstance *instance, const char* key, const char* value);
00160 void sound4cl_SetMetadataMulti(struct sound4cl_CInstance *instance, const char** keyvalue);
00161 const char** sound4cl_GetMetadataInfos(struct sound4cl_CInstance *instance);
00162 void sound4cl_FreeMetadataInfos(struct sound4cl_CInstance *instance, const char** infos);
00163 void sound4cl_StartUpdateThread(struct sound4cl_CInstance *instance, unsigned int port);
00164 void sound4cl_StopUpdateThread(struct sound4cl_CInstance *instance);
00165 int sound4cl_WaitUpdateThreadReady(struct sound4cl_CInstance *instance, int milliseconds);
00166 void sound4cl_ProcessAudio(struct sound4cl_CInstance *instance, const float *input, float *output );
00167 void sound4cl_ProcessAudio_Planar(struct sound4cl_CInstance *instance
00168     , float const * const *input
00169     , float * const *output);
00170 float *sound4cl_GetBufferIn(struct sound4cl_CInstance *instance);
00171 float *sound4cl_GetBufferOut(struct sound4cl_CInstance *instance);
00172 unsigned int sound4cl_GetEstimatedDelay(struct sound4cl_CInstance *instance);
00173 const char *sound4cl_GetFormatName(const enum sound4cl_SampleFormat fmt);
00174 enum sound4cl_SampleFormat sound4cl_GetFormatFromName(const char *name);
00175 unsigned int sound4cl_GetBytesFromFormat(const enum sound4cl_SampleFormat fmt);
00176 unsigned int sound4cl_GetMaxPacketFrame(struct sound4cl_CInstance *instance);
00177 unsigned int sound4cl_AddAudio(struct sound4cl_CInstance *instance, const uint8_t *payload, unsigned
       int nFrame, enum sound4cl_SampleFormat fmt );
00178 unsigned int sound4cl_AddPadAudio(struct sound4cl_CInstance *instance);
00179 unsigned int sound4cl_GetOutputCount(struct sound4cl_CInstance *instance);
```

```
00180 unsigned int sound4cl_GetAudio(struct sound4cl_CInstance *instance, uint8_t *payload, unsigned int
       max_nFrame, enum sound4cl_SampleFormat fmt );
00181 void sound4cl_AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl, enum
       sound4cl_SampleFormat fmt);
00182 void sound4cl_AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl, enum
       sound4cl_SampleFormat fmt);
00183 void sound4cl_StereoToMono(const float *input, float *output, size_t nFrame);
00184 void sound4cl_MonoToStereo(const float *input, float *output, size_t nFrame);
00185 void sound4cl_StereoToMono_Planar(const float *inputL, const float *inputR, float *output, size_t
       nFrame);
00186 void sound4cl_MonoToStereo_Planar(const float *input, float *outputL, float *outputR, size_t nFrame);
00187 void sound4cl_AudioMonoFromLiveStereo(const uint8_t *payload, float *output);
00188 void sound4cl_AudioMonoToLiveStereo(const float *input, uint8_t *payload);
00189 struct sound4cl_CClientInstance *sound4cl_NewClient(struct sound4cl_CInstance *instance);
00190 void sound4cl_DeleteClient(struct sound4cl_CClientInstance *client);
00191 const char *sound4cl_ProcessJson(struct sound4cl_CClientInstance *client, const char *json_str, int
       *need_save);
00192 void sound4cl_FreeJsonAnswer(const char *json_str);
00193 int sound4cl_SaveState(struct sound4cl_CInstance *instance);
00194 uint64_t sound4cl_Webserver_tcp(unsigned int listenport, unsigned int listenport_secure, const char
       *socket_ip, unsigned int socket_port);
00195 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);
00196 uint64_t sound4cl_Webserver(unsigned int listenport, unsigned int listenport_secure, struct
       sound4cl_CInstance *instance);
00197 int sound4cl_Webserver_Stop(uint64_t id, int timeout_ms);
00198 int sound4cl_Webserver_Status(uint64_t id);
00199
00200 #ifdef __cplusplus
00201 } // extern "C"
00202 #endif // __cplusplus
```

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