

SOUND4 x1.CLOUD Library [1.4.0]

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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 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 *AWS_Access_ID, const char *AWS_Access_Secret, const char *save_path)

Use [cloudx1_InitProcess3](#)

Member [cloudx1_InitProcess2](#) (const char *LoginKey, const char *RadioName, const char *AWS_Access_ID, const char *AWS_Access_Secret, const char *save_path, const struct [cloudx1_CParameters](#) *parameters)

Use [cloudx1_InitProcess3](#)

Chapter 3

Module Index

3.1 Modules

Here is a list of all modules:

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Environment variables and parameters	17
Global setup	18
Process creation/destruction	24
Custom preset managagement	29
Metadata Management	37
Update Management	38
Direct processing	40
Audio managing (any audio)	43
Audio convert helpers	48
Client's JSon config interfacing	52
JSON syntax	54
JSON syntax for internal setup	58
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Sample using C++ interface wrapper	65
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Chapter 4

Namespace Index

4.1 Namespace List

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sound4::cloudx1	69
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sound4::cloudx1::helper	76
std	76

Chapter 5

Hierarchical Index

5.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

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sound4::cloudx1::dyn::CInstance::CClient	79
sound4::cloudx1::dyn::CDynLib	81
sound4::cloudx1::dyn::helper::CDynLoader	93
sound4::cloudx1::CInstance	96
sound4::cloudx1::dyn::CInstance	106
cloudx1_CClientInstance	116
cloudx1_CInstance	116
cloudx1_CParameters	117
sound4::cloudx1::CPresetLoader	117
sound4::cloudx1::dyn::CPresetLoader	119
MyPresetManager	123
sound4::cloudx1::dyn::helper::DynFuncHolder< T >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AddAudio) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AddPadAudio) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AudioConvertFrom) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AudioConvertTo) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AudioMonoFromLiveStereo) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AudioMonoToLiveStereo) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_DeleteClient) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_ExitProcess) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_FreeJsonAnswer) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_FreeMetadataInfos) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_FreeParameters) >	121
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sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetAudioInputCount) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount) >	121
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sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetEstimatedDelay) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetFormatFromName) >	121

sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetFormatName) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetMaxPacketFrame) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetMetadataInfos) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetOutputCount) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetParameter) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetSampleRate) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetVersion) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_InitProcess) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_InitProcess2) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_InitProcess3) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_MonoToStereo) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_MonoToStereo_Planar) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_NewClient) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_NewParameters) >	121
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sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_ProcessAudio) >	121
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sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_ProcessJson) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SaveState) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetLogSeverity) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetMetadata) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetParameter) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetPresetManager) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_StartUpdateThread) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_StereoToMono) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_StopUpdateThread) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_TerminateProcess) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver_Status) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver_Stop) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp) >	121
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp2) >	121
sound4::cloudx1::dyn::helper::SampleFormat< T >	125
sound4::cloudx1::helper::SampleFormat< T >	126
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sound4::cloudx1::dyn::helper::SampleFormat< int16_t >	128
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Chapter 6

Class Index

6.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

sound4::cloudx1::CInstance::CClient	77
sound4::cloudx1::dyn::CInstance::CClient	79
sound4::cloudx1::dyn::CDynLib	
Dynamic library interface	81
sound4::cloudx1::dyn::helper::CDynLoader	
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sound4::cloudx1::CInstance	96
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sound4::cloudx1::CPresetLoader	117
sound4::cloudx1::dyn::CPresetLoader	119
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MyPresetManager	
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sound4::cloudx1::dyn::helper::SampleFormat< T >	
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sound4::cloudx1::helper::SampleFormat< T >	
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sound4::cloudx1::helper::SampleFormat< float >	127
sound4::cloudx1::dyn::helper::SampleFormat< int16_t >	128
sound4::cloudx1::helper::SampleFormat< int16_t >	128
sound4::cloudx1::dyn::helper::SampleFormat< int32_t >	129
sound4::cloudx1::helper::SampleFormat< int32_t >	130

Chapter 7

File Index

7.1 File List

Here is a list of all files with brief descriptions:

sound4.x1.cloud-pipe-cxx.cpp	
C++ sample using C++ interface wrapper	131
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C++ sample using C++ interface wrapper with dynamic library loading	134
sound4.x1.cloud-pipe.cpp	
C++ sample using only C interface	140
sound4.x1.cloud.h	
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sound4.x1.cloud.hpp	
C++ wrapper for library	152
sound4.x1.cloud_dyn.hpp	
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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 cloudxl_CParameters *params = cloudxl_NewParameters();
// Optional: activate web authentication, set admin password
// This creates the authentication only for a new storage path
cloudxl_SetParameter(params, "ADMIN_USER", "admin");
cloudxl_SetParameter(params, "ADMIN_SECRET", "admin");

// Create the processing instance
pInstance=cloudxl_InitProcess2(pLoginKey, pRadioName, pKeyId, pAccessKey, store_path.c_str(), params);
cloudxl_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 << "cloudxl_StartUpdateThread (no json port)" << std::endl;
    cloudxl_StartUpdateThread(pInstance, 0);
    std::cerr << "cloudxl_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 (cloudxl_WaitUpdateThreadReady(pInstance, 5000)<0) {
    std::cerr << "Timeout to create the process instance" << std::endl;
}
std::cerr << "Waiting update thread DONE" << std::endl;
#ifdef 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 = cloudxl_Webserver(listenport, listenport_secure, pInstance);
    if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
        std::cerr << "Starting web server FAILED" << std::endl;
    } else {
        int web_status=cloudxl_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_WEBSEVER_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_WEBSEVER)

// 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];
#ifdef _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](#)

```

#ifdef (CLOUDX1_HAS_WEBSEVER)
    // 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_WEBSEVER)

// 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 authentication 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 instances 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 immediately 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 losing changes.

8.3 Global setup

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 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 166 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 172 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 154 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 160 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 178 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 271 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 252 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

<i>logger</i>	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

<i>severity</i>	Log severity
-----------------	--------------

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 *AWS_Access_ID, const char *AWS_Access_Secret, const char *save_path)
- struct [cloudx1_CInstance](#) * [cloudx1_InitProcess2](#) (const char *LoginKey, const char *RadioName, const char *AWS_Access_ID, const char *AWS_Access_Secret, const char *save_path, const struct [cloudx1_CParameters](#) *parameters)
- struct [cloudx1_CInstance](#) * [cloudx1_InitProcess3](#) (const char *LoginKey, const char *RadioName, const char *AWS_Access_ID, const char *AWS_Access_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

<i>instance</i>	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

<i>value</i>	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

<i>instance</i>	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 * AWS_Access_ID,
    const char * AWS_Access_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 * AWS_Access_ID,
    const char * AWS_Access_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 * AWS_Access_ID,
    const char * AWS_Access_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 management](#).

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

<i>LoginKey</i>	SOUND4 Login key (was User ID)
<i>RadioName</i>	SOUND4 RadioName
<i>AWS_Access_ID</i>	SOUND4 AWS access ID
<i>AWS_Access_Secret</i>	SOUND4 AWS access Secret
<i>save_path</i>	Path where we can load/save the configuration. If NULL, memory storage will be used.
<i>parameters</i>	Parameters
<i>frames_per_chunk</i>	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 manangement](#)

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

<i>instance</i>	the instance to terminate
-----------------	---------------------------

Returns

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

8.5 Custom preset management

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](#) 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 overridden 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

<i>filename</i>	the name of the file to test.
<i>userdata</i>	the userdata passed to cloudx1_SetPresetManager

Returns

-1 if not exists, 0 if it exists

Definition at line [578](#) 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

<i>userdata</i>	the userdata passed to cloudx1_SetPresetManager
-----------------	---

Returns

A NULL terminated array of file names

Definition at line [587](#) 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

<i>all</i>	the returned value from <code>cloudx1_storage_getall</code>
<i>userdata</i>	the userdata passed to cloudx1_SetPresetManager

Definition at line [595](#) 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

<i>filename</i>	the name of the file to read.
<i>userdata</i>	the userdata passed to cloudx1_SetPresetManager

Returns

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

Definition at line [551](#) 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

<i>content</i>	the returned value from <code>cloudx1_storage_reader</code>
<i>userdata</i>	the userdata passed to cloudx1_SetPresetManager

Definition at line 559 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

<i>filename</i>	the name of the file to remove.
<i>userdata</i>	the userdata passed to cloudx1_SetPresetManager

Returns

-1 if failed, 0 if OK

Definition at line 604 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

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

Returns

-1 if failed, 0 if OK

Definition at line 614 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

<i>filename</i>	the name of the file to write.
<i>content</i>	the UTF-8 content to write to the file
<i>userdata</i>	the userdata passed to cloudx1_SetPresetManager

Returns

-1 if failed, 0 if OK

Definition at line 569 of file [sound4.x1.cloud.h](#).

8.5.2.9 fs_char

```
typedef wchar_t fs_char
```

Definition at line 539 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 647 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 conjunction with [cloudx1_SetPresetManager](#)

Parameters

<i>instance</i>	the processing instance
<i>relative_path</i>	The path which changed, relative to the root storage
<i>change_kind</i>	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

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

8.6 Metadata Management

Functions

- void [cloudx1_SetMetadata](#) (struct [cloudx1_CInstance](#) *instance, const char *key, const char *value)
- 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

<i>instance</i>	the instance
<i>infos</i>	the infos

8.6.2.2 [cloudx1_GetMetadataInfos\(\)](#)

```
const char** cloudx1_GetMetadataInfos (  
    struct cloudx1\_CInstance * instance )
```

Get information on known metadata keys.

Parameters

<i>instance</i>	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).

Parameters

<i>instance</i>	the instance
<i>key</i>	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.
<i>value</i>	the metadata value or nullptr to erase it.

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

<i>instance</i>	the instance
<i>port</i>	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

<i>instance</i>	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

<i>instance</i>	the processing instance
<i>milliseconds</i>	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

<i>instance</i>	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

<i>instance</i>	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

Output 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

<i>instance</i>	the processing instance
<i>input</i>	audio input buffer (64 byte aligned) or NULL to use internal buffer cloudx1_GetBufferIn
<i>output</i>	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

Output 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

<i>instance</i>	the processing instance
<i>input</i>	array of audio input buffers for each input channel (no alignment required)
<i>output</i>	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 855 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

<i>instance</i>	the processing instance
<i>payload</i>	the binary raw audio buffer
<i>nFrame</i>	the number of frames in the payload
<i>fmt</i>	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

<i>instance</i>	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

<i>instance</i>	the processing instance
<i>payload</i>	the binary raw audio buffer to store output
<i>max_nFrame</i>	the maximum number of frames that can be stored in the payload
<i>fmt</i>	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

<i>fmt</i>	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

<i>name</i>	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

<i>fmt</i>	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

<i>instance</i>	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

<i>instance</i>	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

<i>payload</i>	the binary raw audio buffer
<i>output</i>	audio output buffer (64 byte aligned)
<i>nSpl</i>	the number of samples (not frames)
<i>fmt</i>	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

<i>input</i>	audio input buffer (64 byte aligned)
<i>payload</i>	the binary raw audio buffer
<i>nSpl</i>	the number of samples (not frames)
<i>fmt</i>	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

<i>payload</i>	Livewire Live Stereo raw buffer
<i>output</i>	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

<i>input</i>	audio input mono buffer (64 byte aligned)
<i>payload</i>	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

<i>input</i>	audio input mono buffer (64 byte aligned)
<i>output</i>	audio output stereo buffer (64 byte aligned)
<i>nFrame</i>	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

<i>input</i>	audio input mono buffer (64 byte aligned)
<i>outputL</i>	audio output left buffer (64 byte aligned)
<i>outputR</i>	audio output right buffer (64 byte aligned)
<i>nFrame</i>	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

<i>input</i>	audio input stereo buffer (64 byte aligned)
<i>output</i>	audio output mono buffer (64 byte aligned)
<i>nFrame</i>	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

<i>inputL</i>	audio input left buffer (64 byte aligned)
<i>inputR</i>	audio input right buffer (64 byte aligned)
<i>output</i>	audio output mono buffer (64 byte aligned)
<i>nFrame</i>	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

<i>client</i>	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

<i>json_str</i>	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

<i>instance</i>	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

<i>client</i>	the client instance
<i>json_str</i>	the JSON request
<i>need_save</i>	on return will be 1 if 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

<i>instance</i>	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 $\leq 1.3.7$, the state resetted also for filtered out objects. So avoid alternating `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 $\leq 1.2.2$, 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,"logged_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":"Authentication 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 1502 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 1507 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 1511 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

<i>listenport</i>	The port to listen for HTTP connections (0 to disable)
<i>listenport_secure</i>	The port to listen for HTTPS connections (0 to disable)
<i>instance</i>	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

<i>id</i>	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

<i>id</i>	The web server Id, returned by cloudx1_Webserver_tcp or cloudx1_Webserver
<i>timeout_ms</i>	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

<i>listenport</i>	The port to listen for HTTP connections
<i>listenport_secure</i>	The port to listen for HTTPS connections
<i>socket_ip</i>	The ip of the process to connect to
<i>socket_port</i>	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

<i>listenport</i>	The port to listen for HTTP connections
<i>listenport_secure</i>	The port to listen for HTTPS connections
<i>socket_ip</i>	The ip of the process to connect to
<i>socket_port</i>	The port of the process's JSON server to connect to
<i>parameters</i>	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(std::filesystem::relative(entry.path(), m_preset_path).native());
            }
        }
        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);
}

```

Chapter 9

Namespace Documentation

9.1 dyn Namespace Reference

9.1.1 Detailed Description

Dynamic loading namespace

9.2 sound4 Namespace Reference

Namespaces

- [cloudx1](#)

9.2.1 Detailed Description

SOUND4 namespace

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 697 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 693 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 765 of file [sound4.x1.cloud_dyn.hpp](#).

9.4.1.4 SampleFormat

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

Definition at line 426 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 430 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 434 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 442 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 438 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 446 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 450 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 std Namespace Reference

Chapter 10

Class Documentation

10.1 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.

10.1.1 Detailed Description

Low-level JSON client.

See also

[JSON syntax](#)

Definition at line [770](#) of file [sound4.x1.cloud.hpp](#).

10.1.2 Constructor & Destructor Documentation

10.1.2.1 CClient() [1/2]

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

Definition at line [772](#) of file [sound4.x1.cloud.hpp](#).

10.1.2.2 CClient() [2/2]

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

10.1.2.3 ~CClient()

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

Definition at line 781 of file [sound4.x1.cloud.hpp](#).

10.1.3 Member Function Documentation

10.1.3.1 operator=()

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

10.1.3.2 ProcessJson()

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

Parameters

<i>request</i>	the JSON request.
----------------	-------------------

See also

[JSON syntax](#)

Parameters

<i>NeedSave</i>	if non null, returns if the saving is required (maybe delayed)
-----------------	--

Returns

the JSON answer

Definition at line 795 of file [sound4.x1.cloud.hpp](#).

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

- [sound4.x1.cloud.hpp](#)

10.2 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.

10.2.1 Detailed Description

Low-level JSON client.

See also

[JSON syntax](#)

Definition at line 1170 of file [sound4.x1.cloud_dyn.hpp](#).

10.2.2 Constructor & Destructor Documentation

10.2.2.1 CClient() [1/2]

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

Definition at line 1172 of file [sound4.x1.cloud_dyn.hpp](#).

10.2.2.2 CClient() [2/2]

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

10.2.2.3 ~CClient()

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

Definition at line 1182 of file [sound4.x1.cloud_dyn.hpp](#).

10.2.3 Member Function Documentation

10.2.3.1 operator=()

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

10.2.3.2 ProcessJson()

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

Parameters

<i>request</i>	the JSON request.
----------------	-------------------

See also

[JSON syntax](#)

Parameters

<i>NeedSave</i>	if non null, returns if the saving is required (maybe delayed)
-----------------	--

Returns

the JSON answer

Definition at line 1196 of file [sound4.x1.cloud_dyn.hpp](#).

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

- [sound4.x1.cloud_dyn.hpp](#)

10.3 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=std::filesystem::current_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](#)

10.3.1 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](#).

10.3.2 Constructor & Destructor Documentation

10.3.2.1 CDynLib()

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

10.3.3 Member Function Documentation

10.3.3.1 IsOk()

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

Returns

true if OK.
false if not OK.

Definition at line 416 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.3.2 Load()

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

Parameters

<i>path</i>	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 302 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4 Member Data Documentation

10.3.4.1 AddAudio

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

Definition at line 247 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.2 AddPadAudio

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

Definition at line 248 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.3 AudioConvertFrom

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

Definition at line 251 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.4 AudioConvertTo

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

Definition at line 252 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.5 AudioMonoFromLiveStereo

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

Definition at line 255 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.6 AudioMonoToLiveStereo

```
helper::DynFuncHolder< decltype(cloudx1_AudioMonoToLiveStereo) > sound4::cloudx1::dyn::↵  
CDynLib::AudioMonoToLiveStereo
```

Definition at line 256 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.7 DeleteClient

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

Definition at line 258 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.8 ExitProcess

```
helper::DynFuncHolder< decltype(cloudx1_ExitProcess) > sound4::cloudx1::dyn::CDynLib::↵  
ExitProcess
```

Definition at line 234 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.9 FreeJsonAnswer

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

Definition at line 260 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.10 FreeMetadataInfos

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

Definition at line 277 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.11 FreeParameters

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

Definition at line 227 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.12 FreeParameterValue

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

Definition at line 230 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.13 GetAudio

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

Definition at line 250 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.14 GetAudioInputCount

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

Definition at line 221 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.15 GetAudioOutputCount

```
helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount ) > sound4::cloudx1::dyn::CDynLib::GetAudioOutputCount
```

Definition at line 222 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.16 GetBufferIn

```
helper::DynFuncHolder< decltype(cloudx1_GetBufferIn ) > sound4::cloudx1::dyn::CDynLib::GetBufferIn
```

Definition at line 240 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.17 GetBufferOut

```
helper::DynFuncHolder< decltype(cloudx1_GetBufferOut ) > sound4::cloudx1::dyn::CDynLib::GetBufferOut
```

Definition at line 241 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.18 GetBytesFromFormat

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

Definition at line 245 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.19 GetChannelCount

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

Definition at line 220 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.20 GetChunkSizeInFrames

```
helper::DynFuncHolder< decltype(cloudx1_GetChunkSizeInFrames ) > sound4::cloudx1::dyn::CDynLib::GetChunkSizeInFrames
```

Definition at line 219 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.21 GetEstimatedDelay

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

Definition at line 242 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.22 GetFormatFromName

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

Definition at line 244 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.23 GetFormatName

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

Definition at line 243 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.24 GetMaxPacketFrame

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

Definition at line 246 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.25 GetMetadataInfos

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

Definition at line 276 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.26 GetOutputCount

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

Definition at line 249 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.27 GetParameter

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

Definition at line 229 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.28 GetPossibleChunkSizeInFrames

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

Definition at line 284 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.29 GetProcessChunkFrames

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

Definition at line 285 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.30 GetSampleRate

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

Definition at line 223 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.31 GetVersion

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

Definition at line 218 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.32 InitProcess

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

Definition at line 231 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.33 InitProcess2

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

Definition at line 232 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.34 InitProcess3

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

Definition at line 286 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.35 MonoToStereo

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

Definition at line 254 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.36 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](#).

10.3.4.37 NewClient

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

Definition at line 257 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.38 NewParameters

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

Definition at line 226 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.39 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](#).

10.3.4.40 ProcessAudio

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

Definition at line 238 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.41 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](#).

10.3.4.42 ProcessJson

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

Definition at line 259 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.43 SaveState

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

Definition at line 261 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.44 SetLoggerCallback

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

Definition at line 224 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.45 SetLogSeverity

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

Definition at line 225 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.46 SetMetadata

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

Definition at line 275 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.47 SetParameter

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

Definition at line 228 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.48 SetPresetManager

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

Definition at line 280 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.49 StartUpdateThread

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

Definition at line 235 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.50 StereoToMono

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

Definition at line 253 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.51 StereoToMono_Planar

```
helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar ) > sound4::cloudx1::dyn::CDynLib::StereoToMono_Planar
```

Definition at line 271 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.52 StopUpdateThread

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

Definition at line 236 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.53 TerminateProcess

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

Definition at line 233 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.54 WaitUpdateThreadReady

```
helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady ) > sound4::cloudx1::dyn::CDynLib::WaitUpdateThreadReady
```

Definition at line 237 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.55 Webserver

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

Definition at line 265 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.56 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](#).

10.3.4.57 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](#).

10.3.4.58 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](#).

10.3.4.59 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](#)

10.4 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)

10.4.1 Detailed Description

Definition at line [101](#) of file [sound4.x1.cloud_dyn.hpp](#).

10.4.2 Constructor & Destructor Documentation

10.4.2.1 CDynLoader() [1/3]

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

10.4.2.2 CDynLoader() [2/3]

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

10.4.2.3 CDynLoader() [3/3]

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

10.4.2.4 ~CDynLoader()

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

Definition at line [198](#) of file [sound4.x1.cloud_dyn.hpp](#).

10.4.3 Member Function Documentation

10.4.3.1 Close()

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

Definition at line 159 of file [sound4.x1.cloud_dyn.hpp](#).

10.4.3.2 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](#).

10.4.3.3 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](#).

10.4.3.4 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](#).

10.4.3.5 IsOk()

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

Definition at line 113 of file [sound4.x1.cloud_dyn.hpp](#).

10.4.3.6 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](#).

10.4.3.7 operator bool()

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

Definition at line 110 of file [sound4.x1.cloud_dyn.hpp](#).

10.4.3.8 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](#)

10.5 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)
- 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)

10.5.1 Detailed Description

Instance handling class

Definition at line 385 of file [sound4.x1.cloud.hpp](#).

10.5.2 Constructor & Destructor Documentation

10.5.2.1 CInstance() [1/2]

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

Creates the instance, with default parameters

Definition at line 390 of file [sound4.x1.cloud.hpp](#).

10.5.2.2 CInstance() [2/2]

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

10.5.2.3 ~CInstance()

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

Destructor, stopping any running tasks

Definition at line 401 of file [sound4.x1.cloud.hpp](#).

10.5.3 Member Function Documentation

10.5.3.1 AddAudio()

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

Definition at line 826 of file [sound4.x1.cloud.hpp](#).

10.5.3.2 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

<i>LoginKey</i>	SOUND4 Login key
<i>RadioName</i>	SOUND4 RadioName
<i>AWS_Access_ID</i>	SOUND4 AWS access ID
<i>AWS_Access_Secret</i>	SOUND4 AWS access Secret
<i>save_path</i>	Path where we can load/save the configuration
<i>json_port</i>	Optional json listening port
<i>frames_per_chunk</i>	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](#).

10.5.3.3 GetAudio()

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

Definition at line 832 of file [sound4.x1.cloud.hpp](#).

10.5.3.4 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 681 of file [sound4.x1.cloud.hpp](#).

10.5.3.5 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 698 of file [sound4.x1.cloud.hpp](#).

10.5.3.6 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](#).

10.5.3.7 GetEstimatedDelay()

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

Gets an estimated delay of current processing

See also

[cloudx1_GetEstimatedDelay](#)

Definition at line 665 of file [sound4.x1.cloud.hpp](#).

10.5.3.8 GetMetadataInfos()

```
std::vector< std::tuple<std::string, std::string> > sound4::cloudx1::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 568 of file [sound4.x1.cloud.hpp](#).

10.5.3.9 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](#).

10.5.3.10 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](#).

10.5.3.11 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 818 of file [sound4.x1.cloud.hpp](#).

10.5.3.12 OnUpdateThreadStart()

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

Definition at line 588 of file [sound4.x1.cloud.hpp](#).

10.5.3.13 OnUpdateThreadStop()

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

Definition at line 590 of file [sound4.x1.cloud.hpp](#).

10.5.3.14 operator=()

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

10.5.3.15 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 conjunction with [SetPresetManager](#)

Parameters

<i>relative_path</i>	The path which changed, relative to the root storage
<i>change_kind</i>	What happened to this path

Definition at line 538 of file [sound4.x1.cloud.hpp](#).

10.5.3.16 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

<i>T</i>	the C type for one audio sample
----------	---------------------------------

Parameters

<i>input</i>	audio to process
--------------	------------------

Returns

processed audio

Definition at line 746 of file [sound4.x1.cloud.hpp](#).

10.5.3.17 ProcessAudio()

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

Process one audio chunk, from [GetBufferIn\(\)](#) to [GetBufferOut\(\)](#)

See also

[cloudx1_ProcessAudio](#)

Definition at line 709 of file [sound4.x1.cloud.hpp](#).

10.5.3.18 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

<i>input</i>	has GetAudioInputCount() * GetChannelCount() channels
<i>output</i>	has GetAudioOutputCount() * GetChannelCount() channels

Definition at line 728 of file [sound4.x1.cloud.hpp](#).

10.5.3.19 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

<i>key</i>	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.
<i>value</i>	the metadata value or nullptr to erase it.

Definition at line 554 of file [sound4.x1.cloud.hpp](#).

10.5.3.20 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](#).

10.5.3.21 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

<i>preset_manager</i>	The custom preset manager
-----------------------	---------------------------

Definition at line 445 of file [sound4.x1.cloud.hpp](#).

10.5.3.22 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 598 of file [sound4.x1.cloud.hpp](#).

10.5.3.23 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 646 of file [sound4.x1.cloud.hpp](#).

10.5.3.24 StopWebServer()

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

Stops the Web server

See also

[cloudx1_Webserver_Stop](#)

Definition at line 620 of file [sound4.x1.cloud.hpp](#).

10.5.3.25 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 635 of file [sound4.x1.cloud.hpp](#).

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

- [sound4.x1.cloud.hpp](#)

10.6 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 &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)
- 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)

10.6.1 Detailed Description

Instance handling class

Definition at line 770 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.2 Constructor & Destructor Documentation

10.6.2.1 CInstance() [1/2]

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

Creates the instance, with default parameters

Definition at line 775 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.2.2 CInstance() [2/2]

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

10.6.2.3 ~CInstance()

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

Destructor, stopping any running tasks

Definition at line 787 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3 Member Function Documentation

10.6.3.1 AddAudio()

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

Definition at line 1228 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.2 Create()

```
bool sound4::cloudx1::dyn::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

<i>LoginKey</i>	SOUND4 Login key
<i>RadioName</i>	SOUND4 RadioName
<i>AWS_Access_ID</i>	SOUND4 AWS access ID
<i>AWS_Access_Secret</i>	SOUND4 AWS access Secret
<i>save_path</i>	Path where we can load/save the configuration
<i>json_port</i>	Optional json listening port
<i>frames_per_chunk</i>	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 875 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.3 GetAudio()

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

Definition at line 1234 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.4 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 1081 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.5 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 1098 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.6 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 918 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.7 GetEstimatedDelay()

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

Gets an estimated delay of current processing

See also

[cloudx1_GetEstimatedDelay](#)

Definition at line 1065 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.8 GetMetadataInfos()

```
std::vector< std::tuple<std::string, std::string> > sound4::cloudx1::dyn::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 966 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.9 GetParam()

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

Gets a parameter value

See also

[cloudx1_GetParameter](#)

Definition at line 813 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.10 IsOk()

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

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

Definition at line 795 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.11 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 1220 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.12 OnUpdateThreadStart()

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

Definition at line 988 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.13 OnUpdateThreadStop()

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

Definition at line 990 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.14 operator=()

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

10.6.3.15 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 conjunction with [SetPresetManager](#)

Parameters

<i>relative_path</i>	The path which changed, relative to the root storage
<i>change_kind</i>	What happened to this path

Definition at line 932 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.16 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

<i>T</i>	the C type for one audio sample
----------	---------------------------------

Parameters

<i>input</i>	audio to process
--------------	------------------

Returns

processed audio

Definition at line 1146 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.17 ProcessAudio()

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

Process one audio chunk, from [GetBufferIn\(\)](#) to [GetBufferOut\(\)](#)

See also

[cloudx1_ProcessAudio](#)

Definition at line 1109 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.18 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

<i>input</i>	has GetAudioInputCount() * GetChannelCount() channels
<i>output</i>	has GetAudioOutputCount() * GetChannelCount() channels

Definition at line 1128 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.19 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

<i>key</i>	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.
<i>value</i>	the metadata value or nullptr to erase it.

Definition at line 950 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.20 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 803 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.21 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

<i>preset_manager</i>	The custom preset manager
-----------------------	---------------------------

Definition at line 842 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.22 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 998 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.23 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 1046 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.24 StopWebServer()

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

Stops the Web server

See also

[cloudx1_Webserver_Stop](#)

Definition at line 1020 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.25 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 1035 of file [sound4.x1.cloud_dyn.hpp](#).

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

- [sound4.x1.cloud_dyn.hpp](#)

10.7 cloudx1_CClientInstance Struct Reference

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

10.7.1 Detailed Description

Abstract pointer for a client instance

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

- [sound4.x1.cloud.h](#)

10.8 cloudx1_CInstance Struct Reference

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

10.8.1 Detailed Description

Abstract holder for a process instance

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

- [sound4.x1.cloud.h](#)

10.9 cloudx1_CParameters Struct Reference

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

10.9.1 Detailed Description

Abstract holder for a process instance parameters

Definition at line 307 of file [sound4.x1.cloud.h](#).

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

- [sound4.x1.cloud.h](#)

10.10 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

10.10.1 Detailed Description

Custom preset handler helper Derive from this class and call [CInstance::SetPresetManager](#)

Definition at line 367 of file [sound4.x1.cloud.hpp](#).

10.10.2 Constructor & Destructor Documentation

10.10.2.1 CPresetLoader()

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

10.10.2.2 ~CPresetLoader()

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

10.10.3 Member Function Documentation

10.10.3.1 Exists()

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

10.10.3.2 GetAll()

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

10.10.3.3 IsReadOnly()

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

10.10.3.4 Read()

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

10.10.3.5 Remove()

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

10.10.3.6 Rename()

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

10.10.3.7 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](#)

10.11 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

10.11.1 Detailed Description

Custom preset handler helper Derive from this class and call [CInstance::SetPresetManager](#)

Definition at line 752 of file [sound4.x1.cloud_dyn.hpp](#).

10.11.2 Constructor & Destructor Documentation

10.11.2.1 CPresetLoader()

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

10.11.2.2 ~CPresetLoader()

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

10.11.3 Member Function Documentation

10.11.3.1 Exists()

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

Implemented in [MyPresetManager](#).

10.11.3.2 GetAll()

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

Implemented in [MyPresetManager](#).

10.11.3.3 IsReadOnly()

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

Implemented in [MyPresetManager](#).

10.11.3.4 Read()

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

Implemented in [MyPresetManager](#).

10.11.3.5 Remove()

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

Implemented in [MyPresetManager](#).

10.11.3.6 Rename()

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

Implemented in [MyPresetManager](#).

10.11.3.7 Write()

```
virtual bool sound4::cloudx1::dyn::CPresetLoader::Write (
    const std::filesystem::path & filename,
    const std::string & content ) [pure virtual]
```

Implemented in [MyPresetManager](#).

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

- [sound4.x1.cloud_dyn.hpp](#)

10.12 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

10.12.1 Detailed Description

```
template<typename T>
class sound4::cloudx1::dyn::helper::DynFuncHolder< T >
```

Parameters

T	is the function type, you may use <code>decltype(fn)</code>
----------	---

Definition at line 86 of file [sound4.x1.cloud_dyn.hpp](#).

10.12.2 Constructor & Destructor Documentation

10.12.2.1 DynFuncHolder() [1/2]

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

10.12.2.2 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](#).

10.12.3 Member Function Documentation

10.12.3.1 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](#).

10.12.3.2 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](#).

10.12.3.3 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](#)

10.13 MyPresetManager Class Reference

[Custom preset manager]

Inherits [sound4::cloudx1::dyn::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

10.13.1 Detailed Description

Definition at line 119 of file [sound4.x1.cloud-pipe-dyn.cpp](#).

10.13.2 Constructor & Destructor Documentation

10.13.2.1 MyPresetManager()

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

10.13.2.2 ~MyPresetManager()

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

10.13.3 Member Function Documentation

10.13.3.1 Exists()

```
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](#).

10.13.3.2 GetAll()

```
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](#).

10.13.3.3 IsReadOnly()

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

Implements [sound4::cloudx1::dyn::CPresetLoader](#).

Definition at line 136 of file [sound4.x1.cloud-pipe-dyn.cpp](#).

10.13.3.4 Read()

```
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](#).

10.13.3.5 Remove()

```
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](#).

10.13.3.6 Rename()

```
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](#).

10.13.3.7 SetupPath()

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

Definition at line 124 of file [sound4.x1.cloud-pipe-dyn.cpp](#).

10.13.3.8 Write()

```
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](#).

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

- [sound4.x1.cloud-pipe-dyn.cpp](#)

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

Helper for Sample format types.

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

10.14.1 Detailed Description

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

Template Parameters

<i>T</i>	the C type for one audio sample
----------	---------------------------------

Definition at line 489 of file [sound4.x1.cloud_dyn.hpp](#).

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

- [sound4.x1.cloud_dyn.hpp](#)

10.15 **sound4::cloudx1::helper::SampleFormat< T > Struct Template Reference**

Helper for Sample format types.

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

10.15.1 Detailed Description

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

Template Parameters

<i>T</i>	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](#)

10.16 **sound4::cloudx1::dyn::helper::SampleFormat< float > Struct Reference**

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

Public Attributes

- const [cloudx1_SampleFormat](#) format = F32_NATIVE

10.16.1 Detailed Description

Definition at line 500 of file [sound4.x1.cloud_dyn.hpp](#).

10.16.2 Member Data Documentation

10.16.2.1 format

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

Definition at line 501 of file [sound4.x1.cloud_dyn.hpp](#).

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

- [sound4.x1.cloud_dyn.hpp](#)

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

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

Public Attributes

- const [cloudx1_SampleFormat](#) format = F32_NATIVE

10.17.1 Detailed Description

Definition at line 127 of file [sound4.x1.cloud.hpp](#).

10.17.2 Member Data Documentation

10.17.2.1 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](#)

10.18 `sound4::cloudx1::dyn::helper::SampleFormat< int16_t >` Struct Reference

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

Public Attributes

- const `cloudx1_SampleFormat` `format` = `S16_NATIVE`

10.18.1 Detailed Description

Definition at line 492 of file `sound4.x1.cloud_dyn.hpp`.

10.18.2 Member Data Documentation

10.18.2.1 `format`

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

Definition at line 493 of file `sound4.x1.cloud_dyn.hpp`.

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

- `sound4.x1.cloud_dyn.hpp`

10.19 `sound4::cloudx1::helper::SampleFormat< int16_t >` Struct Reference

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

Public Attributes

- const `cloudx1_SampleFormat` `format` = `S16_NATIVE`

10.19.1 Detailed Description

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

10.19.2 Member Data Documentation

10.19.2.1 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](#)

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

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

Public Attributes

- const [cloudx1_SampleFormat](#) format = S32_NATIVE

10.20.1 Detailed Description

Definition at line 496 of file [sound4.x1.cloud_dyn.hpp](#).

10.20.2 Member Data Documentation

10.20.2.1 format

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

Definition at line 497 of file [sound4.x1.cloud_dyn.hpp](#).

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

- [sound4.x1.cloud_dyn.hpp](#)

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

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

Public Attributes

- const [cloudx1_SampleFormat](#) format = [S32_NATIVE](#)

10.21.1 Detailed Description

Definition at line [123](#) of file [sound4.x1.cloud.hpp](#).

10.21.2 Member Data Documentation

10.21.2.1 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](#)

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 *progrname`)
- `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
00058     while (!stopthread)
00059     {
00060         // Read a chunk from stdin
00061         if (std::fread(instance.GetBufferIn().data(), sizeof(float), sound4::cloudx1::InputSampleSize,
00062             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,
00072             stdout) != sound4::cloudx1::OutputSampleSize) {
00073             std::cerr << "Failed to write audio output" << std::endl;
00074             stopthread=true;
00075         }
00076     }
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)]" <<
00085         std::endl;;
00086     std::cerr << "  - S4LOGINKEY           : SOUND4 Login key (or S4USERID)" << std::endl;;
00087     std::cerr << "  - RADIO_NAME          : SOUND4 Radio Name" << std::endl;;
00088     std::cerr << "  - S4_AWS_ACCESS_KEY_ID : SOUND4 Access Key ID" << std::endl;;
00089     std::cerr << "  - S4_AWS_SECRET_ACCESS_KEY: SOUND4 Access Key Secret" << std::endl;;
00090     std::cerr << std::endl;
00091     std::cerr << "Example:" << std::endl;
00092     std::cerr << "ffmpeg -re -i file.wav -ar " << sound4::cloudx1::GetSampleRate() << " -ac "
00093         << "sound4::cloudx1::GetChannelCount() << " -f f32le - | " << progname << " | ffplay -f f32le -ar "
00094         << "sound4::cloudx1::GetSampleRate() << " -ac " << sound4::cloudx1::GetChannelCount() << " -i -" << std::endl;;
00095     #if defined(_WIN32) || defined(WIN32)
00096         std::cerr << "ffmpeg -f dshow -i audio=\\\"Microphone\\\" -ar " << sound4::cloudx1::GetSampleRate() << " -ac "
00097         << "sound4::cloudx1::GetChannelCount() << " -f f32le - | " << progname << " | ffplay -f f32le -ar "
00098         << "sound4::cloudx1::GetSampleRate() << " -ac " << sound4::cloudx1::GetChannelCount() << " -i -" << std::endl;;
00099     #else
00100         std::cerr << "ffmpeg -f pulse -i default -ar " << sound4::cloudx1::GetSampleRate() << " -ac "
00101         << "sound4::cloudx1::GetChannelCount() << " -f f32le - | " << progname << " | ffplay -f f32le -ar "
00102         << "sound4::cloudx1::GetSampleRate() << " -ac " << sound4::cloudx1::GetChannelCount() << " -i -" << std::endl;;
00103     #endif
00104 }
00105
00106 void MyLogger(sound4::cloudx1::LogSeverity severity, const std::string& msg)
00107 {
00108     std::cerr << msg << std::endl;
00109 }

```

```

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("S4_AWS_ACCESS_KEY_ID");
00118     auto AccessKey=GetEnv("S4_AWS_SECRET_ACCESS_KEY");
00119
00120     const char *programe=argv[0];
00121
00122     if (argc>1) {
00123         if ((strcasecmp(argv[1],"-h")==0) || (strcasecmp(argv[1],"--help")==0)) {
00124             Usage(programe);
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(programe);
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(programe);
00139             return 1;
00140         }
00141     }
00142
00143     sound4::cloudx1::SetLogSeverity(verbose5);
00144     sound4::cloudx1::SetLoggerCallback(MyLogger);
00145
00146     sound4::cloudx1::CInstance instance;
00147     instance.SetParam("ADMIN_USER","admin");
00148     instance.SetParam("ADMIN_SECRET","admin");
00149
00150     std::cerr << "Creating" << std::endl;
00151     if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, store_path)) {
00152         std::cerr << "Failed to create the processing instance" << std::endl;
00153         return 1;
00154     }
00155
00156     #if (CLOUDX1_HAS_WEBSERVER)
00157         std::cerr << "Starting web server" << std::endl;
00158         if (!instance.StartWebServer(listen_port,0)) {
00159             std::cerr << "Failed to create the web server on port " << listen_port << std::endl;
00160             return 1;
00161         }
00162     #endif // (CLOUDX1_HAS_WEBSERVER)
00163
00164     {
00165         auto client = instance.NewClient();
00166         auto answer = client->ProcessJson(R"JSON({{get":{"processorname":null}}})JSON");
00167         std::cerr << "Request for processor name returned " << answer << std::endl;
00168     }
00169
00170     ProcessLoop(instance);
00171
00172     std::cerr << "Stopping now" << std::endl;
00173     instance.Stop();
00174
00175     std::cerr << "End" << std::endl;
00176     return 0;
00177 }

```

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 *progrname, [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),
00075             sound4::cloudx1::dyn::InputSampleSize, stdin) != sound4::cloudx1::dyn::InputSampleSize) {
00076             std::cerr << "ProcessLoop: input stopped" << std::endl;
00077             stopthread=true;
00078             break;
00079         }
00080         // Process it
00081         instance.ProcessAudio();
00082         // Write it to stdout
00083         if (fwrite(instance.GetBufferOut().data(), sizeof(float),
00084             sound4::cloudx1::dyn::OutputSampleSize, stdout) != sound4::cloudx1::dyn::OutputSampleSize) {
00085             std::cerr << "Failed to write audio output" << std::endl;
00086             stopthread=true;
00087         }
00088     }
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)]" <<
00097         std::endl;;
00098     std::cerr << "  - S4LOGINKEY           : SOUND4 Login key (or S4USERID)" << std::endl;;
00099     std::cerr << "  - RADIO_NAME          : SOUND4 Radio Name" << std::endl;;
00100     std::cerr << "  - S4_AWS_ACCESS_KEY_ID : SOUND4 Access Key ID" << std::endl;;
00101     std::cerr << "  - S4_AWS_SECRET_ACCESS_KEY: SOUND4 Access Key Secret" << std::endl;;
00102     if (dynlib.IsOk()) {
00103         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 - | "<<progrname<<" | 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 - | "<<progrname<<" | 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 - | "<<progrname<<" | ffplay -f f32le -ar
"<<dynlib.GetSampleRate()<<" -ac "<<dynlib.GetChannelCount()<<" -i -" << std::endl;;
00109         #endif
00110     }
00111 }
00112
00113 void MyLogger(sound4::cloudxl::dyn::LogSeverity severity, const std::string& msg)
00114 {
00115     std::cerr << msg << std::endl;
00116 }
00117
00119 class MyPresetManager : public sound4::cloudxl::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(std::filesystem::relative(entry.path(), m_preset_path).native());
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 };
00192
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("S4_AWS_ACCESS_KEY_ID");
00208     auto AccessKey=GetEnv("S4_AWS_SECRET_ACCESS_KEY");
00209
00210     const char *programe=argv[0];
00211
00212
00213     sound4::cloudx1::dyn::CDynLib dynlib;
00214     if (!dynlib.Load()) {
00215         std::cerr << "Failed to load processing library" << std::endl;
00216         return 1;
00217     }
00218
00219     if (argc>1) {
00220         if ((strcmp(argv[1],"-h")==0) || (strcmp(argv[1],"--help")==0)) {
00221             Usage(programe, dynlib);
00222             return 0;
00223         }
00224     }
00225
00226     if (LoginKey.empty() || RadioName.empty() || KeyId.empty() || AccessKey.empty()) {
00227         std::cerr << "Missing credentials in environment" << std::endl;
00228         Usage(programe, dynlib);
00229         return 1;
00230     }
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" <<
00237             std::endl;
00238             Usage(programe, dynlib);
00239             return 1;
00240         }
00241     }
00242
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");
00249
00250     MyPresetManager preset_manager;
00251     if (!store_path.empty()) {
00252         if (!preset_manager.SetupPath(store_path)) {
00253             std::cerr << "Failed to setup the custom preset manager on path " << store_path.c_str() <<
00254             std::endl;
00255             return 1;
00256         }
00257     }
00258     instance.SetPresetManager(&preset_manager);
00259
00260
00261     std::cerr << "Creating" << std::endl;
00262     if (!instance.Create(LoginKey, RadioName, KeyId, AccessKey, {})) {
00263         std::cerr << "Failed to create the processing instance" << std::endl;
00264         return 1;
00265     }
00266
00267
00268     #if (CLOUDX1_HAS_WEBSERVER)
00269     std::cerr << "Starting web server" << std::endl;
00270     if (!instance.StartWebServer(listen_port, 0)) {
00271         std::cerr << "Failed to create the web server on port " << listen_port << std::endl;
00272         return 1;
00273     }
00274     #endif // (CLOUDX1_HAS_WEBSERVER)
00275
00276
00277

```

```

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 (
    cloudxl_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 cloudxl_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 cloudxl_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 *programe)
00065 {
00066     std::cerr << "Usage: " << programe << 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 << "  - S4_AWS_ACCESS_KEY_ID : SOUND4 Access Key ID" << std::endl;;
00073     std::cerr << "  - S4_AWS_SECRET_ACCESS_KEY: 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 - |
"<<programe<<" | 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 - | "<<programe<<" | 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 - |
"<<programe<<" | 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("S4_AWS_ACCESS_KEY_ID");
00101     char *pAccessKey=getenv("S4_AWS_SECRET_ACCESS_KEY");
00102
00103     const char *programe=argv[0];
00104
00105     if (argc>1) {
00106         if ((strcmp(argv[1], "-h")==0) || (strcmp(argv[1], "--help")==0)) {
00107             Usage(programe);
00108             return 0;
00109         }
00110     }
00111     if (!pLoginKey || !pRadioName || !pKeyId || !pAccessKey) {
00112         std::cerr << "Missing credentials in environment" << std::endl;
00113         Usage(programe);
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
00142     // Optional: Use our own logging, instead of default color output to stderr.
00143     //cloudxl_SetLoggerCallback(&MyLogger);
00144
00145     //cloudxl_SetLogSeverity(cloudxl_LogSeverity::info);
00146     cloudxl_SetLogSeverity(cloudxl_LogSeverity::verbose5);
00147
00148     std::cerr << "Process version: " << cloudxl_GetVersion() << std::endl;
00149     // Do some sanity checks
00150     if (cloudxl_GetSampleRate() != SAMPLE_RATE) {
00151         std::cerr << "Bad library sampling rate, expecting '"<SAMPLE_RATE<"' but has '"<
00152         cloudxl_GetSampleRate() << std::endl;
00153         return 1;
00154     }
00155     if (cloudxl_GetChunkSizeInFrames() != CHUNK_SIZE) {
00156         std::cerr << "Bad library frame size, expecting '"<CHUNK_SIZE<"' but has '"<
00157         cloudxl_GetChunkSizeInFrames() << std::endl;
00158         return 1;
00159     }
00160     if (cloudxl_GetChannelCount() != CHANNEL_COUNT) {
00161         std::cerr << "Bad library channel count, expecting '"<CHANNEL_COUNT<"' but has '"<
00162         cloudxl_GetChannelCount() << std::endl;
00163         return 1;
00164     }
00165
00166     // Setup parameters
00167     struct cloudxl_CParameters *params = cloudxl_NewParameters();
00168     // Optional: activate web authentication, set admin password
00169     // This creates the authentication only for a new storage path
00170     cloudxl_SetParameter(params,"ADMIN_USER", "admin");
00171     cloudxl_SetParameter(params,"ADMIN_SECRET", "admin");
00172
00173     // Create the processing instance
00174     pInstance=cloudxl_InitProcess2(pLoginKey,pRadioName,pKeyId,pAccessKey,store_path.c_str(), params);
00175     cloudxl_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 << "cloudxl_StartUpdateThread (no json port)" << std::endl;
00185         cloudxl_StartUpdateThread(pInstance, 0);
00186         std::cerr << "cloudxl_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 (cloudxl_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 (CLOUDXL_HAS_WEBSERVER)
00197     // Starts a web server, listening on port http://localhost:8080, https://localhost:8443
00198     std::cerr << "Starting web server" << std::endl;
00199     int listenport= 8080;
00200     int listenport_secure= 8443;
00201     uint64_t webserver= SOUND4_INVALID_WEBSERVER_ID;
00202     if (listenport || listenport_secure) {
00203         webserver = cloudxl_Webserver(listenport,listenport_secure,pInstance);
00204     }

```

```

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\" }",
00234         NULL);
00235         std::cerr << "Loaded factory preset answer: " << answer << std::endl;
00236         cloudx1_FreeJsonAnswer(answer);
00237         cloudx1_DeleteClient(pClient);
00238     }*/
00239
00240     std::cerr << "Estimated delay " << ( cloudx1_GetEstimatedDelay(pInstance)*1000.0/SAMPLE_RATE ) << "
ms" << std::endl;
00241
00242     ProcessLoop(pInstance);
00243
00244 #if (CLOUDX1_HAS_WEBSERVER)
00245     // Stopping the webserver
00246     std::cerr << "Stopping web server" << std::endl;
00247     cloudx1_Webserver_Stop(webserver, 1000);
00248     std::cerr << "Stopping web server DONE" << std::endl;
00249 #endif // (CLOUDX1_HAS_WEBSERVER)
00250
00251     // Stopping the processing instance
00252     std::cerr << "Stopping Update thread" << std::endl;
00253     cloudx1_StopUpdateThread(pInstance); // this will exit the update thread
00254     std::cerr << "Stopping Update thread DONE" << std::endl;
00255
00256     updater.join();
00257
00258     cloudx1_ExitProcess(pInstance);
00259
00260     return 0;
00261 }

```

11.7 sound4.x1.cloud.h File Reference

C interface for library.

```
#include <stdint.h>
```

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 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 *AWS_Access_ID, const char *AWS_Access_Secret, const char *save_path)`

- struct [cloudx1_CInstance](#) * [cloudx1_InitProcess2](#) (const char *LoginKey, const char *RadioName, const char *AWS_Access_ID, const char *AWS_Access_Secret, const char *save_path, const struct [cloudx1_CParameters](#) *parameters)
- struct [cloudx1_CInstance](#) * [cloudx1_InitProcess3](#) (const char *LoginKey, const char *RadioName, const char *AWS_Access_ID, const char *AWS_Access_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)
- 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
```

```

00068 // -----
00087 // -----
00140 // -----
00141
00142 // -----
00154 #define CLOUDX1_AUDIOFRAME_COUNT      64
00160 #define CLOUDX1_CHANNEL_COUNT          2
00166 #define CLOUDX1_AUDIO_INPUT_COUNT      1
00172 #define CLOUDX1_AUDIO_OUTPUT_COUNT    1
00178 #define CLOUDX1_SAMPLE_RATE            48000
00179
00185 CLOUDX1_DECL const char *cloudx1_GetVersion();
00186
00199 CLOUDX1_DECL unsigned int cloudx1_GetChunkSizeInFrames();
00200
00209 CLOUDX1_DECL unsigned int* cloudx1_GetPossibleChunkSizeInFrames();
00210
00218 CLOUDX1_DECL unsigned int cloudx1_GetChannelCount();
00219
00228 CLOUDX1_DECL unsigned int cloudx1_GetAudioInputCount();
00229
00238 CLOUDX1_DECL unsigned int cloudx1_GetAudioOutputCount();
00239
00247 CLOUDX1_DECL unsigned int cloudx1_GetSampleRate();
00248
00252 enum cloudx1_LogSeverity {
00253     none = 0,
00254     fatal = 1,
00255     error = 2,
00256     warning = 3,
00257     info = 4,
00258     verbose = 5,
00259     verbose2 = 6,
00260     verbose3 = 7,
00261     verbose4 = 8,
00262     verbose5 = 9,
00263 };
00264
00271 typedef void (*cloudx1_loggerfn) (enum cloudx1_LogSeverity, const char *);
00272
00282 CLOUDX1_DECL void cloudx1_SetLoggerCallback( cloudx1_loggerfn logger );
00283
00291 CLOUDX1_DECL void cloudx1_SetLogSeverity( enum cloudx1_LogSeverity severity );
00292
00295 // -----
00301 // -----
00305 struct cloudx1_CInstance;
00306
00310 struct cloudx1_CParameters;
00311
00319 CLOUDX1_DECL struct cloudx1_CParameters *cloudx1_NewParameters();
00320
00324 CLOUDX1_DECL void cloudx1_FreeParameters(struct cloudx1_CParameters *params);
00325
00337 CLOUDX1_DECL void cloudx1_SetParameter(struct cloudx1_CParameters *params, const char *name, const
    char *value);
00338
00344 CLOUDX1_DECL const char *cloudx1_GetParameter(struct cloudx1_CParameters *params, const char *name);
00345
00351 CLOUDX1_DECL void cloudx1_FreeParameterValue(const char *value);
00352
00360 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess(
00361     const char *LoginKey,
00362     const char *RadioName,
00363     const char *AWS_Access_ID,
00364     const char *AWS_Access_Secret,
00365     const char *save_path
00366 );
00367
00375 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess2(
00376     const char *LoginKey,
00377     const char *RadioName,
00378     const char *AWS_Access_ID,
00379     const char *AWS_Access_Secret,
00380     const char *save_path,
00381     const struct cloudx1_CParameters *parameters
00382 );
00383
00428 CLOUDX1_DECL struct cloudx1_CInstance *cloudx1_InitProcess3(
00429     const char *LoginKey,
00430     const char *RadioName,
00431     const char *AWS_Access_ID,
00432     const char *AWS_Access_Secret,
00433     const char *save_path,
00434     const struct cloudx1_CParameters *parameters,
00435     unsigned int frames_per_chunk
00436 );

```

```

00437
00449 CLOUDX1_DECL unsigned int cloudxl_GetProcessChunkFrames(struct cloudxl_CInstance *instance);
00450
00460 CLOUDX1_DECL int cloudxl_TerminateProcess(struct cloudxl_CInstance *instance);
00461
00467 CLOUDX1_DECL void cloudxl_ExitProcess(struct cloudxl_CInstance *instance);
00468
00471 #if CLOUDX1_HAS_CLOUDBUS
00472 // -----
00481 struct cloudxl_CBus;
00482
00488 CLOUDX1_DECL struct cloudxl_CBus* cloudxl_NewBus();
00489
00495 CLOUDX1_DECL void cloudxl_FreeBus(struct cloudxl_CBus *bus);
00496
00506 CLOUDX1_DECL void cloudxl_SetInstanceBus(struct cloudxl_CParameters *params, struct cloudxl_CBus
    *bus);
00507
00508
00510 #endif // CLOUDX1_HAS_CLOUDBUS
00511
00512 // -----
00535 // -----
00536
00537 // OS dependent filesystem path char type
00538 #ifdef _WIN32
00539     typedef wchar_t fs_char;
00540 #else // !_WIN32
00541     typedef char fs_char;
00542 #endif // !_WIN32
00543
00551 typedef char * (*cloudxl_storage_reader) (const fs_char *filename, void* userdata);
00552
00559 typedef void (*cloudxl_storage_reader_free) (char *content, void* userdata);
00560
00569 typedef int (*cloudxl_storage_writer) (const fs_char *filename, const char *content, void* userdata);
00570
00578 typedef int (*cloudxl_storage_exists) (const fs_char *filename, void* userdata);
00579
00587 typedef fs_char** (*cloudxl_storage_getall) (void* userdata);
00588
00595 typedef void (*cloudxl_storage_getall_free) (fs_char**all, void* userdata);
00596
00604 typedef int (*cloudxl_storage_remove) (const fs_char *filename, void* userdata);
00605
00614 typedef int (*cloudxl_storage_rename) (const fs_char *from, const fs_char *to, void* userdata);
00615
00633 CLOUDX1_DECL void cloudxl_SetPresetManager(struct cloudxl_CParameters *params
00634     , cloudxl_storage_reader reader, cloudxl_storage_reader_free
00635     , cloudxl_storage_writer writer
00636     , cloudxl_storage_exists exists
00637     , cloudxl_storage_getall getall, cloudxl_storage_getall_free getall_free
00638     , cloudxl_storage_remove remove
00639     , cloudxl_storage_rename rename
00640     , int IsReadOnly
00641     , void* userdata
00642     );
00643
00647 enum cloudxl_PresetChange_Kind {
00648     change_kind_created = 1,
00649     change_kind_modified ,
00650     change_kind_deleted ,
00651 };
00652
00661 CLOUDX1_DECL void cloudxl_PresetManager_InformChange(struct cloudxl_CInstance *instance, const fs_char
    *relative_path, enum cloudxl_PresetChange_Kind change_kind);
00662
00665 // -----
00673 // -----
00674
00688 CLOUDX1_DECL void cloudxl_SetMetadata(struct cloudxl_CInstance *instance, const char* key, const char*
    value);
00689
00697 CLOUDX1_DECL const char** cloudxl_GetMetadataInfos(struct cloudxl_CInstance *instance);
00698
00705 CLOUDX1_DECL void cloudxl_FreeMetadataInfos(struct cloudxl_CInstance *instance, const char** infos);
00706
00709 // -----
00714 // -----
00715
00728 CLOUDX1_DECL void cloudxl_StartUpdateThread(struct cloudxl_CInstance *instance, unsigned int port);
00729
00735 CLOUDX1_DECL void cloudxl_StopUpdateThread(struct cloudxl_CInstance *instance);
00736
00744 CLOUDX1_DECL int cloudxl_WaitUpdateThreadReady(struct cloudxl_CInstance *instance, int milliseconds);
00745
00748 // -----

```

```

00753 // -----
00775 CLOUDX1_DECL void cloudx1_ProcessAudio(struct cloudx1_CInstance *instance, const float *input, float
    *output );
00776
00795 CLOUDX1_DECL void cloudx1_ProcessAudio_Planar(struct cloudx1_CInstance *instance
    , float const * const *input
    , float * const *output);
00796
00797
00798
00811 CLOUDX1_DECL float *cloudx1_GetBufferIn(struct cloudx1_CInstance *instance);
00812
00825 CLOUDX1_DECL float *cloudx1_GetBufferOut(struct cloudx1_CInstance *instance);
00826
00834 CLOUDX1_DECL unsigned int cloudx1_GetEstimatedDelay(struct cloudx1_CInstance *instance);
00835
00838 // -----
00845 // -----
00846 #ifdef _MSC_VER
00847     #define __BYTE_ORDER__ REG_DWORD
00848     #define __ORDER_LITTLE_ENDIAN__ REG_DWORD_LITTLE_ENDIAN
00849     #define __ORDER_BIG_ENDIAN__ REG_DWORD_BIG_ENDIAN
00850 #endif
00851
00855 enum cloudx1_SampleFormat {
00856     INVALID_FORMAT=0,
00857     S16_LE,
00858     S16_BE,
00859     S24_LE,
00860     S24_BE,
00861     S32_LE,
00862     S32_BE,
00863     F32_LE,
00864     F32_BE,
00865
00866     // Native definitions, only links to the physical ones
00867     #if __BYTE_ORDER__ == __ORDER_LITTLE_ENDIAN__
00868         S16_NATIVE=S16_LE,
00869         S24_NATIVE=S24_LE,
00870         S32_NATIVE=S32_LE,
00871         F32_NATIVE=F32_LE,
00872     #else
00873         S16_NATIVE=S16_BE,
00874         S24_NATIVE=S24_BE,
00875         S32_NATIVE=S32_BE,
00876         F32_NATIVE=F32_BE,
00877     #endif
00878 };
00879
00886 CLOUDX1_DECL const char *cloudx1_GetFormatName(const enum cloudx1_SampleFormat fmt);
00887
00894 CLOUDX1_DECL enum cloudx1_SampleFormat cloudx1_GetFormatFromName(const char *name);
00895
00902 CLOUDX1_DECL unsigned int cloudx1_GetBytesFromFormat(const enum cloudx1_SampleFormat fmt);
00903
00904
00911 CLOUDX1_DECL unsigned int cloudx1_GetMaxPacketFrame(struct cloudx1_CInstance *instance);
00912
00923 CLOUDX1_DECL unsigned int cloudx1_AddAudio(struct cloudx1_CInstance *instance, const uint8_t *payload,
    unsigned int nFrame, enum cloudx1_SampleFormat fmt );
00924
00931 CLOUDX1_DECL unsigned int cloudx1_AddPadAudio(struct cloudx1_CInstance *instance);
00932
00939 CLOUDX1_DECL unsigned int cloudx1_GetOutputCount(struct cloudx1_CInstance *instance);
00940
00950 CLOUDX1_DECL unsigned int cloudx1_GetAudio(struct cloudx1_CInstance *instance, uint8_t *payload,
    unsigned int max_nFrame, enum cloudx1_SampleFormat fmt );
00951
00955 // -----
00959 // -----
00970 CLOUDX1_DECL void cloudx1_AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl, enum
    cloudx1_SampleFormat fmt);
00971
00982 CLOUDX1_DECL void cloudx1_AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl, enum
    cloudx1_SampleFormat fmt);
00983
00993 CLOUDX1_DECL void cloudx1_StereoToMono(const float *input, float *output, size_t nFrame);
00994
01004 CLOUDX1_DECL void cloudx1_MonoToStereo(const float *input, float *output, size_t nFrame);
01005
01016 CLOUDX1_DECL void cloudx1_StereoToMono_Planar(const float *inputL, const float *inputR, float *output,
    size_t nFrame);
01017
01028 CLOUDX1_DECL void cloudx1_MonoToStereo_Planar(const float *input, float *outputL, float *outputR,
    size_t nFrame);
01029
01036 CLOUDX1_DECL void cloudx1_AudioMonoFromLiveStereo(const uint8_t *payload, float *output);
01037
01044 CLOUDX1_DECL void cloudx1_AudioMonoToLiveStereo(const float *input, uint8_t *payload);

```

```

01045
01048 // -----
01053 // -----
01057 struct cloudx1_CClientInstance;
01058
01067 CLOUDX1_DECL struct cloudx1_CClientInstance *cloudx1_NewClient(struct cloudx1_CInstance *instance);
01068
01074 CLOUDX1_DECL void cloudx1_DeleteClient(struct cloudx1_CClientInstance *client);
01075
01089 CLOUDX1_DECL const char *cloudx1_ProcessJson(struct cloudx1_CClientInstance *client, const char
    *json_str, int *need_save);
01090
01096 CLOUDX1_DECL void cloudx1_FreeJsonAnswer(const char *json_str);
01097
01109 CLOUDX1_DECL int cloudx1_SaveState(struct cloudx1_CInstance *instance);
01110
01406 #if CLOUDX1_HAS_WEBSERVER
01407 // -----
01415 // -----
01434 CLOUDX1_DECL uint64_t cloudx1_Webserver_tcp(unsigned int listenport, unsigned int listenport_secure,
    const char *socket_ip, unsigned int socket_port);
01435
01436 // -----
01456 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);
01457
01475 CLOUDX1_DECL uint64_t cloudx1_Webserver(unsigned int listenport, unsigned int listenport_secure,
    struct cloudx1_CInstance *instance);
01476
01486 CLOUDX1_DECL int cloudx1_Webserver_Stop(uint64_t id, int timeout_ms);
01487
01496 CLOUDX1_DECL int cloudx1_Webserver_Status(uint64_t id);
01497
01502 #define SOUND4_INVALID_WEBSERVER_ID ((uint64_t)-1)
01503
01507 #define SOUND4_WEBSERVER_HTTP_OK (1<0)
01511 #define SOUND4_WEBSERVER_HTTPS_OK (1<1)
01512
01514 #endif // CLOUDX1_HAS_WEBSERVER
01515
01516 #ifndef __cplusplus
01517 } // extern "C"
01518 #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::CCient](#)

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_shortcode = "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(cloudxl_GetFormatName(fmt));
00289 }
00290
00297 static inline SampleFormat GetFormatFromName(const std::string& name)
00298 {
00299     return cloudxl_GetFormatFromName(name.c_str());
00300 }
00301
00308 static inline unsigned int GetBytesFromFormat(const SampleFormat fmt)
00309 {
00310     return cloudxl_GetBytesFromFormat(fmt);
00311 }
00312
00316 using LogSeverity = cloudxl_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(cloudxl_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     cloudxl_SetLogSeverity(severity);
00337 }
00341 static inline void SetLoggerCallback(log_cb_t cb)
00342 {
00343     _log_cb=cb;
00344     cloudxl_SetLoggerCallback(&_log_cb_c);
00345 }
00346
00347 #if CLOUDX1_HAS_CLOUDBUS
00348 class CBus {
00349 public:
00350     CBus()
00351         : m_bus(cloudxl_NewBus()) {}
00352     ~CBus()
00353     {
00354         cloudxl_FreeBus(m_bus);
00355         m_bus = nullptr;
00356     }
00357     cloudxl_CBus *Get() const { return m_bus; }
00358 private:
00359     cloudxl_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 = cloudxl_PresetChange_Kind;
00381
00385 class CInstance {
00386 public:
00390     CInstance()
00391     {
00392         params = cloudxl_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) cloudxl_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         cloudxl_SetMetadata(instance, key.c_str(), value);
00558     } else {
00559         init_metadata.push_back( {key, value} );
00560     }
00561 }
00562
00568 std::vector< std::tuple<std::string, std::string> > GetMetadataInfos()
00569 {
00570     std::vector< std::tuple<std::string, std::string> > values;
00571     const char** c_values = cloudxl_GetMetadataInfos(instance);
00572     if (c_values) {
00573         for (const char** c_value=c_values; *c_value; ) {
00574             std::string key(*c_value);
00575             c_value++;
00576             if (*c_value) {
00577                 std::string descr(*c_value);
00578                 c_value++;
00579                 values.push_back( {key, descr} );
00580             }
00581         }
00582         cloudxl_FreeMetadataInfos(instance, c_values);
00583     }
00584     return values;
00585 }
00586
00587 // Can be overloaded, called at start of UpdateThread in the thread
00588 virtual void OnUpdateThreadStart() {}
00589 // Can be overloaded to call at end of UpdateThread in the thread
00590 virtual void OnUpdateThreadStop() {}
00591
00592 #if CLOUDX1_HAS_WEBSERVER
00598 bool StartWebServer(int http_port, int https_port=0)
00599 {
00600     assert(instance);
00601     assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
00602     webserver = cloudxl_Webserver(http_port, https_port, instance);
00603     if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
00604         return false;
00605     }
00606     int web_status=cloudxl_Webserver_Status(webserver);
00607     if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
00608         return false;
00609     }
00610     if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
00611         return false;
00612     }
00613     return true;
00614 }
00620 void StopWebServer()
00621 {
00622     if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
00623         cloudxl_Webserver_Stop(webserver, 1000);
00624         webserver = SOUND4_INVALID_WEBSERVER_ID;
00625     }
00626 }
00627 #endif // CLOUDX1_HAS_WEBSERVER
00628
00635 int Terminate()
00636 {
00637     if (!instance) return 0;
00638     return cloudxl_TerminateProcess(instance);
00639 }
00640
00646 void Stop()
00647 {
00648     if (!instance) return;
00649 #if CLOUDX1_HAS_WEBSERVER
00650     StopWebServer();
00651 #endif // CLOUDX1_HAS_WEBSERVER
00652     if (update_thread.joinable()) {
00653         cloudxl_StopUpdateThread(instance); // this will exit the update thread
00654         update_thread.join();
00655     }
00656     cloudxl_ExitProcess(instance);
00657     instance=NULLPTR;
00658 }
00659
00665 unsigned int GetEstimatedDelay()
00666 {
00667     assert(instance);
00668     return cloudxl_GetEstimatedDelay(instance);
00669 }
00670
00681 std::array<float, InputSampleSize>& GetBufferIn()
00682 {
00683     assert(instance);
00684     float *buf=cloudxl_GetBufferIn(instance);

```

```

00685         return reinterpret_cast< std::array<float, InputSampleSize>& >(*buf);
00686     }
00687 }
00698 std::array<float, OutputSampleSize>& GetBufferOut()
00699 {
00700     assert(instance);
00701     float *buf= cloudx1_GetBufferOut(instance);
00702     return reinterpret_cast< std::array<float, OutputSampleSize>& >(*buf);
00703 }
00709 void ProcessAudio()
00710 {
00711     assert(instance);
00712     cloudx1_ProcessAudio(instance, cloudx1_GetBufferIn(instance),
cloudx1_GetBufferOut(instance));
00713 }
00727 // void ProcessAudio_Planar(const std::array< const std::array<const float, ChunkFrames>,
InputChannels>& input, std::array< std::array<float, ChunkFrames>, OutputChannels>& output)
00728 void ProcessAudio_Planar(float const * const *input, float * const *output)
00729 {
00730     assert(instance);
00731     cloudx1_ProcessAudio_Planar(instance, input, output);
00732 }
00733
00745 template<typename T>
00746 std::vector<T> ProcessAnyAudio(const std::vector<T> input)
00747 {
00748     assert(instance);
00749     std::vector<T> output;
00750     unsigned int out_offset=0;
00751     unsigned int in_offset=0;
00752     unsigned int todo = input.size();
00753     while (todo>0) {
00754         unsigned int left = AddAudio(&input[in_offset], todo);
00755         unsigned int out_avail = cloudx1_GetOutputCount(instance);
00756         output.resize(out_offset + out_avail);
00757         GetAudio(&output[out_offset], out_avail);
00758         out_offset+=out_avail;
00759         in_offset += todo-left;
00760         todo=left;
00761     }
00762     return output;
00763 }
00764
00770 class CClient {
00771 public:
00772     CClient(cloudx1_CInstance* instance)
00773     {
00774         assert(instance);
00775         client=cloudx1_NewClient(instance);
00776         if (!client) throw std::bad_alloc();
00777     }
00778     // non-copyable
00779     CClient( const CInstance& ) = delete;
00780     CClient& operator=( const CInstance& ) = delete;
00781     ~CClient()
00782     {
00783         if (client) {
00784             cloudx1_DeleteClient(client);
00785             client=nullptr;
00786         }
00787     }
00795     std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
00796     {
00797         assert(client);
00798         int need_save=0;
00799         const char *canswer = cloudx1_ProcessJson(client, request.c_str(),
&need_save);
00800         if (!canswer) return {};
00801         std::string answer(canswer);
00802         cloudx1_FreeJsonAnswer (canswer);
00803         if (NeedSave) {
00804             *NeedSave=(need_save!=0);
00805         }
00806         return answer;
00807     }
00808 private:
00809     cloudx1_CClientInstance *client = nullptr;
00810 };
00818 std::shared_ptr<CClient> NewClient()
00819 {
00820     assert(instance);
00821     return std::make_shared<CClient>(instance);
00822 }
00823
00824 protected:
00825     template<typename T>
00826     unsigned int AddAudio(const T* payload, unsigned int nFrame)

```

```

00827         {
00828             assert(instance);
00829             return cloudx1_AddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
helper::SampleFormat<T>::format);
00830         }
00831         template<typename T>
00832         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
00833         {
00834             assert(instance);
00835             return cloudx1_GetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
helper::SampleFormat<T>::format);
00836         }
00837     private:
00838         cloudx1_CParameters* params = nullptr;
00839         cloudx1_CInstance* instance = nullptr;
00840         std::thread update_thread;
00841         std::vector< std::pair<std::string, std::string> > init_metadata;
00842 #if CLOUDX1_HAS_WEBSERVER
00843         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
00844 #endif // CLOUDX1_HAS_WEBSERVER
00845     };
00846 }; // namespace cloudx1
00847 }; // namespace sound4
00848 // bridge C callbacks to CPresetLoader
00849 extern "C" {
00850     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata) {
00851         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00852         std::string content=preset_loader->Read(filename);
00853         return strdup(content.c_str());
00854     }
00855     static void cloudx1_custom_reader_free(char *content, void* userdata) {
00856         if (!content) return;
00857         free(content);
00858     }
00859     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata) {
00860         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00861         auto res=preset_loader->Write(filename,content);
00862         return res?0:-1;
00863     }
00864     static int cloudx1_custom_exists(const fs_char *filename, void* userdata) {
00865         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00866         auto res=preset_loader->Exists(filename);
00867         return res?0:-1;
00868     }
00869     static fs_char** cloudx1_custom_getall(void* userdata) {
00870         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00871         auto res=preset_loader->GetAll();
00872         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
00873         for (size_t n=0;n<res.size();n++) {
00874             all[n]=fs_strdup(res[n].c_str());
00875         }
00876         all[res.size()]=nullptr;
00877         return all;
00878     }
00879     static void cloudx1_custom_getall_free(fs_char** all, void* userdata) {
00880         if (!all) return;
00881         for (fs_char** one=all;*one;one++) {
00882             free(*one);
00883         }
00884         free(all);
00885     }
00886     static int cloudx1_custom_remove(const fs_char *filename, void* userdata) {
00887         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00888         auto res=preset_loader->Remove(filename);
00889         return res?0:-1;
00890     }
00891     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
00892         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00893         auto res=preset_loader->Rename(from,to);
00894         return res?0:-1;
00895     }
00896 };
00897 };
00898 };
00899 };
00900 };

```

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 <loaderapi.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 <loaderapi.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 *cloudxl_custom_reader(const fs_char *filename, void* userdata);
00045     static void cloudxl_custom_reader_free(char *content, void* userdata);
00046     static int cloudxl_custom_writer(const fs_char *filename, const char *content, void* userdata);
00047     static int cloudxl_custom_exists(const fs_char *filename, void* userdata);
00048     static fs_char** cloudxl_custom_getall(void* userdata);
00049     static void cloudxl_custom_getall_free(fs_char** all, void* userdata);
00050     static int cloudxl_custom_remove(const fs_char *filename, void* userdata);
00051     static int cloudxl_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00052 };
00053
00057 namespace sound4 {
00061 namespace cloudxl {
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
00132             template <typename T>
00133             DynFuncHolder<T> GetSymbol(const std::string& name) {
00134                 auto ptr=dlsym(m_lib, name.c_str());
00135                 if (!ptr) {
00136                     throw std::runtime_error("Missing function in library");
00137                 }
00138             }
00139         };
00140     }
00141 }
00142 }
00143 }

```

```

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_FREELIBRARYANEXITTHREAD)
FreeLibraryAndExitThread(m_lib, 0);
00164             #elif defined(SOUND4_CALL_FREELIBRARY)
FreeLibrary(m_lib);
00165             #endif // SOUND4_CALL_FREELIBRARY
m_lib=NULL;
00166         }
00167     }
00168     template <typename T>
00169     DynFuncHolder<T> GetSymbol(const std::string& name) {
00170         auto ptr=GetProcAddress(m_lib, name.c_str());
00171         if (!ptr) {
00172             throw std::runtime_error("Missing function in library");
00173         }
00174         return DynFuncHolder<T>(ptr);
00175     }
00176     template <typename T>
00177     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00178         auto ptr=GetProcAddress(m_lib, name.c_str());
00179         return DynFuncHolder<T>(ptr);
00180     }
00181     static std::filesystem::path GetThisLibraryPath(void) {
00182         static wchar_t path[MAX_PATH]={};
00183         HMODULE hm = NULL;
00184         if (GetModuleHandleExW(GET_MODULE_HANDLE_EX_FLAG_FROM_ADDRESS |
GET_MODULE_HANDLE_EX_FLAG_UNCHANGED_REFCOUNT,
00185         (LPCWSTR) &GetThisLibraryPath, &hm))
00186         {
00187             if (GetModuleFileNameW(hm, path, MAX_PATH) > 0) {
00188                 return std::filesystem::path(path);
00189             }
00190         }
00191         return {};
00192     }
00193     #endif
00194     virtual ~CDynLoader() {
00195         Close();
00196     }
00197     }; // class CDynLoader
00198 }; // namespace helper
00199
00200 class CDynLib {
00201 private:
00202     helper::CDynLoader m_lib;
00203     bool m_bOK = false;
00204 public:
00205     CDynLib() = default;
00206
00207     // All those wrapped functions have the same signature as there C cloudx1_XXX
00208     helper::DynFuncHolder< decltype(cloudx1_GetVersion) > > GetVersion ;
00209     helper::DynFuncHolder< decltype(cloudx1_GetChunkSizeInFrames) > > GetChunkSizeInFrames ;
00210     helper::DynFuncHolder< decltype(cloudx1_GetChannelCount) > > GetChannelCount ;
00211     helper::DynFuncHolder< decltype(cloudx1_GetAudioInputCount) > > GetAudioInputCount ;
00212     helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount) > > GetAudioOutputCount ;
00213     helper::DynFuncHolder< decltype(cloudx1_GetSampleRate) > > GetSampleRate ;
00214     helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback) > > SetLoggerCallback ;
00215     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 ;
00282     helper::DynFuncHolder< decltype(cloudx1_PresetManager_InformChange) ) >
PresetManager_InformChange ;
00283
00284     // added 2023-09-21
00285     helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames) ) >
GetPossibleChunkSizeInFrames ;
00286     helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames) ) >
GetProcessChunkFrames ;
00287     helper::DynFuncHolder< decltype(cloudx1_InitProcess3) ) > InitProcess3 ;
00288 ;
00289 #if CLOUDX1_HAS_CLOUDBUS
00290     // added 2023-06-26
00291     helper::DynFuncHolder< decltype(cloudx1_NewBus) ) > NewBus ;
00292     helper::DynFuncHolder< decltype(cloudx1_FreeBus) ) > FreeBus ;
00293     helper::DynFuncHolder< decltype(cloudx1_SetInstanceBus) ) > SetInstanceBus ;
00294 #endif // CLOUDX1_HAS_CLOUDBUS
00295
00302     bool Load(const std::filesystem::path& path = std::filesystem::current_path()) {
00303         std::string filename;
00304         #ifdef __unix__
00305             filename="libsound4.x1.cloud.so";
00306         #else
00307             filename="sound4.x1.cloud.dll";
00308         #endif
00309         auto p = path;
00310         p.append(filename);
00311         m_lib.Load(p.native());
00312         if (!m_lib.IsOk()) {
00313             // Search in the same directory this code is in
00314             p =helper::CDynLoader::GetThisLibraryPath();

```

```

00315         p.append(filename);
00316         m_lib.Load(p.native());
00317         if (!m_lib.IsOk()) {
00318             return false;
00319         }
00320     }
00321     // Load all C functions
00322     try {
00323         GetVersion = m_lib.GetSymbol< decltype(cloudx1_GetVersion) >
00324         >("cloudx1_GetVersion" );
00325         GetChunkSizeInFrames = m_lib.GetSymbol< decltype(cloudx1_GetChunkSizeInFrames) >
00326         >("cloudx1_GetChunkSizeInFrames" );
00327         GetChannelCount = m_lib.GetSymbol< decltype(cloudx1_GetChannelCount) >
00328         >("cloudx1_GetChannelCount" );
00329         GetAudioInputCount = m_lib.GetSymbol< decltype(cloudx1_GetAudioInputCount) >
00330         >("cloudx1_GetAudioInputCount" );
00331         GetAudioOutputCount = m_lib.GetSymbol< decltype(cloudx1_GetAudioOutputCount) >
00332         >("cloudx1_GetAudioOutputCount" );
00333         GetSampleRate = m_lib.GetSymbol< decltype(cloudx1_GetSampleRate) >
00334         >("cloudx1_GetSampleRate" );
00335         SetLoggerCallback = m_lib.GetSymbol< decltype(cloudx1_SetLoggerCallback) >
00336         >("cloudx1_SetLoggerCallback" );
00337         SetLogSeverity = m_lib.GetSymbol< decltype(cloudx1_SetLogSeverity) >
00338         >("cloudx1_SetLogSeverity" );
00339         NewParameters = m_lib.GetSymbol< decltype(cloudx1_NewParameters) >
00340         >("cloudx1_NewParameters" );
00341         FreeParameters = m_lib.GetSymbol< decltype(cloudx1_FreeParameters) >
00342         >("cloudx1_FreeParameters" );
00343         SetParameter = m_lib.GetSymbol< decltype(cloudx1_SetParameter) >
00344         >("cloudx1_SetParameter" );
00345         GetParameter = m_lib.GetSymbol< decltype(cloudx1_GetParameter) >
00346         >("cloudx1_GetParameter" );
00347         FreeParameterValue = m_lib.GetSymbol< decltype(cloudx1_FreeParameterValue) >
00348         >("cloudx1_FreeParameterValue" );
00349         InitProcess = m_lib.GetSymbol< decltype(cloudx1_InitProcess) >
00350         >("cloudx1_InitProcess" );
00351         InitProcess2 = m_lib.GetSymbol< decltype(cloudx1_InitProcess2) >
00352         >("cloudx1_InitProcess2" );
00353         TerminateProcess = m_lib.GetSymbol< decltype(cloudx1_TerminateProcess) >
00354         >("cloudx1_TerminateProcess" );
00355         ExitProcess = m_lib.GetSymbol< decltype(cloudx1_ExitProcess) >
00356         >("cloudx1_ExitProcess" );
00357         StartUpdateThread = m_lib.GetSymbol< decltype(cloudx1_StartUpdateThread) >
00358         >("cloudx1_StartUpdateThread" );
00359         StopUpdateThread = m_lib.GetSymbol< decltype(cloudx1_StopUpdateThread) >
00360         >("cloudx1_StopUpdateThread" );
00361         WaitUpdateThreadReady = m_lib.GetSymbol< decltype(cloudx1_WaitUpdateThreadReady) >
00362         >("cloudx1_WaitUpdateThreadReady" );
00363         ProcessAudio = m_lib.GetSymbol< decltype(cloudx1_ProcessAudio) >
00364         >("cloudx1_ProcessAudio" );
00365         ProcessAudio_Planar = m_lib.GetSymbol< decltype(cloudx1_ProcessAudio_Planar) >
00366         >("cloudx1_ProcessAudio_Planar" );
00367         GetBufferIn = m_lib.GetSymbol< decltype(cloudx1_GetBufferIn) >
00368         >("cloudx1_GetBufferIn" );
00369         GetBufferOut = m_lib.GetSymbol< decltype(cloudx1_GetBufferOut) >
00370         >("cloudx1_GetBufferOut" );
00371         GetEstimatedDelay = m_lib.GetSymbol< decltype(cloudx1_GetEstimatedDelay) >
00372         >("cloudx1_GetEstimatedDelay" );
00373         GetFormatName = m_lib.GetSymbol< decltype(cloudx1_GetFormatName) >
00374         >("cloudx1_GetFormatName" );
00375         GetFormatFromName = m_lib.GetSymbol< decltype(cloudx1_GetFormatFromName) >
00376         >("cloudx1_GetFormatFromName" );
00377         GetBytesFromFormat = m_lib.GetSymbol< decltype(cloudx1_GetBytesFromFormat) >
00378         >("cloudx1_GetBytesFromFormat" );
00379         GetMaxPacketFrame = m_lib.GetSymbol< decltype(cloudx1_GetMaxPacketFrame) >
00380         >("cloudx1_GetMaxPacketFrame" );
00381         AddAudio = m_lib.GetSymbol< decltype(cloudx1_AddAudio) >
00382         >("cloudx1_AddAudio" );
00383         AddPadAudio = m_lib.GetSymbol< decltype(cloudx1_AddPadAudio) >
00384         >("cloudx1_AddPadAudio" );
00385         GetOutputCount = m_lib.GetSymbol< decltype(cloudx1_GetOutputCount) >
00386         >("cloudx1_GetOutputCount" );
00387         GetAudio = m_lib.GetSymbol< decltype(cloudx1_GetAudio) >
00388         >("cloudx1_GetAudio" );
00389         AudioConvertFrom = m_lib.GetSymbol< decltype(cloudx1_AudioConvertFrom) >
00390         >("cloudx1_AudioConvertFrom" );
00391         AudioConvertTo = m_lib.GetSymbol< decltype(cloudx1_AudioConvertTo) >
00392         >("cloudx1_AudioConvertTo" );
00393         StereoToMono = m_lib.GetSymbol< decltype(cloudx1_StereoToMono) >
00394         >("cloudx1_StereoToMono" );
00395         MonoToStereo = m_lib.GetSymbol< decltype(cloudx1_MonoToStereo) >
00396         >("cloudx1_MonoToStereo" );
00397         AudioMonoFromLiveStereo = m_lib.GetSymbol< decltype(cloudx1_AudioMonoFromLiveStereo) >
00398         >("cloudx1_AudioMonoFromLiveStereo");
00399         AudioMonoToLiveStereo = m_lib.GetSymbol< decltype(cloudx1_AudioMonoToLiveStereo) >
00400         >("cloudx1_AudioMonoToLiveStereo" );
00401         NewClient = m_lib.GetSymbol< decltype(cloudx1_NewClient) >

```

```

>("cloudx1_NewClient"                );
00363     DeleteClient                = m_lib.GetSymbol< decltype(cloudx1_DeleteClient)    )
>("cloudx1_DeleteClient"            );
00364     ProcessJson                 = m_lib.GetSymbol< decltype(cloudx1_ProcessJson)      )
>("cloudx1_ProcessJson"             );
00365     FreeJsonAnswer              = m_lib.GetSymbol< decltype(cloudx1_FreeJsonAnswer)   )
>("cloudx1_FreeJsonAnswer"          );
00366     SaveState                   = m_lib.GetSymbol< decltype(cloudx1_SaveState)       )
>("cloudx1_SaveState"               );
00367 #if CLOUDX1_HAS_WEBSERVER
00368     Webserver_tcp               = m_lib.GetSymbol< decltype(cloudx1_Webserver_tcp)    )
>("cloudx1_Webserver_tcp"           );
00369     Webserver_tcp2              = m_lib.GetSymbol< decltype(cloudx1_Webserver_tcp2)   )
>("cloudx1_Webserver_tcp2"          );
00370     Webserver                   = m_lib.GetSymbol< decltype(cloudx1_Webserver)       )
>("cloudx1_Webserver"               );
00371     Webserver_Stop              = m_lib.GetSymbol< decltype(cloudx1_Webserver_Stop)   )
>("cloudx1_Webserver_Stop"          );
00372     Webserver_Status            = m_lib.GetSymbol< decltype(cloudx1_Webserver_Status) )
>("cloudx1_Webserver_Status"        );
00373 #endif // CLOUDX1_HAS_WEBSERVER
00374
00375     // added 2023-03-22
00376     StereoToMono_Planar         = m_lib.GetSymbol< decltype(cloudx1_StereoToMono_Planar) )
>("cloudx1_StereoToMono_Planar"     );
00377     MonoToStereo_Planar        = m_lib.GetSymbol< decltype(cloudx1_MonoToStereo_Planar) )
>("cloudx1_MonoToStereo_Planar"     );
00378
00379     } catch (std::runtime_error& ) {
00380         return false;
00381     }
00382     // C functions allowed to be missing
00383     try {
00384         // added 2023-05-22
00385         SetMetadata              = m_lib.GetSymbol< decltype(cloudx1_SetMetadata)       )
>("cloudx1_SetMetadata"            );
00386         GetMetadataInfos        = m_lib.GetSymbol< decltype(cloudx1_GetMetadataInfos)   )
>("cloudx1_GetMetadataInfos"       );
00387         FreeMetadataInfos       = m_lib.GetSymbol< decltype(cloudx1_FreeMetadataInfos)  )
>("cloudx1_FreeMetadataInfos"      );
00388         // added 2023-06-20
00389         SetPresetManager        = m_lib.GetSymbol< decltype(cloudx1_SetPresetManager)   )
>("cloudx1_SetPresetManager"       );
00390         PresetManager_InformChange = m_lib.GetSymbol<
decltype(cloudx1_PresetManager_InformChange) >("cloudx1_PresetManager_InformChange" );
00391
00392         // added 2023-09-21
00393         GetPossibleChunkSizeInFrames = m_lib.GetSymbol<
decltype(cloudx1_GetPossibleChunkSizeInFrames) >("cloudx1_GetPossibleChunkSizeInFrames" );
00394         GetProcessChunkFrames    = m_lib.GetSymbol< decltype(cloudx1_GetProcessChunkFrames) )
>("cloudx1_GetProcessChunkFrames" );
00395         InitProcess3             = m_lib.GetSymbol< decltype(cloudx1_InitProcess3)      )
>("cloudx1_InitProcess3"          );
00396
00397 #if CLOUDX1_HAS_CLOUDBUS
00398     // added 2023-06-26
00399     NewBus                      = m_lib.GetSymbol< decltype(cloudx1_NewBus)            )
>("cloudx1_NewBus"                 );
00400     FreeBus                    = m_lib.GetSymbol< decltype(cloudx1_FreeBus)           )
>("cloudx1_FreeBus"                );
00401     SetInstanceBus             = m_lib.GetSymbol< decltype(cloudx1_SetInstanceBus)     )
>("cloudx1_SetInstanceBus"         );
00402 #endif // CLOUDX1_HAS_CLOUDBUS
00403     } catch (std::runtime_error& ) {
00404         // Ignored, handler will take care
00405     }
00406
00407     m_bOK=true;
00408     return true;
00409 }
00410 bool IsOk() const {
00411     return m_bOK;
00412 }
00413
00414 };
00415
00416 static constexpr const char *process_name = "SOUND4 x1.CLOUD";
00417 static constexpr const char *process_shortcode = "x1";
00418 using SampleFormat = cloudx1_SampleFormat;
00419 const size_t ChunkFrames=CLOUDX1_AUDIOFRAME_COUNT;
00420 const size_t InputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_INPUT_COUNT;
00421 const size_t OutputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_OUTPUT_COUNT;
00422 const size_t InputSampleSize=ChunkFrames*InputChannels;
00423 const size_t OutputSampleSize=ChunkFrames*OutputChannels;
00424 const size_t SampleRate=CLOUDX1_SAMPLE_RATE;

```

```

00451
00452 namespace helper {
00453     #ifdef _WIN32
00454         static inline std::string WStringToUTF8(const std::wstring& wstr) {
00455             if (wstr.empty()) return {};
00456             int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL,
00457 NULL);
00458             std::string str(size, 0);
00459             WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00460             return str;
00461         }
00462         static inline std::wstring UTF8ToWString(const std::string& str) {
00463             if (str.empty()) return std::wstring();
00464             int size = MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), NULL, 0);
00465             std::wstring wstr(size, 0);
00466             MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), &wstr[0], size);
00467             return wstr;
00468         }
00469     #endif // _WIN32
00470
00471     template<typename T>
00472     struct SampleFormat {
00473     };
00474     template<>
00475     struct SampleFormat<int16_t> {
00476         const cloudx1_SampleFormat format = S16_NATIVE;
00477     };
00478     template<>
00479     struct SampleFormat<int32_t> {
00480         const cloudx1_SampleFormat format = S32_NATIVE;
00481     };
00482     template<>
00483     struct SampleFormat<float> {
00484         const cloudx1_SampleFormat format = F32_NATIVE;
00485     };
00486
00487     static inline void AudioConvertFrom(CDynLib& dynlib, const uint8_t *payload, float *output,
00488 size_t nSpl, cloudx1_SampleFormat fmt) {
00489         dynlib.AudioConvertFrom(payload, output, nSpl, fmt);
00490     }
00491     static inline void AudioConvertTo(CDynLib& dynlib, const float *input, uint8_t *payload,
00492 size_t nSpl, cloudx1_SampleFormat fmt) {
00493         dynlib.AudioConvertTo(input, payload, nSpl, fmt);
00494     }
00495     static inline void StereoToMono(CDynLib& dynlib, const float *input, float *output, size_t
00496 nSpl) {
00497         dynlib.StereoToMono(input, output, nSpl);
00498     }
00499     static inline void MonoToStereo(CDynLib& dynlib, const float *input, float *output, size_t
00500 nSpl) {
00501         dynlib.MonoToStereo(input, output, nSpl);
00502     }
00503     static inline void StereoToMono_Planar(CDynLib& dynlib, const float *inputL, const float
00504 *inputR, float *output, size_t nSpl) {
00505         dynlib.StereoToMono_Planar(inputL, inputR, output, nSpl);
00506     }
00507     static inline void MonoToStereo_Planar(CDynLib& dynlib, const float *input, float *outputL,
00508 float *outputR, size_t nSpl) {
00509         dynlib.MonoToStereo_Planar(input, outputL, outputR, nSpl);
00510     }
00511     static inline void AudioMonoFromLiveStereo(CDynLib& dynlib, const uint8_t *payload, float
00512 *output) {
00513         dynlib.AudioMonoFromLiveStereo(payload, output);
00514     }
00515     static inline void AudioMonoToLiveStereo(CDynLib& dynlib, const float *input, uint8_t
00516 *payload) {
00517         dynlib.AudioMonoToLiveStereo(input, payload);
00518     }
00519 }; // namespace helper
00520
00521 static inline std::string GetVersion(CDynLib& dynlib)
00522 {
00523     return std::string(dynlib.GetVersion());
00524 }
00525
00526 static inline unsigned int GetChunkSizeInFrames(CDynLib& dynlib)
00527 {
00528     return dynlib.GetChunkSizeInFrames();
00529 }
00530
00531 static inline std::vector<unsigned int> GetPossibleChunkSizeInFrames(CDynLib& dynlib)
00532 {
00533     std::vector<unsigned int> list;
00534     if (dynlib.GetPossibleChunkSizeInFrames) {
00535         for (unsigned int* src=dynlib.GetPossibleChunkSizeInFrames();*src;src++) {

```

```

00574         list.push_back(*src);
00575     }
00576     } else {
00577         list.push_back(64);
00578     }
00579     return list;
00580 }
00581
00582 static inline unsigned int GetChannelCount(CDynLib& dynlib)
00583 {
00584     return dynlib.GetChannelCount();
00585 }
00586
00587 static inline unsigned int GetAudioInputCount(CDynLib& dynlib)
00588 {
00589     return dynlib.GetAudioInputCount();
00590 }
00591
00592 static inline unsigned int GetAudioOutputCount(CDynLib& dynlib)
00593 {
00594     return dynlib.GetAudioOutputCount();
00595 }
00596
00597 static inline unsigned int GetSampleRate(CDynLib& dynlib)
00598 {
00599     return dynlib.GetSampleRate();
00600 }
00601
00602 static inline void SanityCheck(CDynLib& dynlib, bool a_bCheckFrames = true)
00603 {
00604     // Do some sanity checks
00605     if (dynlib.GetSampleRate() != CLOUDX1_SAMPLE_RATE) {
00606         throw std::runtime_error("Bad library sampling rate");
00607     }
00608     if (a_bCheckFrames && dynlib.GetChunkSizeInFrames() != ChunkFrames) {
00609         throw std::runtime_error("Bad library frame size");
00610     }
00611     if (dynlib.GetChannelCount() != CLOUDX1_CHANNEL_COUNT) {
00612         throw std::runtime_error("Bad library channel count");
00613     }
00614     if (dynlib.GetAudioInputCount() != CLOUDX1_AUDIO_INPUT_COUNT) {
00615         throw std::runtime_error("Bad library input count");
00616     }
00617     if (dynlib.GetAudioOutputCount() != CLOUDX1_AUDIO_OUTPUT_COUNT) {
00618         throw std::runtime_error("Bad library output count");
00619     }
00620 }
00621
00622 static inline std::string GetFormatName(CDynLib& dynlib, const SampleFormat fmt)
00623 {
00624     return std::string(dynlib.GetFormatName(fmt));
00625 }
00626
00627 static inline SampleFormat GetFormatFromName(CDynLib& dynlib, const std::string& name)
00628 {
00629     return dynlib.GetFormatFromName(name.c_str());
00630 }
00631
00632 static inline unsigned int GetBytesFromFormat(CDynLib& dynlib, const SampleFormat fmt)
00633 {
00634     return dynlib.GetBytesFromFormat(fmt);
00635 }
00636
00637 using LogSeverity = cloudx1_LogSeverity;
00638 using log_cb_t = std::function<void(LogSeverity, const std::string&)>;
00639
00640 static log_cb_t _log_cb;
00641 extern "C" {
00642     static inline void _log_cb_c(cloudx1_LogSeverity severity, const char *c_msg) {
00643         _log_cb(severity, std::string(c_msg));
00644     }
00645 }
00646
00647 static inline void SetLogSeverity(CDynLib& dynlib, LogSeverity severity)
00648 {
00649     dynlib.SetLogSeverity(severity);
00650 }
00651
00652 static inline void SetLoggerCallback(CDynLib& dynlib, log_cb_t cb)
00653 {
00654     _log_cb=cb;
00655     dynlib.SetLoggerCallback(&_log_cb_c);
00656 }
00657
00658 #if CLOUDX1_HAS_CLOUDBUS
00659 class CBus {
00660 public:
00661     CBus(CDynLib& dynlib)
00662         : m_dynlib(dynlib)
00663 
```

```

00729         {
00730             if (m_dynlib.NewBus) {
00731                 m_bus=m_dynlib.NewBus();
00732             }
00733         }
00734     ~CBus()
00735     {
00736         if (m_bus && m_dynlib.FreeBus) {
00737             m_dynlib.FreeBus(m_bus);
00738         }
00739         m_bus = nullptr;
00740     }
00741     cloudxl_CBus *Get() const { return m_bus; }
00742 private:
00743     CDynLib& m_dynlib;
00744     cloudxl_CBus *m_bus;
00745 };
00746 #endif // CLOUDXL_HAS_CLOUDBUS
00747
00752     class CPresetLoader {
00753     public:
00754         CPresetLoader() = default;
00755         virtual ~CPreSetLoader() = default;
00756
00757         virtual bool IsReadOnly() = 0;
00758         virtual bool Exists(const std::filesystem::path &name) = 0;
00759         virtual bool Remove(const std::filesystem::path &name) = 0;
00760         virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) = 0;
00761         virtual std::vector<std::filesystem::path> GetAll() = 0;
00762         virtual std::string Read(const std::filesystem::path &filename) = 0;
00763         virtual bool Write(const std::filesystem::path &filename, const std::string &content) = 0;
00764     };
00765     using PresetChange_Kind = cloudxl_PresetChange_Kind;
00766
00770     class CInstance {
00771     public:
00775         CInstance(CDynLib& dynlib)
00776         : m_dynlib(dynlib)
00777         {
00778             params = m_dynlib.NewParameters();
00779             if (!params) throw std::bad_alloc();
00780         }
00781         // non-copyable
00782         CInstance( const CInstance& ) = delete;
00783         CInstance& operator=( const CInstance& ) = delete;
00787         ~CInstance()
00788         {
00789             Stop();
00790             if (params) m_dynlib.FreeParameters(params);
00791         }
00795     bool IsOk() const { return instance!=nullptr; }
00803     void SetParam(const std::string& name, const std::string& value)
00804     {
00805         assert(params);
00806         m_dynlib.SetParameter(params, name.c_str(), value.c_str());
00807     }
00813     std::string GetParam(const std::string& name)
00814     {
00815         assert(params);
00816         auto c_value=m_dynlib.GetParameter(params, name.c_str());
00817         std::string ret(c_value);
00818         m_dynlib.FreeParameterValue(c_value);
00819         return ret;
00820     }
00821 #if CLOUDXL_HAS_CLOUDBUS
00825     void SetBus(const CBus& bus) {
00826         assert(params);
00827         if (m_dynlib.SetInstanceBus) {
00828             m_dynlib.SetInstanceBus(params,bus.Get());
00829         }
00830     }
00831 #endif // CLOUDXL_HAS_CLOUDBUS
00832
00842     void SetPresetManager(CPresetLoader *preset_manager)
00843     {
00844         if (!preset_manager) return;
00845         if (!m_dynlib.SetPresetManager) return;
00846         assert(params);
00847         m_dynlib.SetPresetManager(params,
00848             cloudxl_custom_reader,
00849             cloudxl_custom_reader_free,
00850             cloudxl_custom_writer,
00851             cloudxl_custom_exists,
00852             cloudxl_custom_getall,
00853             cloudxl_custom_getall_free,
00854             cloudxl_custom_remove,
00855             cloudxl_custom_rename,

```

```

00856         preset_manager->IsReadOnly(),
00857         preset_manager
00858     );
00859 }
00860
00875 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)
00876 {
00877     assert(!instance);
00878     std::string l_save_path;
00879     if (!save_path.empty()) {
00880         l_save_path = save_path.u8string();
00881     }
00882     if (m_dynlib.InitProcess3) {
00883         instance = m_dynlib.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);
00884     } else if (frames_per_chunk!=64) {
00885         return false;
00886     } else {
00887         instance = m_dynlib.InitProcess2(LoginKey.c_str(), RadioName.c_str(),
AWS_Access_ID.c_str(), AWS_Access_Secret.c_str(), l_save_path.c_str(), params);
00888     }
00889     if (!instance) return false;
00890     if (!init_metadata.empty()) {
00891         for (auto&& [key,value]: init_metadata) {
00892             m_dynlib.SetMetadata(instance, key.c_str(), value.c_str());
00893         }
00894         init_metadata.clear();
00895     }
00896     update_thread = std::thread([this, json_port]() {
00897         OnUpdateThreadStart();
00898         m_dynlib.StartUpdateThread(instance, json_port);
00899         OnUpdateThreadStop();
00900     });
00901     int timeout=5000;
00902     #ifdef DEBUG
00903         timeout=60*1000; // For debugger pauses
00904     #endif
00905     if (m_dynlib.WaitUpdateThreadReady(instance, timeout)<0) {
00906         return false;
00907     }
00908     return true;
00909 }
00910
00918 unsigned int GetChunkFrames() {
00919     if (instance && m_dynlib.GetProcessChunkFrames) {
00920         return m_dynlib.GetProcessChunkFrames(instance);
00921     }
00922     return 64;
00923 }
00924
00932 void PresetManager_InformChange(const std::filesystem::path& relative_path, PresetChange_Kind
change_kind)
00933 {
00934     if (m_dynlib.PresetManager_InformChange) {
00935         m_dynlib.PresetManager_InformChange(instance, relative_path.c_str(),
(ccloudxl_PresetChange_Kind) change_kind);
00936     }
00937 }
00938
00950 void SetMetadata(const std::string& key, const char* value)
00951 {
00952     if (m_dynlib.SetMetadata) {
00953         if (instance) {
00954             m_dynlib.SetMetadata(instance, key.c_str(), value);
00955         } else {
00956             init_metadata.push_back( {key, value} );
00957         }
00958     }
00959 }
00960
00966 std::vector< std::tuple<std::string, std::string> > GetMetadataInfos()
00967 {
00968     std::vector< std::tuple<std::string, std::string> > values;
00969     if (m_dynlib.GetMetadataInfos) {
00970         const char** c_values = m_dynlib.GetMetadataInfos(instance);
00971         if (c_values) {
00972             for (const char** c_value=c_values; *c_value; ) {
00973                 std::string key(*c_value);
00974                 c_value++;
00975                 if (*c_value) {
00976                     std::string descr(*c_value);
00977                     c_value++;
00978                     values.push_back( {key, descr} );
00979                 }
00980             }
00981         }
00982     }
00983 }

```

```

00981         m_dynlib.FreeMetadataInfos(instance, c_values);
00982     }
00983 }
00984     return values;
00985 }
00986
00987 // Can be overloaded, called at start of UpdateThread in the thread
00988 virtual void OnUpdateThreadStart() {}
00989 // Can be overloaded to call at end of UpdateThread in the thread
00990 virtual void OnUpdateThreadStop() {}
00991
00992 #if CLOUDX1_HAS_WEBSERVER
00993     bool StartWebServer(int http_port, int https_port=0)
00994     {
01000         assert(instance);
01001         assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
01002         webserver = m_dynlib.Webserver(http_port,https_port,instance);
01003         if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
01004             return false;
01005         }
01006         int web_status=m_dynlib.Webserver_Status(webserver);
01007         if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
01008             return false;
01009         }
01010         if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
01011             return false;
01012         }
01013         return true;
01014     }
01020     void StopWebServer()
01021     {
01022         if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
01023             m_dynlib.Webserver_Stop(webserver, 1000);
01024             webserver = SOUND4_INVALID_WEBSERVER_ID;
01025         }
01026     }
01027 #endif // CLOUDX1_HAS_WEBSERVER
01028
01035     int Terminate()
01036     {
01037         if (!instance) return 0;
01038         return m_dynlib.TerminateProcess(instance);
01039     }
01040
01046     void Stop()
01047     {
01048         if (!instance) return;
01049 #if CLOUDX1_HAS_WEBSERVER
01050         StopWebServer();
01051 #endif // CLOUDX1_HAS_WEBSERVER
01052         if (update_thread.joinable()) {
01053             m_dynlib.StopUpdateThread(instance); // this will exit the update thread
01054             update_thread.join();
01055         }
01056         m_dynlib.ExitProcess(instance);
01057         instance=nullptr;
01058     }
01059
01065     unsigned int GetEstimatedDelay()
01066     {
01067         assert(instance);
01068         return m_dynlib.GetEstimatedDelay(instance);
01069     }
01070
01081     std::array<float,InputSampleSize>& GetBufferIn()
01082     {
01083         assert(instance);
01084         float *buf=m_dynlib.GetBufferIn(instance);
01085         return reinterpret_cast< std::array<float,InputSampleSize>& >(*buf);
01086     }
01087
01098     std::array<float,OutputSampleSize>& GetBufferOut()
01099     {
01100         assert(instance);
01101         float *buf= m_dynlib.GetBufferOut(instance);
01102         return reinterpret_cast< std::array<float,OutputSampleSize>& >(*buf);
01103     }
01109     void ProcessAudio()
01110     {
01111         assert(instance);
01112         m_dynlib.ProcessAudio(instance, m_dynlib.GetBufferIn(instance),
01113             m_dynlib.GetBufferOut(instance));
01114     }
01127 // void ProcessAudio_Planar(const std::array< const std::array<const float,ChunkFrames>,
01128 // InputChannels>& input, std::array< std::array<float,ChunkFrames>, OutputChannels>& output)
01129 void ProcessAudio_Planar(float const * const *input, float * const *output)
01129 {

```

```

01130         assert(instance);
01131         m_dynlib.ProcessAudio_Planar(instance, input, output);
01132     }
01133
01134     template<typename T>
01146     std::vector<T> ProcessAnyAudio(const std::vector<T> input)
01147     {
01148         assert(instance);
01149         std::vector<T> output;
01150         unsigned int out_offset=0;
01151         unsigned int in_offset=0;
01152         unsigned int todo = input.size();
01153         while (todo>0) {
01154             unsigned int left = AddAudio(&input[in_offset], todo);
01155             unsigned int out_avail = m_dynlib.GetOutputCount(instance);
01156             output.resize(out_offset + out_avail);
01157             GetAudio(&output[out_offset], out_avail);
01158             out_offset+=out_avail;
01159             in_offset += todo-left;
01160             todo=left;
01161         }
01162         return output;
01163     }
01164
01170     class CClient {
01171     public:
01172         CClient(cloudx1_CInstance* instance, CDynLib& dynlib)
01173             : m_dynlib(dynlib)
01174         {
01175             assert(instance);
01176             client=m_dynlib.NewClient(instance);
01177             if (!client) throw std::bad_alloc();
01178         }
01179         // non-copyable
01180         CClient( const CInstance& ) = delete;
01181         CClient& operator=( const CInstance& ) = delete;
01182         ~CClient()
01183         {
01184             if (client) {
01185                 m_dynlib.DeleteClient(client);
01186                 client=nullptr;
01187             }
01188         }
01196         std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
01197         {
01198             assert(client);
01199             int need_save=0;
01200             const char *canswer = m_dynlib.ProcessJson(client, request.c_str(),
&need_save);
01201
01202             if (!canswer) return {};
01203             std::string answer(canswer);
01204             m_dynlib.FreeJsonAnswer(canswer);
01205             if (NeedSave) {
01206                 *NeedSave=(need_save!=0);
01207             }
01208             return answer;
01209         }
01210     private:
01211         CDynLib& m_dynlib;
01212         cloudx1_CClientInstance *client = nullptr;
01213     };
01220     std::shared_ptr<CClient> NewClient()
01221     {
01222         assert(instance);
01223         return std::make_shared<CClient>(instance, m_dynlib);
01224     }
01225
01226     protected:
01227         template<typename T>
01228         unsigned int AddAudio(const T* payload, unsigned int nFrame)
01229         {
01230             assert(instance);
01231             return m_dynlib.AddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
helper::SampleFormat<T>::format);
01232         }
01233         template<typename T>
01234         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
01235         {
01236             assert(instance);
01237             return m_dynlib.GetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
helper::SampleFormat<T>::format);
01238         }
01239     private:
01240         CDynLib& m_dynlib;
01241         cloudx1_CParameters* params = nullptr;
01242         cloudx1_CInstance* instance = nullptr;

```

```

01244         std::thread update_thread;
01245         std::vector< std::pair<std::string, std::string> > init_metadata;
01246 #if CLOUDX1_HAS_WEBSERVER
01247         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
01248 #endif // CLOUDX1_HAS_WEBSERVER
01249     };
01250
01251 }; // namespace dyn
01252 }; // namespace cloudx1
01253 }; // namespace sound4
01254
01255
01256 // bridge C callbacks to CPresetLoader
01257 extern "C" {
01258     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata) {
01259         sound4::cloudx1::dyn::CPresetLoader
01260 *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01261         std::string content=preset_loader->Read(filename);
01262         return strdup(content.c_str());
01263     }
01264     static void cloudx1_custom_reader_free(char *content, void* userdata) {
01265         if (!content) return;
01266         free(content);
01267     }
01268     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata) {
01269         sound4::cloudx1::dyn::CPresetLoader
01270 *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01271         auto res=preset_loader->Write(filename, content);
01272         return res?0:-1;
01273     }
01274     static int cloudx1_custom_exists(const fs_char *filename, void* userdata) {
01275         sound4::cloudx1::dyn::CPresetLoader
01276 *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01277         auto res=preset_loader->Exists(filename);
01278         return res?0:-1;
01279     }
01280     static fs_char** cloudx1_custom_getall(void* userdata) {
01281         sound4::cloudx1::dyn::CPresetLoader
01282 *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01283         auto res=preset_loader->GetAll();
01284         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
01285         for (size_t n=0;n<res.size();n++) {
01286             all[n]=fs_strdup(res[n].c_str());
01287         }
01288         all[res.size()]=nullptr;
01289         return all;
01290     }
01291     static void cloudx1_custom_getall_free(fs_char** all, void* userdata) {
01292         if (!all) return;
01293         for (fs_char** one=all;*one;*one++) {
01294             free(*one);
01295         }
01296         free(all);
01297     }
01298     static int cloudx1_custom_remove(const fs_char *filename, void* userdata) {
01299         sound4::cloudx1::dyn::CPresetLoader
01300 *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01301         auto res=preset_loader->Remove(filename);
01302         return res?0:-1;
01303     }
01304     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
01305         sound4::cloudx1::dyn::CPresetLoader
01306 *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01307         auto res=preset_loader->Rename(from, to);
01308         return res?0:-1;
01309     }
01310 }
01311 };

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