

SOUND4 x1.CLOUD Library [1.4.6]

Generated by Doxygen 1.9.1

1 SOUND4 x1.CLOUD Library	1
1.1 General usage	1
1.2 Examples	1
2 Deprecated List	3
3 Module Index	5
3.1 Modules	5
4 Namespace Index	7
4.1 Namespace List	7
5 Hierarchical Index	9
5.1 Class Hierarchy	9
6 Class Index	11
6.1 Class List	11
7 File Index	13
7.1 File List	13
8 Module Documentation	15
8.1 Sample using C interface	15
8.1.1 Sample to create the processing instance	15
8.1.2 Sample processing loop	16
8.1.3 Sample to stop the processing instance	16
8.2 Environment variables and parameters	17
8.2.1 Parameters defaulting from environment	17
8.2.1.1 Webserver authentication setup	17
8.2.1.2 Webserver secure	17
8.2.1.3 Network access	17
8.2.2 Parameters	17
8.2.3 Preset sharing	18
8.3 Global setup	18
8.3.1 Detailed Description	18
8.3.2 Macro Definition Documentation	19
8.3.2.1 CLOUDX1_AUDIO_INPUT_COUNT	19
8.3.2.2 CLOUDX1_AUDIO_OUTPUT_COUNT	19
8.3.2.3 CLOUDX1_AUDIOFRAME_COUNT	19
8.3.2.4 CLOUDX1_CHANNEL_COUNT	20
8.3.2.5 CLOUDX1_SAMPLE_RATE	20
8.3.3 Typedef Documentation	20
8.3.3.1 cloudx1_loggerfn	20
8.3.4 Enumeration Type Documentation	20
8.3.4.1 cloudx1_LogSeverity	20

8.3.5 Function Documentation	21
8.3.5.1 cloudx1_GetAudioInputCount()	21
8.3.5.2 cloudx1_GetAudioOutputCount()	21
8.3.5.3 cloudx1_GetChannelCount()	22
8.3.5.4 cloudx1_GetChunkSizeInFrames()	22
8.3.5.5 cloudx1_GetPossibleChunkSizeInFrames()	22
8.3.5.6 cloudx1_GetSampleRate()	23
8.3.5.7 cloudx1_GetVersion()	23
8.3.5.8 cloudx1_SetLoggerCallback()	23
8.3.5.9 cloudx1_SetLogSeverity()	24
8.4 Process creation/destruction	24
8.4.1 Detailed Description	24
8.4.2 Function Documentation	24
8.4.2.1 cloudx1_ExitProcess()	24
8.4.2.2 cloudx1_FreeParameters()	25
8.4.2.3 cloudx1_FreeParameterValue()	25
8.4.2.4 cloudx1_GetParameter()	25
8.4.2.5 cloudx1_GetProcessChunkFrames()	25
8.4.2.6 cloudx1_InitProcess()	26
8.4.2.7 cloudx1_InitProcess2()	26
8.4.2.8 cloudx1_InitProcess3()	27
8.4.2.9 cloudx1_NewParameters()	28
8.4.2.10 cloudx1_SetParameter()	28
8.4.2.11 cloudx1_TerminateProcess()	28
8.5 Custom preset management	29
8.5.1 Detailed Description	30
8.5.2 Typedef Documentation	30
8.5.2.1 cloudx1_storage_exists	30
8.5.2.2 cloudx1_storage_getall	31
8.5.2.3 cloudx1_storage_getall_free	32
8.5.2.4 cloudx1_storage_reader	32
8.5.2.5 cloudx1_storage_reader_free	33
8.5.2.6 cloudx1_storage_remove	34
8.5.2.7 cloudx1_storage_rename	34
8.5.2.8 cloudx1_storage_writer	35
8.5.2.9 fs_char	35
8.5.3 Enumeration Type Documentation	35
8.5.3.1 cloudx1_PresetChange_Kind	35
8.5.4 Function Documentation	35
8.5.4.1 cloudx1_PresetManager_InformChange()	36
8.5.4.2 cloudx1_SetPresetManager()	36
8.6 Metadata Management	37

8.6.1 Detailed Description	37
8.6.2 Function Documentation	37
8.6.2.1 cloudx1_FreeMetadataInfos()	37
8.6.2.2 cloudx1_GetMetadataInfos()	37
8.6.2.3 cloudx1_SetMetadata()	38
8.6.2.4 cloudx1_SetMetadataMulti()	38
8.7 Update Management	39
8.7.1 Detailed Description	39
8.7.2 Function Documentation	39
8.7.2.1 cloudx1_StartUpdateThread()	39
8.7.2.2 cloudx1_StopUpdateThread()	39
8.7.2.3 cloudx1_WaitUpdateThreadReady()	40
8.8 Direct processing	40
8.8.1 Detailed Description	40
8.8.2 Function Documentation	40
8.8.2.1 cloudx1_GetBufferIn()	40
8.8.2.2 cloudx1_GetBufferOut()	41
8.8.2.3 cloudx1_GetEstimatedDelay()	41
8.8.2.4 cloudx1_ProcessAudio()	42
8.8.2.5 cloudx1_ProcessAudio_Planar()	42
8.9 Audio managing (any audio)	43
8.9.1 Detailed Description	43
8.9.2 Enumeration Type Documentation	43
8.9.2.1 cloudx1_SampleFormat	43
8.9.3 Function Documentation	44
8.9.3.1 cloudx1_AddAudio()	44
8.9.3.2 cloudx1_AddPadAudio()	45
8.9.3.3 cloudx1_GetAudio()	45
8.9.3.4 cloudx1_GetBytesFromFormat()	45
8.9.3.5 cloudx1_GetFormatFromName()	46
8.9.3.6 cloudx1_GetFormatName()	46
8.9.3.7 cloudx1_GetMaxPacketFrame()	46
8.9.3.8 cloudx1_GetOutputCount()	48
8.10 Audio convert helpers	48
8.10.1 Detailed Description	48
8.10.2 Function Documentation	48
8.10.2.1 cloudx1_AudioConvertFrom()	49
8.10.2.2 cloudx1_AudioConvertTo()	49
8.10.2.3 cloudx1_AudioMonoFromLiveStereo()	49
8.10.2.4 cloudx1_AudioMonoToLiveStereo()	50
8.10.2.5 cloudx1_MonoToStereo()	50
8.10.2.6 cloudx1_MonoToStereo_Planar()	51

8.10.2.7 cloudx1_StereoToMono()	51
8.10.2.8 cloudx1_StereoToMono_Planar()	51
8.11 Client's JSon config interfacing	52
8.11.1 Detailed Description	52
8.11.2 Function Documentation	52
8.11.2.1 cloudx1_DeleteClient()	52
8.11.2.2 cloudx1_FreeJsonAnswer()	53
8.11.2.3 cloudx1_NewClient()	53
8.11.2.4 cloudx1_ProcessJson()	53
8.11.2.5 cloudx1_SaveState()	54
8.12 JSON syntax	54
8.12.1 Commands	55
8.12.2 Answers	56
8.12.3 Examples	56
8.12.3.1 Get status	56
8.12.3.2 Get all changes since last request	56
8.12.3.3 Check license	56
8.12.3.4 Set Processor name	56
8.12.3.5 Get presetlist	57
8.12.3.6 Load a preset	57
8.12.3.7 Get information on preset on air	57
8.12.3.8 Set input gain	57
8.12.3.9 Set bypass	57
8.12.3.10 Export a preset	57
8.12.3.11 Import a preset	58
8.13 JSON syntax for internal setup	58
8.13.1 Get process and modules information	58
8.13.2 Authentication management	58
8.13.2.1 Difference between setup and admin account	58
8.13.2.2 Access encoding	59
8.13.2.3 Change setup account	59
8.13.2.4 Get user info	59
8.13.2.5 Add or modify a user	59
8.13.2.6 Removes a user	60
8.13.2.7 List users	60
8.13.2.8 Get/set unlogged access	60
8.13.2.9 Get realm	60
8.13.2.10 Get API version	60
8.13.2.11 Get setup is admin	60
8.13.2.12 Get/set setup account	60
8.13.2.13 Get/set custom storage	60
8.13.3 Get process' interface description	61

8.13.3.1 Get XML decription	61
8.13.3.2 Get Process Image	61
8.13.3.3 Get Process Ico	61
8.14 Web server	61
8.14.1 Detailed Description	62
8.14.2 Macro Definition Documentation	62
8.14.2.1 SOUND4_INVALID_WEBSERVER_ID	62
8.14.2.2 SOUND4_WEBSERVER_HTTP_OK	62
8.14.2.3 SOUND4_WEBSERVER_HTTPS_OK	62
8.14.3 Function Documentation	62
8.14.3.1 cloudx1_Webserver()	62
8.14.3.2 cloudx1_Webserver_Status()	63
8.14.3.3 cloudx1_Webserver_Stop()	63
8.14.3.4 cloudx1_Webserver_tcp()	64
8.14.3.5 cloudx1_Webserver_tcp2()	64
8.15 Sample using C++ interface wrapper	65
8.15.1 Setup and sanity checks	65
8.15.2 Sample to create the processing instance	65
8.15.3 Communicating with the instance	65
8.15.4 Starting a web-server	66
8.15.5 Sample processing loop	66
8.16 Sample using C++ interface wrapper with dynamic library loading	66
8.16.1 Dynamic loading	66
8.16.2 Setup and sanity checks	66
8.16.3 Sample to create the processing instance	66
8.16.4 Communicating with the instance	66
8.16.5 Starting a web-server	67
8.16.6 Sample processing loop	67
8.16.7 Custom preset manager	67
8.16.8 Custom preset manager loading	68
9 Namespace Documentation	69
9.1 dyn Namespace Reference	69
9.1.1 Detailed Description	69
9.2 sound4 Namespace Reference	69
9.2.1 Detailed Description	69
9.3 sound4::cloudx1 Namespace Reference	69
9.3.1 Detailed Description	70
9.3.2 Typedef Documentation	70
9.3.2.1 log_cb_t	70
9.3.2.2 LogSeverity	70
9.3.2.3 PresetChange_Kind	71

9.3.2.4 SampleFormat	71
9.3.3 Variable Documentation	71
9.3.3.1 ChunkFrames	71
9.3.3.2 InputChannels	71
9.3.3.3 InputSampleSize	71
9.3.3.4 OutputChannels	72
9.3.3.5 OutputSampleSize	72
9.3.3.6 SampleRate	72
9.4 sound4::cloudx1::dyn Namespace Reference	72
9.4.1 Typedef Documentation	73
9.4.1.1 log_cb_t	73
9.4.1.2 LogSeverity	73
9.4.1.3 PresetChange_Kind	73
9.4.1.4 SampleFormat	73
9.4.2 Variable Documentation	74
9.4.2.1 ChunkFrames	74
9.4.2.2 InputChannels	74
9.4.2.3 InputSampleSize	74
9.4.2.4 OutputChannels	74
9.4.2.5 OutputSampleSize	74
9.4.2.6 SampleRate	75
9.5 sound4::cloudx1::dyn::helper Namespace Reference	75
9.5.1 Detailed Description	75
9.5.2 Typedef Documentation	75
9.5.2.1 DynFunc_t	75
9.5.2.2 DynLib_t	76
9.6 sound4::cloudx1::helper Namespace Reference	76
9.6.1 Detailed Description	76
9.7 std Namespace Reference	76
10 Class Documentation	77
10.1 sound4::cloudx1::CInstance::CClient Class Reference	77
10.1.1 Detailed Description	77
10.1.2 Constructor & Destructor Documentation	77
10.1.2.1 CClient() [1/2]	77
10.1.2.2 CClient() [2/2]	78
10.1.2.3 ~CClient()	78
10.1.3 Member Function Documentation	78
10.1.3.1 operator=()	78
10.1.3.2 ProcessJson()	78
10.2 sound4::cloudx1::dyn::CInstance::CClient Class Reference	79
10.2.1 Detailed Description	79

10.2.2 Constructor & Destructor Documentation	79
10.2.2.1 CClient() [1/2]	79
10.2.2.2 CClient() [2/2]	80
10.2.2.3 ~CClient()	80
10.2.3 Member Function Documentation	80
10.2.3.1 operator=()	80
10.2.3.2 ProcessJson()	80
10.3 sound4::cloudx1::dyn::CDynLib Class Reference	81
10.3.1 Detailed Description	82
10.3.2 Constructor & Destructor Documentation	82
10.3.2.1 CDynLib()	82
10.3.3 Member Function Documentation	82
10.3.3.1 IsOk()	83
10.3.3.2 Load()	83
10.3.4 Member Data Documentation	83
10.3.4.1 AddAudio	83
10.3.4.2 AddPadAudio	83
10.3.4.3 AudioConvertFrom	84
10.3.4.4 AudioConvertTo	84
10.3.4.5 AudioMonoFromLiveStereo	84
10.3.4.6 AudioMonoToLiveStereo	84
10.3.4.7 DeleteClient	84
10.3.4.8 ExitProcess	84
10.3.4.9 FreeJsonAnswer	85
10.3.4.10 FreeMetadataInfos	85
10.3.4.11 FreeParameters	85
10.3.4.12 FreeParameterValue	85
10.3.4.13 GetAudio	85
10.3.4.14 GetAudioInputCount	85
10.3.4.15 GetAudioOutputCount	86
10.3.4.16 GetBufferIn	86
10.3.4.17 GetBufferOut	86
10.3.4.18 GetBytesFromFormat	86
10.3.4.19 GetChannelCount	86
10.3.4.20 GetChunkSizeInFrames	86
10.3.4.21 GetEstimatedDelay	87
10.3.4.22 GetFormatFromName	87
10.3.4.23 GetFormatName	87
10.3.4.24 GetMaxPacketFrame	87
10.3.4.25 GetMetadataInfos	87
10.3.4.26 GetOutputCount	87
10.3.4.27 GetParameter	88

10.3.4.28	GetPossibleChunkSizeInFrames	88
10.3.4.29	GetProcessChunkFrames	88
10.3.4.30	GetSampleRate	88
10.3.4.31	GetVersion	88
10.3.4.32	InitProcess	88
10.3.4.33	InitProcess2	89
10.3.4.34	InitProcess3	89
10.3.4.35	MonoToStereo	89
10.3.4.36	MonoToStereo_Planar	89
10.3.4.37	NewClient	89
10.3.4.38	NewParameters	89
10.3.4.39	PresetManager_InformChange	90
10.3.4.40	ProcessAudio	90
10.3.4.41	ProcessAudio_Planar	90
10.3.4.42	ProcessJson	90
10.3.4.43	SaveState	90
10.3.4.44	SetLoggerCallback	90
10.3.4.45	SetLogSeverity	91
10.3.4.46	SetMetadata	91
10.3.4.47	SetMetadataMulti	91
10.3.4.48	SetParameter	91
10.3.4.49	SetPresetManager	91
10.3.4.50	StartUpdateThread	91
10.3.4.51	StereoToMono	92
10.3.4.52	StereoToMono_Planar	92
10.3.4.53	StopUpdateThread	92
10.3.4.54	TerminateProcess	92
10.3.4.55	WaitUpdateThreadReady	92
10.3.4.56	Webserver	92
10.3.4.57	Webserver_Status	93
10.3.4.58	Webserver_Stop	93
10.3.4.59	Webserver_tcp	93
10.3.4.60	Webserver_tcp2	93
10.4	sound4::cloudx1::dyn::helper::CDynLoader Class Reference	93
10.4.1	Detailed Description	94
10.4.2	Constructor & Destructor Documentation	94
10.4.2.1	CDynLoader() [1/3]	94
10.4.2.2	CDynLoader() [2/3]	94
10.4.2.3	CDynLoader() [3/3]	94
10.4.2.4	~CDynLoader()	95
10.4.3	Member Function Documentation	95
10.4.3.1	Close()	95

10.4.3.2	GetSymbol()	95
10.4.3.3	GetSymbol_safe()	95
10.4.3.4	GetThisLibraryPath()	95
10.4.3.5	IsOk()	96
10.4.3.6	Load()	96
10.4.3.7	operator bool()	96
10.4.3.8	operator=()	96
10.5	sound4::cloudx1::CInstance Class Reference	96
10.5.1	Detailed Description	97
10.5.2	Constructor & Destructor Documentation	97
10.5.2.1	CInstance() [1/2]	98
10.5.2.2	CInstance() [2/2]	98
10.5.2.3	~CInstance()	98
10.5.3	Member Function Documentation	98
10.5.3.1	AddAudio()	98
10.5.3.2	Create()	98
10.5.3.3	GetAudio()	99
10.5.3.4	GetBufferIn()	99
10.5.3.5	GetBufferOut()	100
10.5.3.6	GetChunkFrames()	100
10.5.3.7	GetEstimatedDelay()	100
10.5.3.8	GetMetadataInfos()	101
10.5.3.9	GetParam()	101
10.5.3.10	IsOk()	101
10.5.3.11	NewClient()	101
10.5.3.12	OnUpdateThreadStart()	102
10.5.3.13	OnUpdateThreadStop()	102
10.5.3.14	operator=()	102
10.5.3.15	PresetManager_InformChange()	102
10.5.3.16	ProcessAnyAudio()	102
10.5.3.17	ProcessAudio()	103
10.5.3.18	ProcessAudio_Planar()	103
10.5.3.19	SetMetadata()	104
10.5.3.20	SetMetadataMulti()	104
10.5.3.21	SetParam()	105
10.5.3.22	SetPresetManager()	105
10.5.3.23	StartWebServer()	105
10.5.3.24	Stop()	106
10.5.3.25	StopWebServer()	106
10.5.3.26	Terminate()	106
10.6	sound4::cloudx1::dyn::CInstance Class Reference	106
10.6.1	Detailed Description	107

10.6.2 Constructor & Destructor Documentation	108
10.6.2.1 CInstance() [1/2]	108
10.6.2.2 CInstance() [2/2]	108
10.6.2.3 ~CInstance()	108
10.6.3 Member Function Documentation	108
10.6.3.1 AddAudio()	108
10.6.3.2 Create()	108
10.6.3.3 GetAudio()	109
10.6.3.4 GetBufferIn()	109
10.6.3.5 GetBufferOut()	110
10.6.3.6 GetChunkFrames()	110
10.6.3.7 GetEstimatedDelay()	110
10.6.3.8 GetMetadataInfos()	111
10.6.3.9 GetParam()	111
10.6.3.10 IsOk()	111
10.6.3.11 NewClient()	111
10.6.3.12 OnUpdateThreadStart()	112
10.6.3.13 OnUpdateThreadStop()	112
10.6.3.14 operator=()	112
10.6.3.15 PresetManager_InformChange()	112
10.6.3.16 ProcessAnyAudio()	112
10.6.3.17 ProcessAudio()	113
10.6.3.18 ProcessAudio_Planar()	113
10.6.3.19 SetMetadata()	114
10.6.3.20 SetMetadataMulti()	114
10.6.3.21 SetParam()	115
10.6.3.22 SetPresetManager()	115
10.6.3.23 StartWebServer()	115
10.6.3.24 Stop()	116
10.6.3.25 StopWebServer()	116
10.6.3.26 Terminate()	116
10.7 cloudx1_CClientInstance Struct Reference	116
10.7.1 Detailed Description	117
10.8 cloudx1_CInstance Struct Reference	117
10.8.1 Detailed Description	117
10.9 cloudx1_CParameters Struct Reference	117
10.9.1 Detailed Description	117
10.10 sound4::cloudx1::CPresetLoader Class Reference	117
10.10.1 Detailed Description	118
10.10.2 Constructor & Destructor Documentation	118
10.10.2.1 CPresetLoader()	118
10.10.2.2 ~CPresetLoader()	118

10.10.3 Member Function Documentation	118
10.10.3.1 Exists()	118
10.10.3.2 GetAll()	119
10.10.3.3 IsReadOnly()	119
10.10.3.4 Read()	119
10.10.3.5 Remove()	119
10.10.3.6 Rename()	119
10.10.3.7 Write()	119
10.11 sound4::cloudx1::dyn::CPresetLoader Class Reference	120
10.11.1 Detailed Description	120
10.11.2 Constructor & Destructor Documentation	120
10.11.2.1 CPresetLoader()	120
10.11.2.2 ~CPresetLoader()	120
10.11.3 Member Function Documentation	120
10.11.3.1 Exists()	121
10.11.3.2 GetAll()	121
10.11.3.3 IsReadOnly()	121
10.11.3.4 Read()	121
10.11.3.5 Remove()	121
10.11.3.6 Rename()	121
10.11.3.7 Write()	122
10.12 sound4::cloudx1::dyn::helper::DynFuncHolder< T > Class Template Reference	122
10.12.1 Detailed Description	122
10.12.2 Constructor & Destructor Documentation	122
10.12.2.1 DynFuncHolder() [1/2]	122
10.12.2.2 DynFuncHolder() [2/2]	123
10.12.3 Member Function Documentation	123
10.12.3.1 IsOk()	123
10.12.3.2 operator bool()	123
10.12.3.3 operator T*()	123
10.13 MyPresetManager Class Reference	123
10.13.1 Detailed Description	124
10.13.2 Constructor & Destructor Documentation	124
10.13.2.1 MyPresetManager()	124
10.13.2.2 ~MyPresetManager()	124
10.13.3 Member Function Documentation	124
10.13.3.1 Exists()	124
10.13.3.2 GetAll()	125
10.13.3.3 IsReadOnly()	125
10.13.3.4 Read()	125
10.13.3.5 Remove()	125
10.13.3.6 Rename()	125

10.13.3.7 SetupPath()	126
10.13.3.8 Write()	126
10.14 sound4::cloudx1::dyn::helper::SampleFormat< T > Struct Template Reference	126
10.14.1 Detailed Description	126
10.15 sound4::cloudx1::helper::SampleFormat< T > Struct Template Reference	127
10.15.1 Detailed Description	127
10.16 sound4::cloudx1::dyn::helper::SampleFormat< float > Struct Reference	127
10.16.1 Detailed Description	127
10.16.2 Member Data Documentation	127
10.16.2.1 format	128
10.17 sound4::cloudx1::helper::SampleFormat< float > Struct Reference	128
10.17.1 Detailed Description	128
10.17.2 Member Data Documentation	128
10.17.2.1 format	128
10.18 sound4::cloudx1::dyn::helper::SampleFormat< int16_t > Struct Reference	128
10.18.1 Detailed Description	129
10.18.2 Member Data Documentation	129
10.18.2.1 format	129
10.19 sound4::cloudx1::helper::SampleFormat< int16_t > Struct Reference	129
10.19.1 Detailed Description	129
10.19.2 Member Data Documentation	129
10.19.2.1 format	130
10.20 sound4::cloudx1::dyn::helper::SampleFormat< int32_t > Struct Reference	130
10.20.1 Detailed Description	130
10.20.2 Member Data Documentation	130
10.20.2.1 format	130
10.21 sound4::cloudx1::helper::SampleFormat< int32_t > Struct Reference	130
10.21.1 Detailed Description	131
10.21.2 Member Data Documentation	131
10.21.2.1 format	131
11 File Documentation	133
11.1 sound4.x1.cloud-pipe-cxx.cpp File Reference	133
11.1.1 Function Documentation	133
11.1.1.1 GetEnv()	133
11.1.1.2 main()	134
11.1.1.3 MyLogger()	134
11.1.1.4 ProcessLoop()	134
11.1.1.5 Usage()	134
11.2 sound4.x1.cloud-pipe-cxx.cpp	135
11.3 sound4.x1.cloud-pipe-dyn.cpp File Reference	136
11.3.1 Function Documentation	137

11.3.1.1 GetEnv()	137
11.3.1.2 main()	138
11.3.1.3 MyLogger()	138
11.3.1.4 ProcessLoop()	138
11.3.1.5 Usage()	139
11.4 sound4.x1.cloud-pipe-dyn.cpp	139
11.5 sound4.x1.cloud-pipe.cpp File Reference	142
11.5.1 Macro Definition Documentation	142
11.5.1.1 CHANNEL_COUNT	143
11.5.1.2 CHUNK_SIZE	143
11.5.1.3 SAMPLE_RATE	143
11.5.2 Function Documentation	143
11.5.2.1 main()	143
11.5.2.2 MyLogger()	144
11.5.2.3 ProcessLoop()	144
11.5.2.4 Usage()	144
11.6 sound4.x1.cloud-pipe.cpp	144
11.7 sound4.x1.cloud.h File Reference	147
11.7.1 Macro Definition Documentation	150
11.7.1.1 CLOUDX1_DECL	150
11.7.1.2 CLOUDX1_HAS_CLOUDBUS	150
11.7.1.3 CLOUDX1_HAS_WEBSERVER	150
11.8 sound4.x1.cloud.h	150
11.9 sound4.x1.cloud.hpp File Reference	154
11.9.1 Macro Definition Documentation	155
11.9.1.1 fs_strdup	155
11.10 sound4.x1.cloud.hpp	156
11.11 sound4.x1.cloud_dyn.hpp File Reference	163
11.11.1 Detailed Description	164
11.11.2 Macro Definition Documentation	164
11.11.2.1 fs_strdup	164
11.12 sound4.x1.cloud_dyn.hpp	165
Index	179

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:

Sample using C interface	15
Environment variables and parameters	17
Global setup	18
Process creation/destruction	24
Custom preset managagement	29
Metadata Management	37
Update Management	39
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
Web server	61
Sample using C++ interface wrapper	65
Sample using C++ interface wrapper with dynamic library loading	66

Chapter 4

Namespace Index

4.1 Namespace List

Here is a list of all namespaces with brief descriptions:

dyn	69
sound4	69
sound4::cloudx1	69
sound4::cloudx1::dyn	72
sound4::cloudx1::dyn::helper	75
sound4::cloudx1::helper	76
std	76

Chapter 5

Hierarchical Index

5.1 Class Hierarchy

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

sound4::cloudx1::CInstance::CClient	77
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	117
cloudx1_CParameters	117
sound4::cloudx1::CPresetLoader	117
sound4::cloudx1::dyn::CPresetLoader	120
MyPresetManager	123
sound4::cloudx1::dyn::helper::DynFuncHolder< T >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AddAudio) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AddPadAudio) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AudioConvertFrom) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AudioConvertTo) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AudioMonoFromLiveStereo) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_AudioMonoToLiveStereo) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_DeleteClient) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_ExitProcess) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_FreeJsonAnswer) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_FreeMetadataInfos) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_FreeParameters) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_FreeParameterValue) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetAudio) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetAudioInputCount) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetBufferIn) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetBufferOut) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetBytesFromFormat) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetChannelCount) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetChunkSizeInFrames) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetEstimatedDelay) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetFormatFromName) >	122

sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetFormatName) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetMaxPacketFrame) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetMetadataInfos) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetOutputCount) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetParameter) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetSampleRate) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_GetVersion) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_InitProcess) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_InitProcess2) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_InitProcess3) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_MonoToStereo) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_MonoToStereo_Planar) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_NewClient) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_NewParameters) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_PresetManager_InformChange) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_ProcessAudio) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_ProcessAudio_Planar) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_ProcessJson) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SaveState) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetLogSeverity) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetMetadata) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetMetadataMulti) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetParameter) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_SetPresetManager) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_StartUpdateThread) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_StereoToMono) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_StopUpdateThread) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_TerminateProcess) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver_Status) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver_Stop) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp) >	122
sound4::cloudx1::dyn::helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp2) >	122
sound4::cloudx1::dyn::helper::SampleFormat< T >	126
sound4::cloudx1::helper::SampleFormat< T >	127
sound4::cloudx1::dyn::helper::SampleFormat< float >	127
sound4::cloudx1::helper::SampleFormat< float >	128
sound4::cloudx1::dyn::helper::SampleFormat< int16_t >	128
sound4::cloudx1::helper::SampleFormat< int16_t >	129
sound4::cloudx1::dyn::helper::SampleFormat< int32_t >	130
sound4::cloudx1::helper::SampleFormat< int32_t >	130

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	
Helper to load dynamic library	93
sound4::cloudx1::CInstance	96
sound4::cloudx1::dyn::CInstance	106
cloudx1_CClientInstance	116
cloudx1_CInstance	117
cloudx1_CParameters	117
sound4::cloudx1::CPresetLoader	117
sound4::cloudx1::dyn::CPresetLoader	120
sound4::cloudx1::dyn::helper::DynFuncHolder< T >	
Helper to wrap a function pointer	122
MyPresetManager	
[Custom preset manager]	123
sound4::cloudx1::dyn::helper::SampleFormat< T >	
Helper for Sample format types	126
sound4::cloudx1::helper::SampleFormat< T >	
Helper for Sample format types	127
sound4::cloudx1::dyn::helper::SampleFormat< float >	127
sound4::cloudx1::helper::SampleFormat< float >	128
sound4::cloudx1::dyn::helper::SampleFormat< int16_t >	128
sound4::cloudx1::helper::SampleFormat< int16_t >	129
sound4::cloudx1::dyn::helper::SampleFormat< int32_t >	130
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	133
sound4.x1.cloud-pipe-dyn.cpp	
C++ sample using C++ interface wrapper with dynamic library loading	136
sound4.x1.cloud-pipe.cpp	
C++ sample using only C interface	142
sound4.x1.cloud.h	
C interface for library	147
sound4.x1.cloud.hpp	
C++ wrapper for library	154
sound4.x1.cloud_dyn.hpp	
C++ wrapper for dynamic loading library	163

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_WEBSERVER_HTTPS_OK) {
                std::cerr << "Web server listening on secure port " << listenport_secure;
            } else {
                std::cerr << "Web server failed to listen on secure port " << listenport_secure;
            }
        }
        std::cerr << "Starting web server DONE" << std::endl;
    }
}
#endif // (CLOUDX1_HAS_WEBSERVER)

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

```

8.1.2 Sample processing loop

see [Direct processing](#)

```

bool stopthread=false;
alignas(64) float audio_in[CHUNK_SIZE*CHANNEL_COUNT];
alignas(64) float audio_out[CHUNK_SIZE*CHANNEL_COUNT];
#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_WEBSERVER)
    // Stopping the webserver
    std::cerr << "Stopping web server" << std::endl;
    cloudx1_Webserver_Stop(webserver, 1000);
    std::cerr << "Stopping web server DONE" << std::endl;
#endif // (CLOUDX1_HAS_WEBSERVER)

// Stopping the processing instance
std::cerr << "Stopping Update thread" << std::endl;
cloudx1_StopUpdateThread(pInstance); // this will exit the update thread
std::cerr << "Stopping Update thread DONE" << std::endl;
updater.join();
cloudx1_ExitProcess(pInstance);

```

8.2 Environment variables and parameters

8.2.1 Parameters defaulting from environment

The following environment variables are used by software library:

Note

Those variables can be passed as parameters with [cloudx1_InitProcess2](#)

8.2.1.1 Webserver 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 <code>getall</code>
<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)
- void [cloudx1_SetMetadataMulti](#) (struct [cloudx1_CInstance](#) *instance, const char **keyvalue)
- const char ** [cloudx1_GetMetadataInfos](#) (struct [cloudx1_CInstance](#) *instance)
- void [cloudx1_FreeMetadataInfos](#) (struct [cloudx1_CInstance](#) *instance, const char **infos)

8.6.1 Detailed Description

Metadata handling.

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

8.6.2 Function Documentation

8.6.2.1 [cloudx1_FreeMetadataInfos\(\)](#)

```
void cloudx1_FreeMetadataInfos (  
    struct cloudx1\_CInstance * instance,  
    const char ** infos )
```

Frees the information returned by [cloudx1_GetMetadataInfos](#).

Parameters

<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).

See also

[cloudx1_SetMetadataMulti](#)

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.

8.6.2.4 cloudx1_SetMetadataMulti()

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

Adds multiple metadata to the process.

This works like [cloudx1_SetMetadata](#) but with multiple metadata at once.

See also

[cloudx1_SetMetadata](#)

Parameters

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

8.7 Update Management

Functions

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

8.7.1 Detailed Description

Manage the process update.

8.7.2 Function Documentation

8.7.2.1 [cloudx1_StartUpdateThread\(\)](#)

```
void cloudx1_StartUpdateThread (  
    struct cloudx1\_CInstance * instance,  
    unsigned int port )
```

Update function

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

Remarks

This function does not return until it is stopped with [cloudx1_StopUpdateThread](#)

Parameters

<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 870 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 1517 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 1522 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 1526 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 704 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 700 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 772 of file [sound4.x1.cloud_dyn.hpp](#).

9.4.1.4 SampleFormat

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

Definition at line 433 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 437 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 441 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 449 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 445 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 453 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 457 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 [804](#) 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 [806](#) 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 815 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 829 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 1218 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 1220 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 1230 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 1244 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](#)
- [helper::DynFuncHolder< decltype\(cloudx1_SetMetadataMulti\) > SetMetadataMulti](#)

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 423 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 305 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 SetMetadataMulti

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

Definition at line 296 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.48 SetParameter

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

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

10.3.4.49 SetPresetManager

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

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

10.3.4.50 StartUpdateThread

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

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

10.3.4.51 StereoToMono

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

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

10.3.4.52 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](#).

10.3.4.53 StopUpdateThread

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

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

10.3.4.54 TerminateProcess

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

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

10.3.4.55 WaitUpdateThreadReady

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

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

10.3.4.56 Webserver

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

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

10.3.4.57 Webserver_Status

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

Definition at line 267 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.58 Webserver_Stop

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

Definition at line 266 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.59 Webserver_tcp

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

Definition at line 263 of file [sound4.x1.cloud_dyn.hpp](#).

10.3.4.60 Webserver_tcp2

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

Definition at line 264 of file [sound4.x1.cloud_dyn.hpp](#).

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

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

10.4 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)
- void [SetMetadataMulti](#) (const std::unordered_map< std::string, const char * > &list)
- std::vector< std::tuple< std::string, std::string > > [GetMetadataInfos](#) ()
- virtual void [OnUpdateThreadStart](#) ()
- virtual void [OnUpdateThreadStop](#) ()
- bool [StartWebServer](#) (int http_port, int https_port=0)
- void [StopWebServer](#) ()
- int [Terminate](#) ()
- void [Stop](#) ()
- unsigned int [GetEstimatedDelay](#) ()
- std::array< float, [InputSampleSize](#) > & [GetBufferIn](#) ()
- std::array< float, [OutputSampleSize](#) > & [GetBufferOut](#) ()
- void [ProcessAudio](#) ()
- void [ProcessAudio_Planar](#) (float const *const *input, float *const *output)
- template<typename T >
std::vector< T > [ProcessAnyAudio](#) (const std::vector< T > input)
- std::shared_ptr< [CCClient](#) > [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 860 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 866 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 715 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 732 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 699 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 602 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 852 of file [sound4.x1.cloud.hpp](#).

10.5.3.12 OnUpdateThreadStart()

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

Definition at line 622 of file [sound4.x1.cloud.hpp](#).

10.5.3.13 OnUpdateThreadStop()

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

Definition at line 624 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 780 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 743 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 762 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 SetMetadataMulti()

```
void sound4::cloudx1::CInstance::SetMetadataMulti (
    const std::unordered_map< std::string, const char * > & list ) [inline]
```

Adds multiple metadata to the process.

This works like [CInstance::SetMetadata](#) but with multiple metadata at once.

See also

[CInstance::SetMetadata](#)

Parameters

<i>list</i>	a map of key/value pair.
-------------	--------------------------

Definition at line 572 of file [sound4.x1.cloud.hpp](#).

10.5.3.21 SetParam()

```
void sound4::cloudx1::CInstance::SetParam (
    const std::string & name,
    const std::string & value ) [inline]
```

Set a parameter value

Must be done before [Create](#)

See also

[cloudx1_SetParameter](#)

Definition at line 417 of file [sound4.x1.cloud.hpp](#).

10.5.3.22 SetPresetManager()

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

Sets a custom preset manager Optional, this overrides the `save_path` in [Create](#)

See also

[cloudx1_SetPresetManager](#)

Must be done before [Create](#)

Parameters

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

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

10.5.3.23 StartWebServer()

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

Starts a Web server on requested ports

See also

[cloudx1_Webserver](#)

Definition at line 632 of file [sound4.x1.cloud.hpp](#).

10.5.3.24 Stop()

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

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

See also

[cloudx1_ExitProcess](#),
[cloudx1_StopUpdateThread](#) and
[cloudx1_Webserver_Stop](#)

Definition at line 680 of file [sound4.x1.cloud.hpp](#).

10.5.3.25 StopWebServer()

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

Stops the Web server

See also

[cloudx1_Webserver_Stop](#)

Definition at line 654 of file [sound4.x1.cloud.hpp](#).

10.5.3.26 Terminate()

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

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

See also

[cloudx1_TerminateProcess](#)

Definition at line 669 of file [sound4.x1.cloud.hpp](#).

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

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

10.6 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)
- void [SetMetadataMulti](#) (const std::unordered_map< std::string, const char * > &list)
- std::vector< std::tuple< std::string, std::string > > [GetMetadataInfos](#) ()
- virtual void [OnUpdateThreadStart](#) ()
- virtual void [OnUpdateThreadStop](#) ()
- bool [StartWebServer](#) (int http_port, int https_port=0)
- void [StopWebServer](#) ()
- int [Terminate](#) ()
- void [Stop](#) ()
- unsigned int [GetEstimatedDelay](#) ()
- std::array< float, [InputSampleSize](#) > & [GetBufferIn](#) ()
- std::array< float, [OutputSampleSize](#) > & [GetBufferOut](#) ()
- void [ProcessAudio](#) ()
- void [ProcessAudio_Planar](#) (float const *const *input, float *const *output)
- template<typename T >
std::vector< T > [ProcessAnyAudio](#) (const std::vector< T > input)
- std::shared_ptr< [CClient](#) > [NewClient](#) ()

Protected Member Functions

- template<typename T >
unsigned int [AddAudio](#) (const T *payload, unsigned int nFrame)
- template<typename T >
unsigned int [GetAudio](#) (T *payload, unsigned int max_nFrame)

10.6.1 Detailed Description

Instance handling class

Definition at line 777 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 782 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 794 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 1276 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 882 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 1282 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 1129 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 1146 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 925 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 1113 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 1014 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 820 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 802 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 1268 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.12 OnUpdateThreadStart()

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

Definition at line 1036 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.13 OnUpdateThreadStop()

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

Definition at line 1038 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 939 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 1194 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 1157 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 1176 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 957 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.20 SetMetadataMulti()

```
void sound4::cloudx1::dyn::CInstance::SetMetadataMulti (
    const std::unordered_map< std::string, const char * > & list ) [inline]
```

Adds multiple metadata to the process.

This works like [CInstance::SetMetadata](#) but with multiple metadata at once.

See also

[CInstance::SetMetadata](#)

Parameters

<i>list</i>	a map of key/value pair.
-------------	--------------------------

Definition at line 978 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.21 SetParam()

```
void sound4::cloudx1::dyn::CInstance::SetParam (
    const std::string & name,
    const std::string & value ) [inline]
```

Set a parameter value

Must be done before [Create](#)

See also

[cloudx1_SetParameter](#)

Definition at line 810 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.22 SetPresetManager()

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

Sets a custom preset manager Optional, this overrides the `save_path` in [Create](#)

See also

[cloudx1_SetPresetManager](#)

Must be done before [Create](#)

Parameters

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

Definition at line 849 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.23 StartWebServer()

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

Starts a Web server on requested ports

See also

[cloudx1_Webserver](#)

Definition at line 1046 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.24 Stop()

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

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

See also

[cloudx1_ExitProcess](#),
[cloudx1_StopUpdateThread](#) and
[cloudx1_Webserver_Stop](#)

Definition at line 1094 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.25 StopWebServer()

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

Stops the Web server

See also

[cloudx1_Webserver_Stop](#)

Definition at line 1068 of file [sound4.x1.cloud_dyn.hpp](#).

10.6.3.26 Terminate()

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

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

See also

[cloudx1_TerminateProcess](#)

Definition at line 1083 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 759 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 496 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 507 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 508 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 499 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 500 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 503 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 504 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 << "  - ACCESS_KEY_ID       : SOUND4 Access Key ID" << std::endl;;
00089     std::cerr << "  - ACCESS_KEY_SECRET   : SOUND4 Access Key Secret" << std::endl;;
00090     std::cerr << "Example:" << std::endl;
00091     std::cerr << "ffmpeg -re -i file.wav -ar " << sound4::cloudx1::GetSampleRate() << " -ac "
00092         << "sound4::cloudx1::GetChannelCount() << " -f f32le - | " << progname << " | ffplay -f f32le -ar "
00093         << "sound4::cloudx1::GetSampleRate() << " -ac " << sound4::cloudx1::GetChannelCount() << " -i -" << std::endl;;
00094     #if defined(_WIN32) || defined(WIN32)
00095         std::cerr << "ffmpeg -f dshow -i audio=\"Microphone\" -ar " << sound4::cloudx1::GetSampleRate() << " -ac "
00096         << "sound4::cloudx1::GetChannelCount() << " -f f32le - | " << progname << " | ffplay -f f32le -ar "
00097         << "sound4::cloudx1::GetSampleRate() << " -ac " << sound4::cloudx1::GetChannelCount() << " -i -" << std::endl;;
00098     #else
00099         std::cerr << "ffmpeg -f pulse -i default -ar " << sound4::cloudx1::GetSampleRate() << " -ac "
00100         << "sound4::cloudx1::GetChannelCount() << " -f f32le - | " << progname << " | ffplay -f f32le -ar "
00101         << "sound4::cloudx1::GetSampleRate() << " -ac " << sound4::cloudx1::GetChannelCount() << " -i -" << std::endl;;
00102     #endif
00103 }
00104
00105 void MyLogger(sound4::cloudx1::LogSeverity severity, const std::string& msg)
00106 {
00107     std::cerr << msg << std::endl;
00108 }

```

```

00103
00104 int main(int argc, const char **argv)
00105 {
00106     #if (CLOUDX1_HAS_WEBSERVER)
00107         int listen_port = 8080;
00108     #endif // (CLOUDX1_HAS_WEBSERVER)
00109     auto store_path_str=GetEnv("S4STORE_PATH");
00110
00111     // Get credentials from environment
00112     auto LoginKey=GetEnv("S4LOGINKEY");
00113     if (LoginKey.empty()) {
00114         LoginKey=GetEnv("S4USERID");
00115     }
00116     auto RadioName=GetEnv("RADIO_NAME");
00117     auto KeyId=GetEnv("ACCESS_KEY_ID");
00118     auto AccessKey=GetEnv("ACCESS_KEY_SECRET");
00119
00120     const char *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 // 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::freed(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 << "  - ACCESS_KEY_ID       : SOUND4 Access Key ID" << std::endl;;
00101     std::cerr << "  - ACCESS_KEY_SECRET   : SOUND4 Access Key Secret" << std::endl;;
00102     if (dynlib.IsOk()) {
00103         std::cerr << std::endl;
```

```

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::cloudx1::dyn::LogSeverity severity, const std::string& msg)
00114 {
00115     std::cerr << msg << std::endl;
00116 }
00117
00119 class MyPresetManager : public sound4::cloudx1::dyn::CPresetLoader {
00120 public:
00121     MyPresetManager() = default;
00122     virtual ~MyPresetManager() = default;
00123
00124     bool SetupPath(const std::filesystem::path& a_preset_path)
00125     {
00126         m_preset_path=a_preset_path;
00127         if ( !std::filesystem::exists(m_preset_path) ) {
00128             return false;
00129         }
00130         std::error_code ec;
00131         if ( !std::filesystem::is_directory(m_preset_path, ec) ) {
00132             return false;
00133         }
00134         return true;
00135     }
00136     virtual bool IsReadOnly() override { return false; };
00137     virtual bool Exists(const std::filesystem::path &name) override
00138     {
00139         std::error_code ec;
00140         return std::filesystem::exists(GetRealPath(name), ec);
00141     }
00142     virtual bool Remove(const std::filesystem::path &name) override
00143     {
00144         std::error_code ec;
00145         return std::filesystem::remove(GetRealPath(name), ec);
00146     }
00147     virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) override
00148     {
00149         std::error_code ec;
00150         std::filesystem::rename(GetRealPath(from), GetRealPath(to), ec);
00151         return (!ec);
00152     }
00153     virtual std::vector<std::filesystem::path> GetAll() override
00154     {
00155         std::vector<std::filesystem::path> list;
00156         for (const auto & entry : std::filesystem::directory_iterator(m_preset_path.c_str(),
std::filesystem::directory_options::skip_permission_denied)) {
00157             if (entry.is_regular_file()) {
00158                 list.push_back(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("ACCESS_KEY_ID");
00208     auto AccessKey=GetEnv("ACCESS_KEY_SECRET");
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 << "  - ACCESS_KEY_ID       : SOUND4 Access Key ID" << std::endl;;
00073     std::cerr << "  - ACCESS_KEY_SECRET   : SOUND4 Access Key Secret" << std::endl;;
00074     std::cerr << std::endl;
00075     std::cerr << "Example:" << std::endl;
00076     std::cerr << "ffmpeg -re -i file.wav -ar "<<SAMPLE_RATE<<" -ac "<<CHANNEL_COUNT<<" -f f32le - |
"<<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("ACCESS_KEY_ID");
00101     char *pAccessKey=getenv("ACCESS_KEY_SECRET");
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 "<
cloudxl_GetSampleRate() << std::endl;
00152         return 1;
00153     }
00154     if (cloudxl_GetChunkSizeInFrames() != CHUNK_SIZE) {
00155         std::cerr << "Bad library frame size, expecting '"<CHUNK_SIZE<"' but has "<
cloudxl_GetChunkSizeInFrames() << std::endl;
00156         return 1;
00157     }
00158     if (cloudxl_GetChannelCount() != CHANNEL_COUNT) {
00159         std::cerr << "Bad library channel count, expecting '"<CHANNEL_COUNT<"' but has "<
cloudxl_GetChannelCount() << std::endl;
00160         return 1;
00161     }
00162
00163     // Setup parameters
00164     struct cloudxl_CParameters *params = cloudxl_NewParameters();
00165     // Optional: activate web authentication, set admin password
00166     // This creates the authentication only for a new storage path
00167     cloudxl_SetParameter(params,"ADMIN_USER", "admin");
00168     cloudxl_SetParameter(params,"ADMIN_SECRET", "admin");
00169
00170     // Create the processing instance
00171     pInstance=cloudxl_InitProcess2(pLoginKey,pRadioName,pKeyId,pAccessKey,store_path.c_str(), params);
00172     cloudxl_FreeParameters(params);
00173     if (!pInstance) {
00174         std::cerr << "Failed to create the process instance"<< std::endl;
00175         return 1;
00176     }
00177
00178     // Start the update thread, without JSON server (low priority)
00179     std::thread updater([pInstance](){
00180         // will returned when stopped or destroyed
00181         std::cerr << "cloudxl_StartUpdateThread (no json port)" << std::endl;
00182         cloudxl_StartUpdateThread(pInstance, 0);
00183         std::cerr << "cloudxl_StartUpdateThread END" << std::endl;
00184     });
00185
00186     // This is not mandatory, but better be sure we are ready right now
00187     std::cerr << "Waiting update thread" << std::endl;
00188     if (cloudxl_WaitUpdateThreadReady(pInstance, 5000)<0) {
00189         std::cerr << "Timeout to create the process instance"<< std::endl;
00190     }
00191     std::cerr << "Waiting update thread DONE" << std::endl;
00192
00193     #if (CLOUDXL_HAS_WEBSERVER)
00194     // Starts a web server, listening on port http://localhost:8080, https://localhost:8443
00195     std::cerr << "Starting web server" << std::endl;
00196     int listenport= 8080;
00197     int listenport_secure= 8443;
00198     uint64_t webserver= SOUND4_INVALID_WEBSERVER_ID;
00199     if (listenport || listenport_secure) {
00200         webserver = cloudxl_Webserver(listenport,listenport_secure,pInstance);
00201     }
00202

```

```

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 }
00262
00263 }

```

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](#) reader_free, [cloudx1_storage_writer](#) writer, [cloudx1_storage_exists](#) exists, [cloudx1_storage_getall](#) getall, [cloudx1_storage_getall_free](#) getall_free, [cloudx1_storage_remove](#) remove, [cloudx1_storage_rename](#) rename, int IsReadOnly, void *userdata)
- void [cloudx1_PresetManager_InformChange](#) (struct [cloudx1_CInstance](#) *instance, const fs_char *relative_path, enum [cloudx1_PresetChange_Kind](#) change_kind)
- void [cloudx1_SetMetadata](#) (struct [cloudx1_CInstance](#) *instance, const char *key, const char *value)
- void [cloudx1_SetMetadataMulti](#) (struct [cloudx1_CInstance](#) *instance, const char **keyvalue)
- const char ** [cloudx1_GetMetadataInfos](#) (struct [cloudx1_CInstance](#) *instance)
- void [cloudx1_FreeMetadataInfos](#) (struct [cloudx1_CInstance](#) *instance, const char **infos)
- void [cloudx1_StartUpdateThread](#) (struct [cloudx1_CInstance](#) *instance, unsigned int port)
- void [cloudx1_StopUpdateThread](#) (struct [cloudx1_CInstance](#) *instance)
- int [cloudx1_WaitUpdateThreadReady](#) (struct [cloudx1_CInstance](#) *instance, int milliseconds)
- void [cloudx1_ProcessAudio](#) (struct [cloudx1_CInstance](#) *instance, const float *input, float *output)
- void [cloudx1_ProcessAudio_Planar](#) (struct [cloudx1_CInstance](#) *instance, float const *const *input, float *const *output)
- float * [cloudx1_GetBufferIn](#) (struct [cloudx1_CInstance](#) *instance)
- float * [cloudx1_GetBufferOut](#) (struct [cloudx1_CInstance](#) *instance)
- unsigned int [cloudx1_GetEstimatedDelay](#) (struct [cloudx1_CInstance](#) *instance)
- const char * [cloudx1_GetFormatName](#) (const enum [cloudx1_SampleFormat](#) fmt)
- enum [cloudx1_SampleFormat](#) [cloudx1_GetFormatFromName](#) (const char *name)
- unsigned int [cloudx1_GetBytesFromFormat](#) (const enum [cloudx1_SampleFormat](#) fmt)
- unsigned int [cloudx1_GetMaxPacketFrame](#) (struct [cloudx1_CInstance](#) *instance)
- unsigned int [cloudx1_AddAudio](#) (struct [cloudx1_CInstance](#) *instance, const uint8_t *payload, unsigned int nFrame, enum [cloudx1_SampleFormat](#) fmt)
- unsigned int [cloudx1_AddPadAudio](#) (struct [cloudx1_CInstance](#) *instance)
- unsigned int [cloudx1_GetOutputCount](#) (struct [cloudx1_CInstance](#) *instance)
- unsigned int [cloudx1_GetAudio](#) (struct [cloudx1_CInstance](#) *instance, uint8_t *payload, unsigned int max_nFrame, enum [cloudx1_SampleFormat](#) fmt)
- void [cloudx1_AudioConvertFrom](#) (const uint8_t *payload, float *output, size_t nSpl, enum [cloudx1_SampleFormat](#) fmt)
- void [cloudx1_AudioConvertTo](#) (const float *input, uint8_t *payload, size_t nSpl, enum [cloudx1_SampleFormat](#) fmt)
- void [cloudx1_StereoToMono](#) (const float *input, float *output, size_t nFrame)
- void [cloudx1_MonoToStereo](#) (const float *input, float *output, size_t nFrame)
- void [cloudx1_StereoToMono_Planar](#) (const float *inputL, const float *inputR, float *output, size_t nFrame)
- void [cloudx1_MonoToStereo_Planar](#) (const float *input, float *outputL, float *outputR, size_t nFrame)
- void [cloudx1_AudioMonoFromLiveStereo](#) (const uint8_t *payload, float *output)
- void [cloudx1_AudioMonoToLiveStereo](#) (const float *input, uint8_t *payload)
- struct [cloudx1_CClientInstance](#) * [cloudx1_NewClient](#) (struct [cloudx1_CInstance](#) *instance)
- void [cloudx1_DeleteClient](#) (struct [cloudx1_CClientInstance](#) *client)
- const char * [cloudx1_ProcessJson](#) (struct [cloudx1_CClientInstance](#) *client, const char *json_str, int *need_save)
- void [cloudx1_FreeJsonAnswer](#) (const char *json_str)
- int [cloudx1_SaveState](#) (struct [cloudx1_CInstance](#) *instance)
- uint64_t [cloudx1_Webserver_tcp](#) (unsigned int listenport, unsigned int listenport_secure, const char *socket_ip, unsigned int socket_port)

- uint64_t [cloudx1_Webserver_tcp2](#) (unsigned int listenport, unsigned int listenport_secure, const char *socket_ip, unsigned int socket_port, const struct [cloudx1_CParameters](#) *parameters)
- uint64_t [cloudx1_Webserver](#) (unsigned int listenport, unsigned int listenport_secure, struct [cloudx1_CInstance](#) *instance)
- int [cloudx1_Webserver_Stop](#) (uint64_t id, int timeout_ms)
- int [cloudx1_Webserver_Status](#) (uint64_t id)

11.7.1 Macro Definition Documentation

11.7.1.1 CLOUDX1_DECL

```
#define CLOUDX1_DECL __declspec(dllimport)
```

Definition at line 14 of file [sound4.x1.cloud.h](#).

11.7.1.2 CLOUDX1_HAS_CLOUDBUS

```
#define CLOUDX1_HAS_CLOUDBUS 0
```

Definition at line 19 of file [sound4.x1.cloud.h](#).

11.7.1.3 CLOUDX1_HAS_WEBSERVER

```
#define CLOUDX1_HAS_WEBSERVER 1
```

Definition at line 18 of file [sound4.x1.cloud.h](#).

11.8 sound4.x1.cloud.h

```
00001
00004 #pragma once
00005
00006 #include <stdint.h>
00007 #ifdef __unix__
00008     #include <sys/types.h>
00009     #define CLOUDX1_DECL __attribute__((visibility ("default")))
00010 #elif defined(_WIN32) || defined(WIN32)
00011     #ifdef BUILDING_CLOUDX1_DLL
00012         #define CLOUDX1_DECL __declspec(dllexport)
00013     #else
00014         #define CLOUDX1_DECL __declspec(dllimport)
00015     #endif
00016 #endif
00017
00018 #define CLOUDX1_HAS_WEBSERVER 1
00019 #define CLOUDX1_HAS_CLOUDBUS 0
00020
00021 #ifdef __cplusplus
00022 extern "C" {
00023 #endif // __cplusplus
00024
```

```

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
    , cloudxl_storage_reader reader, cloudxl_storage_reader_free
    , cloudxl_storage_writer writer
    , cloudxl_storage_exists exists
    , cloudxl_storage_getall getall, cloudxl_storage_getall_free getall_free
    , cloudxl_storage_remove remove
    , cloudxl_storage_rename rename
    , int IsReadOnly
    , void* userdata
    );
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
00691 CLOUDX1_DECL void cloudxl_SetMetadata(struct cloudxl_CInstance *instance, const char* key, const char*
    value);
00692
00703 CLOUDX1_DECL void cloudxl_SetMetadataMulti(struct cloudxl_CInstance *instance, const char** keyvalue);
00704
00712 CLOUDX1_DECL const char** cloudxl_GetMetadataInfos(struct cloudxl_CInstance *instance);
00713
00720 CLOUDX1_DECL void cloudxl_FreeMetadataInfos(struct cloudxl_CInstance *instance, const char** infos);
00721
00724 // -----
00729 // -----
00730
00743 CLOUDX1_DECL void cloudxl_StartUpdateThread(struct cloudxl_CInstance *instance, unsigned int port);
00744
00750 CLOUDX1_DECL void cloudxl_StopUpdateThread(struct cloudxl_CInstance *instance);
00751
00759 CLOUDX1_DECL int cloudxl_WaitUpdateThreadReady(struct cloudxl_CInstance *instance, int milliseconds);

```

```

00760
00763 // -----
00768 // -----
00790 CLOUDX1_DECL void cloudx1_ProcessAudio(struct cloudx1_CInstance *instance, const float *input, float
    *output );
00791
00810 CLOUDX1_DECL void cloudx1_ProcessAudio_Planar(struct cloudx1_CInstance *instance
00811     , float const * const *input
00812     , float * const *output);
00813
00826 CLOUDX1_DECL float *cloudx1_GetBufferIn(struct cloudx1_CInstance *instance);
00827
00840 CLOUDX1_DECL float *cloudx1_GetBufferOut(struct cloudx1_CInstance *instance);
00841
00849 CLOUDX1_DECL unsigned int cloudx1_GetEstimatedDelay(struct cloudx1_CInstance *instance);
00850
00853 // -----
00860 // -----
00861 #ifdef _MSC_VER
00862     #define __BYTE_ORDER__ REG_DWORD
00863     #define __ORDER_LITTLE_ENDIAN__ REG_DWORD_LITTLE_ENDIAN
00864     #define __ORDER_BIG_ENDIAN__ REG_DWORD_BIG_ENDIAN
00865 #endif
00866
00870 enum cloudx1_SampleFormat {
00871     INVALID_FORMAT=0,
00872     S16_LE,
00873     S16_BE,
00874     S24_LE,
00875     S24_BE,
00876     S32_LE,
00877     S32_BE,
00878     F32_LE,
00879     F32_BE,
00880
00881     // Native definitions, only links to the physical ones
00882     #if __BYTE_ORDER__ == __ORDER_LITTLE_ENDIAN__
00883         S16_NATIVE=S16_LE,
00884         S24_NATIVE=S24_LE,
00885         S32_NATIVE=S32_LE,
00886         F32_NATIVE=F32_LE,
00887     #else
00888         S16_NATIVE=S16_BE,
00889         S24_NATIVE=S24_BE,
00890         S32_NATIVE=S32_BE,
00891         F32_NATIVE=F32_BE,
00892     #endif
00893 };
00894
00901 CLOUDX1_DECL const char *cloudx1_GetFormatName(const enum cloudx1_SampleFormat fmt);
00902
00909 CLOUDX1_DECL enum cloudx1_SampleFormat cloudx1_GetFormatFromName(const char *name);
00910
00917 CLOUDX1_DECL unsigned int cloudx1_GetBytesFromFormat(const enum cloudx1_SampleFormat fmt);
00918
00919
00926 CLOUDX1_DECL unsigned int cloudx1_GetMaxPacketFrame(struct cloudx1_CInstance *instance);
00927
00938 CLOUDX1_DECL unsigned int cloudx1_AddAudio(struct cloudx1_CInstance *instance, const uint8_t *payload,
    unsigned int nFrame, enum cloudx1_SampleFormat fmt );
00939
00946 CLOUDX1_DECL unsigned int cloudx1_AddPadAudio(struct cloudx1_CInstance *instance);
00947
00954 CLOUDX1_DECL unsigned int cloudx1_GetOutputCount(struct cloudx1_CInstance *instance);
00955
00965 CLOUDX1_DECL unsigned int cloudx1_GetAudio(struct cloudx1_CInstance *instance, uint8_t *payload,
    unsigned int max_nFrame, enum cloudx1_SampleFormat fmt );
00966
00970 // -----
00974 // -----
00985 CLOUDX1_DECL void cloudx1_AudioConvertFrom(const uint8_t *payload, float *output, size_t nSpl, enum
    cloudx1_SampleFormat fmt);
00986
00997 CLOUDX1_DECL void cloudx1_AudioConvertTo(const float *input, uint8_t *payload, size_t nSpl, enum
    cloudx1_SampleFormat fmt);
00998
01008 CLOUDX1_DECL void cloudx1_StereoToMono(const float *input, float *output, size_t nFrame);
01009
01019 CLOUDX1_DECL void cloudx1_MonoToStereo(const float *input, float *output, size_t nFrame);
01020
01031 CLOUDX1_DECL void cloudx1_StereoToMono_Planar(const float *inputL, const float *inputR, float *output,
    size_t nFrame);
01032
01043 CLOUDX1_DECL void cloudx1_MonoToStereo_Planar(const float *input, float *outputL, float *outputR,
    size_t nFrame);
01044
01051 CLOUDX1_DECL void cloudx1_AudioMonoFromLiveStereo(const uint8_t *payload, float *output);

```

```

01052
01059 CLOUDX1_DECL void cloudx1_AudioMonoToLiveStereo(const float *input, uint8_t *payload);
01060
01063 // -----
01068 // -----
01072 struct cloudx1_CClientInstance;
01073
01082 CLOUDX1_DECL struct cloudx1_CClientInstance *cloudx1_NewClient(struct cloudx1_CInstance *instance);
01083
01089 CLOUDX1_DECL void cloudx1_DeleteClient(struct cloudx1_CClientInstance *client);
01090
01104 CLOUDX1_DECL const char *cloudx1_ProcessJson(struct cloudx1_CClientInstance *client, const char
    *json_str, int *need_save);
01105
01111 CLOUDX1_DECL void cloudx1_FreeJsonAnswer(const char *json_str);
01112
01124 CLOUDX1_DECL int cloudx1_SaveState(struct cloudx1_CInstance *instance);
01125
01421 #if CLOUDX1_HAS_WEBSERVER
01422 // -----
01430 // -----
01449 CLOUDX1_DECL uint64_t cloudx1_Webserver_tcp(unsigned int listenport, unsigned int listenport_secure,
    const char *socket_ip, unsigned int socket_port);
01450
01451 // -----
01471 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);
01472
01490 CLOUDX1_DECL uint64_t cloudx1_Webserver(unsigned int listenport, unsigned int listenport_secure,
    struct cloudx1_CInstance *instance);
01491
01501 CLOUDX1_DECL int cloudx1_Webserver_Stop(uint64_t id, int timeout_ms);
01502
01511 CLOUDX1_DECL int cloudx1_Webserver_Status(uint64_t id);
01512
01517 #define SOUND4_INVALID_WEBSERVER_ID ((uint64_t)-1)
01518
01522 #define SOUND4_WEBSERVER_HTTP_OK (1<<0)
01526 #define SOUND4_WEBSERVER_HTTPS_OK (1<<1)
01527
01529 #endif // CLOUDX1_HAS_WEBSERVER
01530
01531 #ifdef __cplusplus
01532 } // extern "C"
01533 #endif // __cplusplus

```

11.9 sound4.x1.cloud.hpp File Reference

C++ wrapper for library.

```

#include <string>
#include <exception>
#include <thread>
#include <functional>
#include <memory>
#include <array>
#include <assert.h>
#include <stdexcept>
#include <filesystem>
#include <string.h>
#include "sound4.x1.cloud.h"
#include <stringapiset.h>
#include <wchar.h>

```

Classes

- struct [sound4::cloudx1::helper::SampleFormat< T >](#)
Helper for Sample format types.

- struct [sound4::cloudx1::helper::SampleFormat< int16_t >](#)
- struct [sound4::cloudx1::helper::SampleFormat< int32_t >](#)
- struct [sound4::cloudx1::helper::SampleFormat< float >](#)
- class [sound4::cloudx1::CPresetLoader](#)
- class [sound4::cloudx1::CInstance](#)
- class [sound4::cloudx1::CInstance::CClient](#)

Namespaces

- [sound4](#)
- [sound4::cloudx1](#)
- [sound4::cloudx1::helper](#)

Macros

- `#define fs\_strdup wcsdup`
helper for OS dependant file name copy

Typedefs

- using [sound4::cloudx1::SampleFormat](#) = [cloudx1_SampleFormat](#)
- using [sound4::cloudx1::LogSeverity](#) = [cloudx1_LogSeverity](#)
- using [sound4::cloudx1::log_cb_t](#) = `std::function< void(LogSeverity, const std::string &)>`
- using [sound4::cloudx1::PresetChange_Kind](#) = [cloudx1_PresetChange_Kind](#)

Variables

- `const size_t sound4::cloudx1::ChunkFrames = CLOUDX1\_AUDIOFRAME\_COUNT`
- `const size_t sound4::cloudx1::InputChannels = CLOUDX1\_CHANNEL\_COUNT*CLOUDX1\_AUDIO\_INPUT\_COUNT`
- `const size_t sound4::cloudx1::OutputChannels = CLOUDX1\_CHANNEL\_COUNT*CLOUDX1\_AUDIO\_OUTPUT\_COUNT`
- `const size_t sound4::cloudx1::InputSampleSize = ChunkFrames*InputChannels`
- `const size_t sound4::cloudx1::OutputSampleSize = ChunkFrames*OutputChannels`
- `const size_t sound4::cloudx1::SampleRate = CLOUDX1\_SAMPLE\_RATE`

11.9.1 Macro Definition Documentation

11.9.1.1 `fs_strdup`

```
#define fs_strdup wcsdup
```

Definition at line 25 of file [sound4.x1.cloud.hpp](#).

11.10 sound4.x1.cloud.hpp

```

00001
00004 #pragma once
00005
00006 #include <string>
00007 #include <exception>
00008 #include <thread>
00009 #include <functional>
00010 #include <memory>
00011 #include <array>
00012 #include <assert.h>
00013 #include <stdexcept>
00014 #include <filesystem>
00015 #include <string.h>
00016
00017 #include "sound4.x1.cloud.h"
00018
00019
00020 // Filesystem path char type
00021 #ifdef _WIN32
00022     #include <stringapiset.h>
00023     #include <wchar.h>
00025     #define fs_strdup wcsdup
00026 #else // !_WIN32
00028     #define fs_strdup strdup
00029 #endif // !_WIN32
00030
00031 // bridge C callbacks to CPresetLoader
00032 extern "C" {
00033     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata);
00034     static void cloudx1_custom_reader_free(char *content, void* userdata);
00035     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata);
00036     static int cloudx1_custom_exists(const fs_char *filename, void* userdata);
00037     static fs_char** cloudx1_custom_getall(void* userdata);
00038     static void cloudx1_custom_getall_free(fs_char** all, void* userdata);
00039     static int cloudx1_custom_remove(const fs_char *filename, void* userdata);
00040     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00041 };
00042
00046 namespace sound4 {
00050 namespace cloudx1 {
00051     static constexpr const char *process_name = "SOUND4 x1.CLOUD";
00052     static constexpr const char *process_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
00572 void SetMetadataMulti(const std::unordered_map<std::string, const char*>& list)
00573 {
00574     if (instance) {
00575         typedef const char* pchar;
00576         pchar* keyvalue=new pchar[2*list.size()+1];
00577         size_t n=0;
00578         for (auto&& [key,value]: list) {
00579             keyvalue[2*n+0]=key.c_str();
00580             keyvalue[2*n+1]=value;
00581             n++;
00582         }
00583         keyvalue[2*n+0]=nullptr;
00584
00585         cloudxl_SetMetadataMulti(instance, keyvalue);
00586
00587         delete[] keyvalue;
00588     } else {
00589         for (auto&& [key,value]: list) {
00590             if (value) {
00591                 init_metadata.push_back( {key, value} );
00592             }
00593         }
00594     }
00595 }
00596
00602 std::vector< std::tuple<std::string, std::string> > GetMetadataInfos()
00603 {
00604     std::vector< std::tuple<std::string, std::string> > values;
00605     const char** c_values = cloudxl_GetMetadataInfos(instance);
00606     if (c_values) {
00607         for (const char** c_value=c_values; *c_value; ) {
00608             std::string key(*c_value);
00609             c_value++;
00610             if (*c_value) {
00611                 std::string descr(*c_value);
00612                 c_value++;
00613                 values.push_back( {key,descr} );
00614             }
00615             c_value++;
00616         }
00617         cloudxl_FreeMetadataInfos(instance, c_values);
00618     }
00619     return values;
00620 }
00621
00622 // Can be overloaded, called at start of UpdateThread in the thread
00623 virtual void OnUpdateThreadStart() {}
00624 // Can be overloaded to call at end of UpdateThread in the thread
00625 virtual void OnUpdateThreadStop() {}
00626
00626 #if CLOUDX1_HAS_WEBSERVER
00632 bool StartWebServer(int http_port, int https_port=0)
00633 {
00634     assert(instance);
00635     assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
00636     webserver = cloudxl_Webserver(http_port,https_port,instance);
00637     if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
00638         return false;
00639     }
00640     int web_status=cloudxl_Webserver_Status(webserver);
00641     if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
00642         return false;
00643     }
00644     if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {
00645         return false;
00646     }
00647     return true;
00648 }
00654 void StopWebServer()
00655 {
00656     if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
00657         cloudxl_Webserver_Stop(webserver, 1000);
00658         webserver = SOUND4_INVALID_WEBSERVER_ID;
00659     }
00660 }
00661 #endif // CLOUDX1_HAS_WEBSERVER
00662
00669 int Terminate()
00670 {
00671     if (!instance) return 0;
00672     return cloudxl_TerminateProcess(instance);
00673 }

```

```

00674
00680     void Stop()
00681     {
00682         if (!instance) return;
00683 #if CLOUDX1_HAS_WEBSERVER
00684         StopWebServer();
00685 #endif // CLOUDX1_HAS_WEBSERVER
00686         if (update_thread.joinable()) {
00687             cloudx1_StopUpdateThread(instance); // this will exit the update thread
00688             update_thread.join();
00689         }
00690         cloudx1_ExitProcess(instance);
00691         instance=nullptr;
00692     }
00693
00699     unsigned int GetEstimatedDelay()
00700     {
00701         assert(instance);
00702         return cloudx1_GetEstimatedDelay(instance);
00703     }
00704
00715     std::array<float,InputSampleSize>& GetBufferIn()
00716     {
00717         assert(instance);
00718         float *buf=cloudx1_GetBufferIn(instance);
00719         return reinterpret_cast< std::array<float,InputSampleSize>& >(*buf);
00720     }
00721
00732     std::array<float,OutputSampleSize>& GetBufferOut()
00733     {
00734         assert(instance);
00735         float *buf= cloudx1_GetBufferOut(instance);
00736         return reinterpret_cast< std::array<float,OutputSampleSize>& >(*buf);
00737     }
00743     void ProcessAudio()
00744     {
00745         assert(instance);
00746         cloudx1_ProcessAudio(instance, cloudx1_GetBufferIn(instance),
cloudx1_GetBufferOut(instance));
00747     }
00761     // void ProcessAudio_Planar(const std::array< const std::array<const float,ChunkFrames>,
InputChannels>& input, std::array< std::array<float,ChunkFrames>, OutputChannels>& output)
00762     void ProcessAudio_Planar(float const * const *input, float * const *output)
00763     {
00764         assert(instance);
00765         cloudx1_ProcessAudio_Planar(instance, input, output);
00766     }
00767
00779     template<typename T>
00780     std::vector<T> ProcessAnyAudio(const std::vector<T> input)
00781     {
00782         assert(instance);
00783         std::vector<T> output;
00784         unsigned int out_offset=0;
00785         unsigned int in_offset=0;
00786         unsigned int todo = input.size();
00787         while (todo>0) {
00788             unsigned int left = AddAudio(&input[in_offset], todo);
00789             unsigned int out_avail = cloudx1_GetOutputCount(instance);
00790             output.resize(out_offset + out_avail);
00791             GetAudio(&output[out_offset], out_avail);
00792             out_offset+=out_avail;
00793             in_offset += todo-left;
00794             todo=left;
00795         }
00796         return output;
00797     }
00798
00804     class CClient {
00805     public:
00806         CClient(cloudx1_CInstance* instance)
00807         {
00808             assert(instance);
00809             client=cloudx1_NewClient(instance);
00810             if (!client) throw std::bad_alloc();
00811         }
00812         // non-copyable
00813         CClient( const CInstance& ) = delete;
00814         CClient& operator=( const CInstance& ) = delete;
00815         ~CClient()
00816         {
00817             if (client) {
00818                 cloudx1_DeleteClient(client);
00819                 client=nullptr;
00820             }
00821         }
00829         std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)

```

```

00830         {
00831             assert(client);
00832             int need_save=0;
00833             const char *canswer = cloudx1_ProcessJson(client, request.c_str(),
&need_save);
00834             if (!canswer) return {};
00835             std::string answer(canswer);
00836             cloudx1_FreeJsonAnswer (canswer);
00837             if (NeedSave) {
00838                 *NeedSave=(need_save!=0);
00839             }
00840             return answer;
00841         }
00842     private:
00843         cloudx1_CClientInstance *client = nullptr;
00844     };
00852     std::shared_ptr<CClient> NewClient ()
00853     {
00854         assert(instance);
00855         return std::make_shared<CClient>(instance);
00856     }
00857
00858     protected:
00859         template<typename T>
00860         unsigned int AddAudio(const T* payload, unsigned int nFrame)
00861         {
00862             assert(instance);
00863             return cloudx1_AddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
helper::SampleFormat<T>::format);
00864         }
00865         template<typename T>
00866         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
00867         {
00868             assert(instance);
00869             return cloudx1_GetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
helper::SampleFormat<T>::format);
00870         }
00871
00872     private:
00873         cloudx1_CParameters* params = nullptr;
00874         cloudx1_CInstance* instance = nullptr;
00875         std::thread update_thread;
00876         std::vector< std::pair<std::string, std::string> > init_metadata;
00877 #if CLOUDX1_HAS_WEBSERVER
00878         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
00879 #endif // CLOUDX1_HAS_WEBSERVER
00880     };
00881
00882 }; // namespace cloudx1
00883 }; // namespace sound4
00884
00885 // bridge C callbacks to CPresetLoader
00886 extern "C" {
00887     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata) {
00888         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00889         std::string content=preset_loader->Read(filename);
00890         return strdup(content.c_str());
00891     }
00892     static void cloudx1_custom_reader_free(char *content, void* userdata) {
00893         if (!content) return;
00894         free(content);
00895     }
00896     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata) {
00897         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00898         auto res=preset_loader->Write(filename,content);
00899         return res?0:-1;
00900     }
00901     static int cloudx1_custom_exists(const fs_char *filename, void* userdata) {
00902         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00903         auto res=preset_loader->Exists(filename);
00904         return res?0:-1;
00905     }
00906     static fs_char** cloudx1_custom_getall(void* userdata) {
00907         sound4::cloudx1::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00908         auto res=preset_loader->GetAll();
00909         fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
00910         for (size_t n=0;n<res.size();n++) {
00911             all[n]=fs_strdup(res[n].c_str());
00912         }
00913         all[res.size()]=nullptr;
00914         return all;
00915     }
00916     static void cloudx1_custom_getall_free(fs_char** all, void* userdata) {

```

```

00917         if (!all) return;
00918         for (fs_char** one=all;*one;one++) {
00919             free(*one);
00920         }
00921         free(all);
00922     }
00923     static int cloudx1_custom_remove(const fs_char *filename, void* userdata) {
00924         sound4::cloudx1::CPresetLoader
00925         *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00926         auto res=preset_loader->Remove(filename);
00927         return res?0:-1;
00928     }
00929     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
00930         sound4::cloudx1::CPresetLoader
00931         *preset_loader=reinterpret_cast<sound4::cloudx1::CPresetLoader*>(userdata);
00932         auto res=preset_loader->Rename(from,to);
00933         return res?0:-1;
00934     };

```

11.11 sound4.x1.cloud_dyn.hpp File Reference

C++ wrapper for dynamic loading library.

```

#include <string>
#include <exception>
#include <thread>
#include <functional>
#include <memory>
#include <array>
#include <assert.h>
#include <stdexcept>
#include <filesystem>
#include <string.h>
#include <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 <libloaderapi.h>
00024 #else
00025     #error "Unsupported OS"
00026 #endif
00027
00028 // Needed to have function declarations
00029 #include "sound4.x1.cloud.h"
00030
00031
00032 #ifdef _WIN32
00033     #include <stringapiset.h>
00034     #include <wchar.h>
00036     #define fs_strdup wcsdup
00037 #else // !_WIN32
00039     #define fs_strdup strdup
00040 #endif // !_WIN32
00041
00042 // bridge C callbacks to CPresetLoader
00043 extern "C" {
00044     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata);
00045     static void cloudx1_custom_reader_free(char *content, void* userdata);
00046     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata);
00047     static int cloudx1_custom_exists(const fs_char *filename, void* userdata);
00048     static fs_char** cloudx1_custom_getall(void* userdata);
00049     static void cloudx1_custom_getall_free(fs_char** all, void* userdata);
00050     static int cloudx1_custom_remove(const fs_char *filename, void* userdata);
00051     static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata);
00052 };
00053
00057 namespace sound4 {
00061 namespace cloudx1 {
00065 namespace dyn {
00066
00070     namespace helper {
00071         // Storage definition, depending on OS
00072         #ifdef __unix__
00073             using DynLib_t = void *;
00074             using DynFunc_t = void *;
00075         #else
00076             using DynLib_t = HMODULE;
00077             using DynFunc_t = FARPROC;
00078         #endif
00079
00085         template <typename T>
00086         class DynFuncHolder {
00087         private:
00088             DynFunc_t m_ptr = NULL;
00089         public:
00090             DynFuncHolder() = default;
00091             DynFuncHolder(DynFunc_t a_ptr) : m_ptr(a_ptr) {}
00092             operator bool() const { return (m_ptr!=NULL); }
00093             bool IsOk() const { return m_ptr!=NULL; }
00094             operator T* () const { return reinterpret_cast<T*>(m_ptr); }
00095         };
00096
00101         class CDynLoader {
00102         private:
00103             DynLib_t m_lib {};
00104         public:
00105             CDynLoader() = default;
00106             CDynLoader(CDynLoader&&) = default;
00107             // No copy allowed
00108             CDynLoader(const CDynLoader&) = delete;
00109             CDynLoader& operator=(CDynLoader const&) = delete;
00110             operator bool() const {
00111                 return (m_lib!=NULL);
00112             }
00113             bool IsOk() const {

```

```

00114         return (m_lib!=NULL);
00115     }
00116     #ifdef __unix__
00117     void Close() {
00118         if (IsOk()) {
00119             #ifndef __SANITIZE_ADDRESS__ // avoid unloading to keep call stack
00120                 dlclose(m_lib);
00121             #endif // __SANITIZE_ADDRESS__
00122             m_lib=NULL;
00123         }
00124     }
00125     bool Load(const std::filesystem::path& dynlib)
00126     {
00127         Close();
00128         m_lib=dlopen(dynlib.c_str(), RTLD_NOW|RTLD_LOCAL);
00129         return IsOk();
00130     }
00131     template <typename T>
00132     DynFuncHolder<T> GetSymbol(const std::string& name) {
00133         auto ptr=dlsym(m_lib, name.c_str());
00134         if (!ptr) {
00135             throw std::runtime_error("Missing function in library");
00136         }
00137         return DynFuncHolder<T>(ptr);
00138     }
00139     template <typename T>
00140     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00141         auto ptr=dlsym(m_lib, name.c_str());
00142         return DynFuncHolder<T>(ptr);
00143     }
00144     static std::filesystem::path GetThisLibraryPath(void) {
00145         static Dl_info info;
00146         if (! dladdr((void *) GetThisLibraryPath, & info)) return {};
00147         auto rp=realpath(info.dli_fname, NULL);
00148         std::filesystem::path p(rp);
00149         free(rp);
00150         return p;
00151     }
00152     #else
00153     bool Load(const std::filesystem::path& dynlib, uint32_t loadflags =
LOAD_LIBRARY_SEARCH_DLL_LOAD_DIR|LOAD_LIBRARY_SEARCH_APPLICATION_DIR|LOAD_LIBRARY_SEARCH_USER_DIRS|LOAD_LIBRARY_SEARCH_
00154     {
00155         Close();
00156         m_lib=LoadLibraryExW(dynlib.c_str(), NULL, loadflags);
00157         return IsOk();
00158     }
00159     void Close() {
00160         if (IsOk()) {
00161             // NOTE: On Windows, FreeLibrary may create a lot of troubles, should use
FreeLibraryAndExitThread but...
00162             // So define SOUND4_CALL_FREELIBRARY before including this file if you
really want to unload the library dynamically
00163             #if defined(SOUND4_CALL_FREELIBRARYANDEXITTHREAD)
FreeLibraryAndExitThread(m_lib, 0);
00164             #elif defined(SOUND4_CALL_FREELIBRARY)
FreeLibrary(m_lib);
00165             #endif // SOUND4_CALL_FREELIBRARY
00166             m_lib=NULL;
00167         }
00168     }
00169     }
00170     template <typename T>
00171     DynFuncHolder<T> GetSymbol(const std::string& name) {
00172         auto ptr=GetProcAddress(m_lib, name.c_str());
00173         if (!ptr) {
00174             throw std::runtime_error("Missing function in library");
00175         }
00176         return DynFuncHolder<T>(ptr);
00177     }
00178     template <typename T>
00179     DynFuncHolder<T> GetSymbol_safe(const std::string& name) {
00180         auto ptr=GetProcAddress(m_lib, name.c_str());
00181         return DynFuncHolder<T>(ptr);
00182     }
00183     }
00184     static std::filesystem::path GetThisLibraryPath(void) {
00185         static wchar_t path[MAX_PATH]={};
00186         HMODULE hm = NULL;
00187         if (GetModuleHandleExW(GET_MODULE_HANDLE_EX_FLAG_FROM_ADDRESS |
GET_MODULE_HANDLE_EX_FLAG_UNCHANGED_REFCOUNT,
00188         (LPCWSTR) &GetThisLibraryPath, &hm))
00189         {
00190             if (GetModuleFileNameW(hm, path, MAX_PATH) > 0) {
00191                 return std::filesystem::path(path);
00192             }
00193         }
00194         return {};
00195     }
00196     #endif
00197 
```

```

00198         virtual ~CDynLoader() {
00199             Close();
00200         }
00201     }; // class CDynLoader
00202 }; // namespace helper
00203
00210 class CDynLib {
00211 private:
00212     helper::CDynLoader m_lib;
00213     bool m_bOK = false;
00214 public:
00215     CDynLib() = default;
00216
00217     // All those wrapped functions have the same signature as there C cloudx1_XXX
00218     helper::DynFuncHolder< decltype(cloudx1_GetVersion) > > GetVersion ;
00219     helper::DynFuncHolder< decltype(cloudx1_GetChunkSizeInFrames) > > GetChunkSizeInFrames ;
00220     helper::DynFuncHolder< decltype(cloudx1_GetChannelCount) > > GetChannelCount ;
00221     helper::DynFuncHolder< decltype(cloudx1_GetAudioInputCount) > > GetAudioInputCount ;
00222     helper::DynFuncHolder< decltype(cloudx1_GetAudioOutputCount) > > GetAudioOutputCount ;
00223     helper::DynFuncHolder< decltype(cloudx1_GetSampleRate) > > GetSampleRate ;
00224     helper::DynFuncHolder< decltype(cloudx1_SetLoggerCallback) > > SetLoggerCallback ;
00225     helper::DynFuncHolder< decltype(cloudx1_SetLogSeverity) > > SetLogSeverity ;
00226     helper::DynFuncHolder< decltype(cloudx1_NewParameters) > > NewParameters ;
00227     helper::DynFuncHolder< decltype(cloudx1_FreeParameters) > > FreeParameters ;
00228     helper::DynFuncHolder< decltype(cloudx1_SetParameter) > > SetParameter ;
00229     helper::DynFuncHolder< decltype(cloudx1_GetParameter) > > GetParameter ;
00230     helper::DynFuncHolder< decltype(cloudx1_FreeParameterValue) > > FreeParameterValue ;
00231     helper::DynFuncHolder< decltype(cloudx1_InitProcess) > > InitProcess ;
00232     helper::DynFuncHolder< decltype(cloudx1_InitProcess2) > > InitProcess2 ;
00233     helper::DynFuncHolder< decltype(cloudx1_TerminateProcess) > > TerminateProcess ;
00234     helper::DynFuncHolder< decltype(cloudx1_ExitProcess) > > ExitProcess ;
00235     helper::DynFuncHolder< decltype(cloudx1_StartUpdateThread) > > StartUpdateThread ;
00236     helper::DynFuncHolder< decltype(cloudx1_StopUpdateThread) > > StopUpdateThread ;
00237     helper::DynFuncHolder< decltype(cloudx1_WaitUpdateThreadReady) > > WaitUpdateThreadReady ;
00238     helper::DynFuncHolder< decltype(cloudx1_ProcessAudio) > > ProcessAudio ;
00239     helper::DynFuncHolder< decltype(cloudx1_ProcessAudio_Planar) > > ProcessAudio_Planar ;
00240     helper::DynFuncHolder< decltype(cloudx1_GetBufferIn) > > GetBufferIn ;
00241     helper::DynFuncHolder< decltype(cloudx1_GetBufferOut) > > GetBufferOut ;
00242     helper::DynFuncHolder< decltype(cloudx1_GetEstimatedDelay) > > GetEstimatedDelay ;
00243     helper::DynFuncHolder< decltype(cloudx1_GetFormatName) > > GetFormatName ;
00244     helper::DynFuncHolder< decltype(cloudx1_GetFormatFromName) > > GetFormatFromName ;
00245     helper::DynFuncHolder< decltype(cloudx1_GetBytesFromFormat) > > GetBytesFromFormat ;
00246     helper::DynFuncHolder< decltype(cloudx1_GetMaxPacketFrame) > > GetMaxPacketFrame ;
00247     helper::DynFuncHolder< decltype(cloudx1_AddAudio) > > AddAudio ;
00248     helper::DynFuncHolder< decltype(cloudx1_AddPadAudio) > > AddPadAudio ;
00249     helper::DynFuncHolder< decltype(cloudx1_GetOutputCount) > > GetOutputCount ;
00250     helper::DynFuncHolder< decltype(cloudx1_GetAudio) > > GetAudio ;
00251     helper::DynFuncHolder< decltype(cloudx1_AudioConvertFrom) > > AudioConvertFrom ;
00252     helper::DynFuncHolder< decltype(cloudx1_AudioConvertTo) > > AudioConvertTo ;
00253     helper::DynFuncHolder< decltype(cloudx1_StereoToMono) > > StereoToMono ;
00254     helper::DynFuncHolder< decltype(cloudx1_MonoToStereo) > > MonoToStereo ;
00255     helper::DynFuncHolder< decltype(cloudx1_AudioMonoFromLiveStereo) > > AudioMonoFromLiveStereo ;
00256     helper::DynFuncHolder< decltype(cloudx1_AudioMonoToLiveStereo) > > AudioMonoToLiveStereo ;
00257     helper::DynFuncHolder< decltype(cloudx1_NewClient) > > NewClient ;
00258     helper::DynFuncHolder< decltype(cloudx1_DeleteClient) > > DeleteClient ;
00259     helper::DynFuncHolder< decltype(cloudx1_ProcessJson) > > ProcessJson ;
00260     helper::DynFuncHolder< decltype(cloudx1_FreeJsonAnswer) > > FreeJsonAnswer ;
00261     helper::DynFuncHolder< decltype(cloudx1_SaveState) > > SaveState ;
00262 #if CLOUDX1_HAS_WEBSERVER
00263     helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp) > > Webserver_tcp ;
00264     helper::DynFuncHolder< decltype(cloudx1_Webserver_tcp2) > > Webserver_tcp2 ;
00265     helper::DynFuncHolder< decltype(cloudx1_Webserver) > > Webserver ;
00266     helper::DynFuncHolder< decltype(cloudx1_Webserver_Stop) > > Webserver_Stop ;
00267     helper::DynFuncHolder< decltype(cloudx1_Webserver_Status) > > Webserver_Status ;
00268 #endif // CLOUDX1_HAS_WEBSERVER
00269
00270     // added 2023-03-22
00271     helper::DynFuncHolder< decltype(cloudx1_StereoToMono_Planar) > > StereoToMono_Planar ;
00272     helper::DynFuncHolder< decltype(cloudx1_MonoToStereo_Planar) > > MonoToStereo_Planar ;
00273
00274     // added 2023-05-22
00275     helper::DynFuncHolder< decltype(cloudx1_SetMetadata) > > SetMetadata ;
00276     helper::DynFuncHolder< decltype(cloudx1_GetMetadataInfos) > > GetMetadataInfos ;
00277     helper::DynFuncHolder< decltype(cloudx1_FreeMetadataInfos) > > FreeMetadataInfos ;
00278
00279     // added 2023-06-20
00280     helper::DynFuncHolder< decltype(cloudx1_SetPresetManager) > > SetPresetManager ;
00281 ;
00282     helper::DynFuncHolder< decltype(cloudx1_PresetManager_InformChange) > >
00283     PresetManager_InformChange ;
00284
00285     // added 2023-09-21
00286     helper::DynFuncHolder< decltype(cloudx1_GetPossibleChunkSizeInFrames) > >
00287     GetPossibleChunkSizeInFrames ;
00288     helper::DynFuncHolder< decltype(cloudx1_GetProcessChunkFrames) > >
00289     GetProcessChunkFrames ;
00290     helper::DynFuncHolder< decltype(cloudx1_InitProcess3) > > InitProcess3 ;

```

```

00287     ;
00288 #if CLOUDX1_HAS_CLOUDBUS
00289     // added 2023-06-26
00290     helper::DynFuncHolder< decltype(cloudx1_NewBus)                ) > NewBus                ;
00291     helper::DynFuncHolder< decltype(cloudx1_FreeBus)              ) > FreeBus              ;
00292     helper::DynFuncHolder< decltype(cloudx1_SetInstanceBus        ) > SetInstanceBus        ;
00293 #endif // CLOUDX1_HAS_CLOUDBUS
00294
00295     // added 2024-02-19
00296     helper::DynFuncHolder< decltype(cloudx1_SetMetadataMulti      ) > SetMetadataMulti      ;
00297
00300     bool Load(const std::filesystem::path& path = std::filesystem::current_path()) {
00301         std::string filename;
00302         #ifdef __unix__
00303             filename="libsound4.x1.cloud.so";
00304         #else
00305             filename="sound4.x1.cloud.dll";
00306         #endif
00307         auto p = path;
00308         p.append(filename);
00309         m_lib.Load(p.native());
00310         if (!m_lib.IsOk()) {
00311             // Search in the same directory this code is in
00312             p =helper::CDynLoader::GetThisLibraryPath();
00313             p.append(filename);
00314             m_lib.Load(p.native());
00315             if (!m_lib.IsOk()) {
00316                 return false;
00317             }
00318         }
00319         // Load all C functions
00320         try {
00321             GetVersion                = m_lib.GetSymbol< decltype(cloudx1_GetVersion)                )
00322             >("cloudx1_GetVersion"    );
00323             GetChunkSizeInFrames      = m_lib.GetSymbol< decltype(cloudx1_GetChunkSizeInFrames)      )
00324             >("cloudx1_GetChunkSizeInFrames" );
00325             GetChannelCount           = m_lib.GetSymbol< decltype(cloudx1_GetChannelCount)           )
00326             >("cloudx1_GetChannelCount" );
00327             GetAudioInputCount        = m_lib.GetSymbol< decltype(cloudx1_GetAudioInputCount)        )
00328             >("cloudx1_GetAudioInputCount" );
00329             GetAudioOutputCount       = m_lib.GetSymbol< decltype(cloudx1_GetAudioOutputCount)       )
00330             >("cloudx1_GetAudioOutputCount" );
00331             GetSampleRate             = m_lib.GetSymbol< decltype(cloudx1_GetSampleRate)             )
00332             >("cloudx1_GetSampleRate"   );
00333             SetLoggerCallback         = m_lib.GetSymbol< decltype(cloudx1_SetLoggerCallback)         )
00334             >("cloudx1_SetLoggerCallback" );
00335             SetLogSeverity            = m_lib.GetSymbol< decltype(cloudx1_SetLogSeverity)            )
00336             >("cloudx1_SetLogSeverity"   );
00337             NewParameters             = m_lib.GetSymbol< decltype(cloudx1_NewParameters)             )
00338             >("cloudx1_NewParameters"    );
00339             FreeParameters            = m_lib.GetSymbol< decltype(cloudx1_FreeParameters)            )
00340             >("cloudx1_FreeParameters"   );
00341             SetParameter             = m_lib.GetSymbol< decltype(cloudx1_SetParameter)             )
00342             >("cloudx1_SetParameter"    );
00343             GetParameter             = m_lib.GetSymbol< decltype(cloudx1_GetParameter)             )
00344             >("cloudx1_GetParameter"    );
00345             FreeParameterValue        = m_lib.GetSymbol< decltype(cloudx1_FreeParameterValue)        )
00346             >("cloudx1_FreeParameterValue" );
00347             InitProcess              = m_lib.GetSymbol< decltype(cloudx1_InitProcess)              )
00348             >("cloudx1_InitProcess"     );
00349             InitProcess2             = m_lib.GetSymbol< decltype(cloudx1_InitProcess2)             )
00350             >("cloudx1_InitProcess2"    );
00351             TerminateProcess         = m_lib.GetSymbol< decltype(cloudx1_TerminateProcess)         )
00352             >("cloudx1_TerminateProcess" );
00353             ExitProcess              = m_lib.GetSymbol< decltype(cloudx1_ExitProcess)              )
00354             >("cloudx1_ExitProcess"     );
00355             StartUpdateThread        = m_lib.GetSymbol< decltype(cloudx1_StartUpdateThread)        )
00356             >("cloudx1_StartUpdateThread" );
00357             StopUpdateThread         = m_lib.GetSymbol< decltype(cloudx1_StopUpdateThread)         )
00358             >("cloudx1_StopUpdateThread" );
00359             WaitUpdateThreadReady    = m_lib.GetSymbol< decltype(cloudx1_WaitUpdateThreadReady)    )
00360             >("cloudx1_WaitUpdateThreadReady" );
00361             ProcessAudio             = m_lib.GetSymbol< decltype(cloudx1_ProcessAudio)             )
00362             >("cloudx1_ProcessAudio"     );
00363             ProcessAudio_Planar      = m_lib.GetSymbol< decltype(cloudx1_ProcessAudio_Planar)      )
00364             >("cloudx1_ProcessAudio_Planar" );
00365             GetBufferIn              = m_lib.GetSymbol< decltype(cloudx1_GetBufferIn)              )
00366             >("cloudx1_GetBufferIn"     );
00367             GetBufferOut             = m_lib.GetSymbol< decltype(cloudx1_GetBufferOut)             )
00368             >("cloudx1_GetBufferOut"    );
00369             GetEstimatedDelay        = m_lib.GetSymbol< decltype(cloudx1_GetEstimatedDelay)        )
00370             >("cloudx1_GetEstimatedDelay" );
00371             GetFormatName            = m_lib.GetSymbol< decltype(cloudx1_GetFormatName)            )
00372             >("cloudx1_GetFormatName"   );
00373             GetFormatFromName        = m_lib.GetSymbol< decltype(cloudx1_GetFormatFromName)        )
00374             >("cloudx1_GetFormatFromName" );

```

```

00353         GetBytesFromFormat      = m_lib.GetSymbol< decltype(cloudx1_GetBytesFromFormat      )
>("cloudx1_GetBytesFromFormat" );
00354         GetMaxPacketFrame       = m_lib.GetSymbol< decltype(cloudx1_GetMaxPacketFrame       )
>("cloudx1_GetMaxPacketFrame" );
00355         AddAudio                = m_lib.GetSymbol< decltype(cloudx1_AddAudio                )
>("cloudx1_AddAudio" );
00356         AddPadAudio             = m_lib.GetSymbol< decltype(cloudx1_AddPadAudio             )
>("cloudx1_AddPadAudio" );
00357         GetOutputCount          = m_lib.GetSymbol< decltype(cloudx1_GetOutputCount          )
>("cloudx1_GetOutputCount" );
00358         GetAudio                = m_lib.GetSymbol< decltype(cloudx1_GetAudio                )
>("cloudx1_GetAudio" );
00359         AudioConvertFrom        = m_lib.GetSymbol< decltype(cloudx1_AudioConvertFrom        )
>("cloudx1_AudioConvertFrom" );
00360         AudioConvertTo          = m_lib.GetSymbol< decltype(cloudx1_AudioConvertTo          )
>("cloudx1_AudioConvertTo" );
00361         StereoToMono            = m_lib.GetSymbol< decltype(cloudx1_StereoToMono            )
>("cloudx1_StereoToMono" );
00362         MonoToStereo            = m_lib.GetSymbol< decltype(cloudx1_MonoToStereo            )
>("cloudx1_MonoToStereo" );
00363         AudioMonoFromLiveStereo = m_lib.GetSymbol< decltype(cloudx1_AudioMonoFromLiveStereo )
>("cloudx1_AudioMonoFromLiveStereo");
00364         AudioMonoToLiveStereo   = m_lib.GetSymbol< decltype(cloudx1_AudioMonoToLiveStereo   )
>("cloudx1_AudioMonoToLiveStereo" );
00365         NewClient               = m_lib.GetSymbol< decltype(cloudx1_NewClient               )
>("cloudx1_NewClient" );
00366         DeleteClient            = m_lib.GetSymbol< decltype(cloudx1_DeleteClient            )
>("cloudx1_DeleteClient" );
00367         ProcessJson             = m_lib.GetSymbol< decltype(cloudx1_ProcessJson             )
>("cloudx1_ProcessJson" );
00368         FreeJsonAnswer          = m_lib.GetSymbol< decltype(cloudx1_FreeJsonAnswer          )
>("cloudx1_FreeJsonAnswer" );
00369         SaveState               = m_lib.GetSymbol< decltype(cloudx1_SaveState               )
>("cloudx1_SaveState" );
00370 #if CLOUDX1_HAS_WEBSERVER
00371         Webserver_tcp           = m_lib.GetSymbol< decltype(cloudx1_Webserver_tcp           )
>("cloudx1_Webserver_tcp" );
00372         Webserver_tcp2          = m_lib.GetSymbol< decltype(cloudx1_Webserver_tcp2          )
>("cloudx1_Webserver_tcp2" );
00373         Webserver               = m_lib.GetSymbol< decltype(cloudx1_Webserver               )
>("cloudx1_Webserver" );
00374         Webserver_Stop          = m_lib.GetSymbol< decltype(cloudx1_Webserver_Stop          )
>("cloudx1_Webserver_Stop" );
00375         Webserver_Status        = m_lib.GetSymbol< decltype(cloudx1_Webserver_Status        )
>("cloudx1_Webserver_Status" );
00376 #endif // CLOUDX1_HAS_WEBSERVER
00377
00378         // added 2023-03-22
00379         StereoToMono_Planar     = m_lib.GetSymbol< decltype(cloudx1_StereoToMono_Planar     )
>("cloudx1_StereoToMono_Planar" );
00380         MonoToStereo_Planar     = m_lib.GetSymbol< decltype(cloudx1_MonoToStereo_Planar     )
>("cloudx1_MonoToStereo_Planar" );
00381
00382     } catch (std::runtime_error& ) {
00383         return false;
00384     }
00385     // C functions allowed to be missing
00386     try {
00387         // added 2023-05-22
00388         SetMetadata              = m_lib.GetSymbol< decltype(cloudx1_SetMetadata              )
>("cloudx1_SetMetadata" );
00389         GetMetadataInfos         = m_lib.GetSymbol< decltype(cloudx1_GetMetadataInfos         )
>("cloudx1_GetMetadataInfos" );
00390         FreeMetadataInfos        = m_lib.GetSymbol< decltype(cloudx1_FreeMetadataInfos        )
>("cloudx1_FreeMetadataInfos" );
00391         // added 2023-06-20
00392         SetPresetManager         = m_lib.GetSymbol< decltype(cloudx1_SetPresetManager         )
>("cloudx1_SetPresetManager" );
00393         PresetManager_InformChange = m_lib.GetSymbol<
decltype(cloudx1_PresetManager_InformChange ) >("cloudx1_PresetManager_InformChange" );
00394
00395         // added 2023-09-21
00396         GetPossibleChunkSizeInFrames = m_lib.GetSymbol<
decltype(cloudx1_GetPossibleChunkSizeInFrames ) >("cloudx1_GetPossibleChunkSizeInFrames" );
00397         GetProcessChunkFrames     = m_lib.GetSymbol< decltype(cloudx1_GetProcessChunkFrames     )
>("cloudx1_GetProcessChunkFrames" );
00398         InitProcess3              = m_lib.GetSymbol< decltype(cloudx1_InitProcess3              )
>("cloudx1_InitProcess3" );
00399
00400 #if CLOUDX1_HAS_CLOUDBUS
00401         // added 2023-06-26
00402         NewBus                   = m_lib.GetSymbol< decltype(cloudx1_NewBus                   )
>("cloudx1_NewBus" );
00403         FreeBus                  = m_lib.GetSymbol< decltype(cloudx1_FreeBus                  )
>("cloudx1_FreeBus" );
00404         SetInstanceBus           = m_lib.GetSymbol< decltype(cloudx1_SetInstanceBus           )
>("cloudx1_SetInstanceBus" );

```

```

00405 #endif // CLOUDX1_HAS_CLOUDBUS
00406
00407         // added 2024-02-19
00408         SetMetadataMulti      = m_lib.GetSymbol< decltype(cloudx1_SetMetadataMulti )
>("cloudx1_SetMetadataMulti" );
00409
00410     } catch (std::runtime_error& ) {
00411         // Ignored, handler will take care
00412     }
00413
00414     m_bOK=true;
00415     return true;
00416 }
00423 bool IsOk() const {
00424     return m_bOK;
00425 }
00426
00427 };
00428
00429
00430
00431 static constexpr const char *process_name = "SOUND4 x1.CLOUD";
00432 static constexpr const char *process_shortname = "x1";
00433 using SampleFormat = cloudx1_SampleFormat;
00437 const size_t ChunkFrames=CLOUDX1_AUDIOFRAME_COUNT;
00441 const size_t InputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_INPUT_COUNT;
00445 const size_t OutputChannels=CLOUDX1_CHANNEL_COUNT*CLOUDX1_AUDIO_OUTPUT_COUNT;
00449 const size_t InputSampleSize=ChunkFrames*InputChannels;
00453 const size_t OutputSampleSize=ChunkFrames*OutputChannels;
00457 const size_t SampleRate=CLOUDX1_SAMPLE_RATE;
00458
00462 namespace helper {
00463     #ifdef _WIN32
00464     static inline std::string WStringToUTF8(const std::wstring& wstr) {
00465         if (wstr.empty()) return {};
00466         int size = WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), NULL, 0, NULL,
00472 NULL);
00473         std::string str(size, 0);
00474         WideCharToMultiByte(CP_UTF8, 0, &wstr[0], (int)wstr.size(), &str[0], size, NULL, NULL);
00475         return str;
00476     }
00481     static inline std::wstring UTF8ToWString(const std::string& str) {
00482         if (str.empty()) return std::wstring();
00483         int size = MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), NULL, 0);
00484         std::wstring wstr(size, 0);
00485         MultiByteToWideChar(CP_UTF8, 0, &str[0], (int)str.size(), &wstr[0], size);
00486         return wstr;
00487     }
00488     #endif // _WIN32
00489
00495     template<typename T>
00496     struct SampleFormat {
00497     };
00498     template<>
00499     struct SampleFormat<int16_t> {
00500         const cloudx1_SampleFormat format = S16_NATIVE;
00501     };
00502     template<>
00503     struct SampleFormat<int32_t> {
00504         const cloudx1_SampleFormat format = S32_NATIVE;
00505     };
00506     template<>
00507     struct SampleFormat<float> {
00508         const cloudx1_SampleFormat format = F32_NATIVE;
00509     };
00510
00511
00516     static inline void AudioConvertFrom(CDynLib& dynlib, const uint8_t *payload, float *output,
size_t nSpl, cloudx1_SampleFormat fmt) {
00517         dynlib.AudioConvertFrom(payload, output, nSpl, fmt);
00518     }
00519     static inline void AudioConvertTo(CDynLib& dynlib, const float *input, uint8_t *payload,
size_t nSpl, cloudx1_SampleFormat fmt) {
00520         dynlib.AudioConvertTo(input, payload, nSpl, fmt);
00521     }
00522     static inline void StereoToMono(CDynLib& dynlib, const float *input, float *output, size_t
nSpl) {
00523         dynlib.StereoToMono(input, output, nSpl);
00524     }
00525     static inline void MonoToStereo(CDynLib& dynlib, const float *input, float *output, size_t
nSpl) {
00526         dynlib.MonoToStereo(input, output, nSpl);
00527     }
00528     static inline void StereoToMono_Planar(CDynLib& dynlib, const float *inputL, const float
*inputR, float *output, size_t nSpl) {
00529         dynlib.StereoToMono_Planar(inputL, inputR, output, nSpl);
00530     }

```

```

00531     static inline void MonoToStereo_Planar(CDynLib& dynlib, const float *input, float *outputL,
float *outputR, size_t nSpl) {
00532         dynlib.MonoToStereo_Planar(input, outputL, outputR, nSpl);
00533     }
00534     static inline void AudioMonoFromLiveStereo(CDynLib& dynlib, const uint8_t *payload, float
*out) {
00535         dynlib.AudioMonoFromLiveStereo(payload, out);
00536     }
00537     static inline void AudioMonoToLiveStereo(CDynLib& dynlib, const float *input, uint8_t
*payload) {
00538         dynlib.AudioMonoToLiveStereo(input, payload);
00539     }
00540
00541     }; // namespace helper
00542
00543     static inline std::string GetVersion(CDynLib& dynlib)
00544     {
00545         return std::string(dynlib.GetVersion());
00546     }
00547
00548     static inline unsigned int GetChunkSizeInFrames(CDynLib& dynlib)
00549     {
00550         return dynlib.GetChunkSizeInFrames();
00551     }
00552
00553     static inline std::vector<unsigned int> GetPossibleChunkSizeInFrames(CDynLib& dynlib)
00554     {
00555         std::vector<unsigned int> list;
00556         if (dynlib.GetPossibleChunkSizeInFrames()) {
00557             for (unsigned int* src=dynlib.GetPossibleChunkSizeInFrames();*src;src++) {
00558                 list.push_back(*src);
00559             }
00560         } else {
00561             list.push_back(64);
00562         }
00563         return list;
00564     }
00565
00566     static inline unsigned int GetChannelCount(CDynLib& dynlib)
00567     {
00568         return dynlib.GetChannelCount();
00569     }
00570
00571     static inline unsigned int GetAudioInputCount(CDynLib& dynlib)
00572     {
00573         return dynlib.GetAudioInputCount();
00574     }
00575
00576     static inline unsigned int GetAudioOutputCount(CDynLib& dynlib)
00577     {
00578         return dynlib.GetAudioOutputCount();
00579     }
00580
00581     static inline unsigned int GetSampleRate(CDynLib& dynlib)
00582     {
00583         return dynlib.GetSampleRate();
00584     }
00585
00586     static inline void SanityCheck(CDynLib& dynlib, bool a_bCheckFrames = true)
00587     {
00588         // Do some sanity checks
00589         if (dynlib.GetSampleRate() != CLOUDX1_SAMPLE_RATE) {
00590             throw std::runtime_error("Bad library sampling rate");
00591         }
00592         if (a_bCheckFrames && dynlib.GetChunkSizeInFrames() != ChunkFrames) {
00593             throw std::runtime_error("Bad library frame size");
00594         }
00595         if (dynlib.GetChannelCount() != CLOUDX1_CHANNEL_COUNT) {
00596             throw std::runtime_error("Bad library channel count");
00597         }
00598         if (dynlib.GetAudioInputCount() != CLOUDX1_AUDIO_INPUT_COUNT) {
00599             throw std::runtime_error("Bad library input count");
00600         }
00601         if (dynlib.GetAudioOutputCount() != CLOUDX1_AUDIO_OUTPUT_COUNT) {
00602             throw std::runtime_error("Bad library output count");
00603         }
00604     }
00605
00606     static inline std::string GetFormatName(CDynLib& dynlib, const SampleFormat fmt)
00607     {
00608         return std::string(dynlib.GetFormatName(fmt));
00609     }
00610
00611     static inline SampleFormat GetFormatFromName(CDynLib& dynlib, const std::string& name)
00612     {
00613         return dynlib.GetFormatFromName(name.c_str());
00614     }

```

```

00685
00692 static inline unsigned int GetBytesFromFormat(CDynLib& dynlib, const SampleFormat fmt)
00693 {
00694     return dynlib.GetBytesFromFormat(fmt);
00695 }
00696
00700 using LogSeverity = cloudxl_LogSeverity;
00704 using log_cb_t = std::function<void(LogSeverity, const std::string&);>;
00705
00709 static log_cb_t _log_cb;
00710 extern "C" {
00711     static inline void _log_cb_c(cloudxl_LogSeverity severity, const char *c_msg) {
00712         _log_cb(severity, std::string(c_msg));
00713     }
00714 }
00718 static inline void SetLogSeverity(CDynLib& dynlib, LogSeverity severity)
00719 {
00720     dynlib.SetLogSeverity(severity);
00721 }
00725 static inline void SetLoggerCallback(CDynLib& dynlib, log_cb_t cb)
00726 {
00727     _log_cb=cb;
00728     dynlib.SetLoggerCallback(&_log_cb_c);
00729 }
00730
00731 #if CLOUDXL_HAS_CLOUDBUS
00732 class CBus {
00733 public:
00734     CBus(CDynLib& dynlib)
00735         : m_dynlib(dynlib)
00736     {
00737         if (m_dynlib.NewBus()) {
00738             m_bus=m_dynlib.NewBus();
00739         }
00740     }
00741     ~CBus()
00742     {
00743         if (m_bus && m_dynlib.FreeBus()) {
00744             m_dynlib.FreeBus(m_bus);
00745         }
00746         m_bus = nullptr;
00747     }
00748     cloudxl_CBus *Get() const { return m_bus; }
00749 private:
00750     CDynLib& m_dynlib;
00751     cloudxl_CBus *m_bus;
00752 };
00753 #endif // CLOUDXL_HAS_CLOUDBUS
00754
00759 class CPresetLoader {
00760 public:
00761     CPresetLoader() = default;
00762     virtual ~CPresetLoader() = default;
00763
00764     virtual bool IsReadOnly() = 0;
00765     virtual bool Exists(const std::filesystem::path &name) = 0;
00766     virtual bool Remove(const std::filesystem::path &name) = 0;
00767     virtual bool Rename(const std::filesystem::path &from, const std::filesystem::path &to) = 0;
00768     virtual std::vector<std::filesystem::path> GetAll() = 0;
00769     virtual std::string Read(const std::filesystem::path &filename) = 0;
00770     virtual bool Write(const std::filesystem::path &filename, const std::string &content) = 0;
00771 };
00772 using PresetChange_Kind = cloudxl_PresetChange_Kind;
00773
00777 class CInstance {
00778 public:
00779     CInstance(CDynLib& dynlib)
00780         : m_dynlib(dynlib)
00781     {
00782         params = m_dynlib.NewParameters();
00783         if (!params) throw std::bad_alloc();
00784     }
00785     // non-copyable
00786     CInstance( const CInstance& ) = delete;
00787     CInstance& operator=( const CInstance& ) = delete;
00788     ~CInstance()
00789     {
00790         Stop();
00791         if (params) m_dynlib.FreeParameters(params);
00792     }
00793
00802 bool IsOk() const { return instance!=nullptr; }
00810 void SetParam(const std::string& name, const std::string& value)
00811 {
00812     assert(params);
00813     m_dynlib.SetParameter(params, name.c_str(), value.c_str());
00814 }
00820 std::string GetParam(const std::string& name)

```

```

00821     {
00822         assert(params);
00823         auto c_value=m_dynlib.GetParameter(params, name.c_str());
00824         std::string ret(c_value);
00825         m_dynlib.FreeParameterValue(c_value);
00826         return ret;
00827     }
00828 #if CLOUDX1_HAS_CLOUDBUS
00832     void SetBus(const CBus& bus) {
00833         assert(params);
00834         if (m_dynlib.SetInstanceBus) {
00835             m_dynlib.SetInstanceBus(params,bus.Get());
00836         }
00837     }
00838 #endif // CLOUDX1_HAS_CLOUDBUS
00839
00849     void SetPresetManager(CPresetLoader *preset_manager)
00850     {
00851         if (!preset_manager) return;
00852         if (!m_dynlib.SetPresetManager) return;
00853         assert(params);
00854         m_dynlib.SetPresetManager(params,
00855             cloudxl_custom_reader,
00856             cloudxl_custom_reader_free,
00857             cloudxl_custom_writer,
00858             cloudxl_custom_exists,
00859             cloudxl_custom_getall,
00860             cloudxl_custom_getall_free,
00861             cloudxl_custom_remove,
00862             cloudxl_custom_rename,
00863             preset_manager->IsReadOnly(),
00864             preset_manager
00865         );
00866     }
00867
00882     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)
    {
00883         assert(!instance);
00884         std::string l_save_path;
00885         if (!save_path.empty()) {
00886             l_save_path = save_path.u8string();
00887         }
00888         if (m_dynlib.InitProcess3) {
00889             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);
00890         } else if (frames_per_chunk!=64) {
00891             return false;
00892         } else {
00893             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);
00894         }
00895         if (!instance) return false;
00896         if (!init_metadata.empty()) {
00897             for (auto&& [key,value]: init_metadata) {
00898                 m_dynlib.SetMetadata(instance, key.c_str(), value.c_str());
00899             }
00900             init_metadata.clear();
00901         }
00902         update_thread = std::thread([this, json_port]() {
00903             OnUpdateThreadStart();
00904             m_dynlib.StartUpdateThread(instance, json_port);
00905             OnUpdateThreadStop();
00906         });
00907         int timeout=5000;
00908         #ifdef DEBUG
00909             timeout=60*1000; // For debugger pauses
00910         #endif
00911         if (m_dynlib.WaitUpdateThreadReady(instance, timeout)<0) {
00912             return false;
00913         }
00914         return true;
00915     }
00916
00917     unsigned int GetChunkFrames() {
00925         if (instance && m_dynlib.GetProcessChunkFrames) {
00926             return m_dynlib.GetProcessChunkFrames(instance);
00927         }
00928         return 64;
00929     }
00930
00931     void PresetManager_InformChange(const std::filesystem::path& relative_path, PresetChange_Kind
change_kind)
    {
00940         if (m_dynlib.PresetManager_InformChange) {
00941             m_dynlib.PresetManager_InformChange(instance, relative_path.c_str(),
00942

```

```

        (cloudxl_PresetChange_Kind) change_kind);
00943     }
00944 }
00945
00957 void SetMetadata(const std::string& key, const char* value)
00958 {
00959     if (m_dynlib.SetMetadata) {
00960         if (instance) {
00961             m_dynlib.SetMetadata(instance, key.c_str(), value);
00962         } else {
00963             init_metadata.push_back( {key, value} );
00964         }
00965     }
00966 }
00967
00968
00978 void SetMetadataMulti(const std::unordered_map<std::string, const char*>& list)
00979 {
00980     if (instance) {
00981         if (m_dynlib.SetMetadataMulti) {
00982             typedef const char* pchar;
00983             pchar keyvalue=new pchar[2*list.size()+1];
00984             size_t n=0;
00985             for (auto&& [key,value]: list) {
00986                 keyvalue[2*n+0]=key.c_str();
00987                 keyvalue[2*n+1]=value;
00988                 n++;
00989             }
00990             keyvalue[2*n+0]=nullptr;
00991
00992             cloudxl_SetMetadataMulti(instance, keyvalue);
00993
00994             delete[] keyvalue;
00995         } else {
00996             for (auto&& [key,value]: list) {
00997                 SetMetadata(key, value);
00998             }
00999         }
01000     } else {
01001         for (auto&& [key,value]: list) {
01002             if (value) {
01003                 init_metadata.push_back( {key, value} );
01004             }
01005         }
01006     }
01007 }
01008
01014 std::vector< std::tuple<std::string, std::string> > GetMetadataInfos()
01015 {
01016     std::vector< std::tuple<std::string, std::string> > values;
01017     if (m_dynlib.GetMetadataInfos) {
01018         const char** c_values = m_dynlib.GetMetadataInfos(instance);
01019         if (c_values) {
01020             for (const char** c_value=c_values; *c_value; ) {
01021                 std::string key(*c_value);
01022                 c_value++;
01023                 if (*c_value) {
01024                     std::string descr(*c_value);
01025                     c_value++;
01026                     values.push_back( {key, descr} );
01027                 }
01028             }
01029             m_dynlib.FreeMetadataInfos(instance, c_values);
01030         }
01031     }
01032     return values;
01033 }
01034
01035 // Can be overloaded, called at start of UpdateThread in the thread
01036 virtual void OnUpdateThreadStart() {}
01037 // Can be overloaded to call at end of UpdateThread in the thread
01038 virtual void OnUpdateThreadStop() {}
01039
01040 #if CLOUDX1_HAS_WEBSERVER
01046 bool StartWebServer(int http_port, int https_port=0)
01047 {
01048     assert(instance);
01049     assert(webserver==SOUND4_INVALID_WEBSERVER_ID);
01050     webserver = m_dynlib.Webserver(http_port, https_port, instance);
01051     if (webserver==SOUND4_INVALID_WEBSERVER_ID) {
01052         return false;
01053     }
01054     int web_status=m_dynlib.Webserver_Status(webserver);
01055     if (http_port && (web_status & SOUND4_WEBSERVER_HTTP_OK) == 0) {
01056         return false;
01057     }
01058     if (https_port && (web_status & SOUND4_WEBSERVER_HTTPS_OK) == 0) {

```

```

01059         return false;
01060     }
01061     return true;
01062 }
01063 void StopWebServer()
01064 {
01070     if (webserver != SOUND4_INVALID_WEBSERVER_ID) {
01071         m_dynlib.Webserver_Stop(webserver, 1000);
01072         webserver = SOUND4_INVALID_WEBSERVER_ID;
01073     }
01074 }
01075 #endif // CLOUDX1_HAS_WEBSERVER
01076
01083 int Terminate()
01084 {
01085     if (!instance) return 0;
01086     return m_dynlib.TerminateProcess(instance);
01087 }
01088
01094 void Stop()
01095 {
01096     if (!instance) return;
01097 #if CLOUDX1_HAS_WEBSERVER
01098     StopWebServer();
01099 #endif // CLOUDX1_HAS_WEBSERVER
01100     if (update_thread.joinable()) {
01101         m_dynlib.StopUpdateThread(instance); // this will exit the update thread
01102         update_thread.join();
01103     }
01104     m_dynlib.ExitProcess(instance);
01105     instance=nullptr;
01106 }
01107
01113 unsigned int GetEstimatedDelay()
01114 {
01115     assert(instance);
01116     return m_dynlib.GetEstimatedDelay(instance);
01117 }
01118
01129 std::array<float, InputSampleSize>& GetBufferIn()
01130 {
01131     assert(instance);
01132     float *buf=m_dynlib.GetBufferIn(instance);
01133     return reinterpret_cast< std::array<float, InputSampleSize>& >(*buf);
01134 }
01135
01146 std::array<float, OutputSampleSize>& GetBufferOut()
01147 {
01148     assert(instance);
01149     float *buf= m_dynlib.GetBufferOut(instance);
01150     return reinterpret_cast< std::array<float, OutputSampleSize>& >(*buf);
01151 }
01157 void ProcessAudio()
01158 {
01159     assert(instance);
01160     m_dynlib.ProcessAudio(instance, m_dynlib.GetBufferIn(instance),
m_dynlib.GetBufferOut(instance));
01161 }
01175 // void ProcessAudio_Planar(const std::array< const std::array<const float, ChunkFrames>,
InputChannels>& input, std::array< std::array<float, ChunkFrames>, OutputChannels>& output)
01176 void ProcessAudio_Planar(float const * const *input, float * const *output)
01177 {
01178     assert(instance);
01179     m_dynlib.ProcessAudio_Planar(instance, input, output);
01180 }
01181
01193 template<typename T>
01194 std::vector<T> ProcessAnyAudio(const std::vector<T> input)
01195 {
01196     assert(instance);
01197     std::vector<T> output;
01198     unsigned int out_offset=0;
01199     unsigned int in_offset=0;
01200     unsigned int todo = input.size();
01201     while (todo>0) {
01202         unsigned int left = AddAudio(&input[in_offset], todo);
01203         unsigned int out_avail = m_dynlib.GetOutputCount(instance);
01204         output.resize(out_offset + out_avail);
01205         GetAudio(&output[out_offset], out_avail);
01206         out_offset+=out_avail;
01207         in_offset += todo-left;
01208         todo=left;
01209     }
01210     return output;
01211 }
01212
01218 class CClient {

```

```

01219     public:
01220         CClient(cloudx1_CInstance* instance, CDynLib& dynlib)
01221             : m_dynlib(dynlib)
01222         {
01223             assert(instance);
01224             client=m_dynlib.NewClient(instance);
01225             if (!client) throw std::bad_alloc();
01226         }
01227         // non-copyable
01228         CClient( const CInstance& ) = delete;
01229         CClient& operator=( const CInstance& ) = delete;
01230         ~CClient()
01231         {
01232             if (client) {
01233                 m_dynlib.DeleteClient(client);
01234                 client=nullptr;
01235             }
01236         }
01244         std::string ProcessJson(const std::string &request, bool *NeedSave = nullptr)
01245         {
01246             assert(client);
01247             int need_save=0;
01248             const char *canswer = m_dynlib.ProcessJson(client, request.c_str(),
&need_save);
01249             if (!canswer) return {};
01250             std::string answer(canswer);
01251             m_dynlib.FreeJsonAnswer(canswer);
01252             if (NeedSave) {
01253                 *NeedSave=(need_save!=0);
01254             }
01255             return answer;
01256         }
01257     private:
01258         CDynLib& m_dynlib;
01259         cloudx1_CClientInstance *client = nullptr;
01260 };
01268     std::shared_ptr<CClient> NewClient()
01269     {
01270         assert(instance);
01271         return std::make_shared<CClient>(instance, m_dynlib);
01272     }
01273
01274     protected:
01275         template<typename T>
01276         unsigned int AddAudio(const T* payload, unsigned int nFrame)
01277         {
01278             assert(instance);
01279             return m_dynlib.AddAudio(instance, reinterpret_cast<const T*>(payload), nFrame,
helper::SampleFormat<T>::format);
01280         }
01281         template<typename T>
01282         unsigned int GetAudio(T* payload, unsigned int max_nFrame)
01283         {
01284             assert(instance);
01285             return m_dynlib.GetAudio(instance, reinterpret_cast<T*>(payload), max_nFrame,
helper::SampleFormat<T>::format);
01286         }
01287
01288     private:
01289         CDynLib& m_dynlib;
01290         cloudx1_CParameters* params = nullptr;
01291         cloudx1_CInstance* instance = nullptr;
01292         std::thread update_thread;
01293         std::vector< std::pair<std::string, std::string> > init_metadata;
01294 #if CLOUDX1_HAS_WEBSERVER
01295         uint64_t webserver = SOUND4_INVALID_WEBSERVER_ID;
01296 #endif // CLOUDX1_HAS_WEBSERVER
01297 };
01298
01299 }; // namespace dyn
01300 }; // namespace cloudx1
01301 }; // namespace sound4
01302
01303
01304 // bridge C callbacks to CPresetLoader
01305 extern "C" {
01306     static char *cloudx1_custom_reader(const fs_char *filename, void* userdata) {
01307         sound4::cloudx1::dyn::CPresetLoader
*preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01308         std::string content=preset_loader->Read(filename);
01309         return strdup(content.c_str());
01310     }
01311     static void cloudx1_custom_reader_free(char *content, void* userdata) {
01312         if (!content) return;
01313         free(content);
01314     }
01315     static int cloudx1_custom_writer(const fs_char *filename, const char *content, void* userdata) {

```

```

01316         sound4::cloudx1::dyn::CPresetLoader
01317     *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01318     auto res=preset_loader->Write(filename,content);
01319     return res?0:-1;
01320 }
01321 static int cloudx1_custom_exists(const fs_char *filename, void* userdata) {
01322     sound4::cloudx1::dyn::CPresetLoader
01323     *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01324     auto res=preset_loader->Exists(filename);
01325     return res?0:-1;
01326 }
01327 static fs_char** cloudx1_custom_getall(void* userdata) {
01328     sound4::cloudx1::dyn::CPresetLoader
01329     *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01330     auto res=preset_loader->GetAll();
01331     fs_char**all=(fs_char**)malloc((res.size()+1)*sizeof(const fs_char*));
01332     for (size_t n=0;n<res.size();n++) {
01333         all[n]=fs_strdup(res[n].c_str());
01334     }
01335     all[res.size()]=nullptr;
01336     return all;
01337 }
01338 static void cloudx1_custom_getall_free(fs_char** all, void* userdata) {
01339     if (!all) return;
01340     for (fs_char** one=all;*one;one++) {
01341         free(*one);
01342     }
01343     free(all);
01344 }
01345 static int cloudx1_custom_remove(const fs_char *filename, void* userdata) {
01346     sound4::cloudx1::dyn::CPresetLoader
01347     *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01348     auto res=preset_loader->Remove(filename);
01349     return res?0:-1;
01350 }
01351 static int cloudx1_custom_rename(const fs_char *from, const fs_char *to, void* userdata) {
01352     sound4::cloudx1::dyn::CPresetLoader
01353     *preset_loader=reinterpret_cast<sound4::cloudx1::dyn::CPresetLoader*>(userdata);
01354     auto res=preset_loader->Rename(from,to);
01355     return res?0:-1;
01356 }
01357 }
01358 };

```


Index

- ~CClient
 - sound4::cloudx1::CInstance::CClient, [78](#)
 - sound4::cloudx1::dyn::CInstance::CClient, [80](#)
- ~CDynLoader
 - sound4::cloudx1::dyn::helper::CDynLoader, [94](#)
- ~CInstance
 - sound4::cloudx1::CInstance, [98](#)
 - sound4::cloudx1::dyn::CInstance, [108](#)
- ~CPresetLoader
 - sound4::cloudx1::CPresetLoader, [118](#)
 - sound4::cloudx1::dyn::CPresetLoader, [120](#)
- ~MyPresetManager
 - MyPresetManager, [124](#)
- AddAudio
 - sound4::cloudx1::CInstance, [98](#)
 - sound4::cloudx1::dyn::CDynLib, [83](#)
 - sound4::cloudx1::dyn::CInstance, [108](#)
- AddPadAudio
 - sound4::cloudx1::dyn::CDynLib, [83](#)
- Audio convert helpers, [48](#)
 - cloudx1_AudioConvertFrom, [48](#)
 - cloudx1_AudioConvertTo, [49](#)
 - cloudx1_AudioMonoFromLiveStereo, [49](#)
 - cloudx1_AudioMonoToLiveStereo, [50](#)
 - cloudx1_MonoToStereo, [50](#)
 - cloudx1_MonoToStereo_Planar, [50](#)
 - cloudx1_StereoToMono, [51](#)
 - cloudx1_StereoToMono_Planar, [51](#)
- Audio managing (any audio), [43](#)
 - cloudx1_AddAudio, [44](#)
 - cloudx1_AddPadAudio, [44](#)
 - cloudx1_GetAudio, [45](#)
 - cloudx1_GetBytesFromFormat, [45](#)
 - cloudx1_GetFormatFromName, [46](#)
 - cloudx1_GetFormatName, [46](#)
 - cloudx1_GetMaxPacketFrame, [46](#)
 - cloudx1_GetOutputCount, [48](#)
 - cloudx1_SampleFormat, [43](#)
 - F32_BE, [44](#)
 - F32_LE, [44](#)
 - F32_NATIVE, [44](#)
 - INVALID_FORMAT, [44](#)
 - S16_BE, [44](#)
 - S16_LE, [44](#)
 - S16_NATIVE, [44](#)
 - S24_BE, [44](#)
 - S24_LE, [44](#)
 - S24_NATIVE, [44](#)
 - S32_BE, [44](#)
 - S32_LE, [44](#)
 - S32_NATIVE, [44](#)
- AudioConvertFrom
 - sound4::cloudx1::dyn::CDynLib, [83](#)
- AudioConvertTo
 - sound4::cloudx1::dyn::CDynLib, [84](#)
- AudioMonoFromLiveStereo
 - sound4::cloudx1::dyn::CDynLib, [84](#)
- AudioMonoToLiveStereo
 - sound4::cloudx1::dyn::CDynLib, [84](#)
- CClient
 - sound4::cloudx1::CInstance::CClient, [77](#)
 - sound4::cloudx1::dyn::CInstance::CClient, [79](#)
- CDynLib
 - sound4::cloudx1::dyn::CDynLib, [82](#)
- CDynLoader
 - sound4::cloudx1::dyn::helper::CDynLoader, [94](#)
- change_kind_created
 - Custom preset management, [35](#)
- change_kind_deleted
 - Custom preset management, [35](#)
- change_kind_modified
 - Custom preset management, [35](#)
- CHANNEL_COUNT
 - sound4.x1.cloud-pipe.cpp, [142](#)
- CHUNK_SIZE
 - sound4.x1.cloud-pipe.cpp, [143](#)
- ChunkFrames
 - sound4::cloudx1, [71](#)
 - sound4::cloudx1::dyn, [74](#)
- CInstance
 - sound4::cloudx1::CInstance, [97](#), [98](#)
 - sound4::cloudx1::dyn::CInstance, [108](#)
- Client's JSON config interfacing, [52](#)
 - cloudx1_DeleteClient, [52](#)
 - cloudx1_FreeJsonAnswer, [53](#)
 - cloudx1_NewClient, [53](#)
 - cloudx1_ProcessJson, [53](#)
 - cloudx1_SaveState, [54](#)
- Close
 - sound4::cloudx1::dyn::helper::CDynLoader, [95](#)
- cloudx1_AddAudio
 - Audio managing (any audio), [44](#)
- cloudx1_AddPadAudio
 - Audio managing (any audio), [44](#)
- CLOUDX1_AUDIO_INPUT_COUNT
 - Global setup, [19](#)
- CLOUDX1_AUDIO_OUTPUT_COUNT
 - Global setup, [19](#)

- cloudx1_AudioConvertFrom
 - Audio convert helpers, [48](#)
- cloudx1_AudioConvertTo
 - Audio convert helpers, [49](#)
- CLOUDX1_AUDIOFRAME_COUNT
 - Global setup, [19](#)
- cloudx1_AudioMonoFromLiveStereo
 - Audio convert helpers, [49](#)
- cloudx1_AudioMonoToLiveStereo
 - Audio convert helpers, [50](#)
- cloudx1_CClientInstance, [116](#)
- CLOUDX1_CHANNEL_COUNT
 - Global setup, [19](#)
- cloudx1_CInstance, [117](#)
- cloudx1_CParameters, [117](#)
- CLOUDX1_DECL
 - sound4.x1.cloud.h, [150](#)
- cloudx1_DeleteClient
 - Client's JSON config interfacing, [52](#)
- cloudx1_ExitProcess
 - Process creation/destruction, [24](#)
- cloudx1_FreeJsonAnswer
 - Client's JSON config interfacing, [53](#)
- cloudx1_FreeMetadataInfos
 - Metadata Management, [37](#)
- cloudx1_FreeParameters
 - Process creation/destruction, [25](#)
- cloudx1_FreeParameterValue
 - Process creation/destruction, [25](#)
- cloudx1_GetAudio
 - Audio managing (any audio), [45](#)
- cloudx1_GetAudioInputCount
 - Global setup, [21](#)
- cloudx1_GetAudioOutputCount
 - Global setup, [21](#)
- cloudx1_GetBufferIn
 - Direct processing, [40](#)
- cloudx1_GetBufferOut
 - Direct processing, [41](#)
- cloudx1_GetBytesFromFormat
 - Audio managing (any audio), [45](#)
- cloudx1_GetChannelCount
 - Global setup, [21](#)
- cloudx1_GetChunkSizeInFrames
 - Global setup, [22](#)
- cloudx1_GetEstimatedDelay
 - Direct processing, [41](#)
- cloudx1_GetFormatFromName
 - Audio managing (any audio), [46](#)
- cloudx1_GetFormatName
 - Audio managing (any audio), [46](#)
- cloudx1_GetMaxPacketFrame
 - Audio managing (any audio), [46](#)
- cloudx1_GetMetadataInfos
 - Metadata Management, [37](#)
- cloudx1_GetOutputCount
 - Audio managing (any audio), [48](#)
- cloudx1_GetParameter
 - Process creation/destruction, [25](#)
- cloudx1_GetPossibleChunkSizeInFrames
 - Global setup, [22](#)
- cloudx1_GetProcessChunkFrames
 - Process creation/destruction, [25](#)
- cloudx1_GetSampleRate
 - Global setup, [22](#)
- cloudx1_GetVersion
 - Global setup, [23](#)
- CLOUDX1_HAS_CLOUDBUS
 - sound4.x1.cloud.h, [150](#)
- CLOUDX1_HAS_WEBSERVER
 - sound4.x1.cloud.h, [150](#)
- cloudx1_InitProcess
 - Process creation/destruction, [26](#)
- cloudx1_InitProcess2
 - Process creation/destruction, [26](#)
- cloudx1_InitProcess3
 - Process creation/destruction, [26](#)
- cloudx1_loggerfn
 - Global setup, [20](#)
- cloudx1_LogSeverity
 - Global setup, [20](#)
- cloudx1_MonoToStereo
 - Audio convert helpers, [50](#)
- cloudx1_MonoToStereo_Planar
 - Audio convert helpers, [50](#)
- cloudx1_NewClient
 - Client's JSON config interfacing, [53](#)
- cloudx1_NewParameters
 - Process creation/destruction, [28](#)
- cloudx1_PresetChange_Kind
 - Custom preset management, [35](#)
- cloudx1_PresetManager_InformChange
 - Custom preset management, [35](#)
- cloudx1_ProcessAudio
 - Direct processing, [41](#)
- cloudx1_ProcessAudio_Planar
 - Direct processing, [42](#)
- cloudx1_ProcessJson
 - Client's JSON config interfacing, [53](#)
- CLOUDX1_SAMPLE_RATE
 - Global setup, [20](#)
- cloudx1_SampleFormat
 - Audio managing (any audio), [43](#)
- cloudx1_SaveState
 - Client's JSON config interfacing, [54](#)
- cloudx1_SetLoggerCallback
 - Global setup, [23](#)
- cloudx1_SetLogSeverity
 - Global setup, [23](#)
- cloudx1_SetMetadata
 - Metadata Management, [38](#)
- cloudx1_SetMetadataMulti
 - Metadata Management, [38](#)
- cloudx1_SetParameter
 - Process creation/destruction, [28](#)
- cloudx1_SetPresetManager

- Custom preset management, 36
- cloudx1_StartUpdateThread
 - Update Management, 39
- cloudx1_StereoToMono
 - Audio convert helpers, 51
- cloudx1_StereoToMono_Planar
 - Audio convert helpers, 51
- cloudx1_StopUpdateThread
 - Update Management, 39
- cloudx1_storage_exists
 - Custom preset management, 30
- cloudx1_storage_getall
 - Custom preset management, 30
- cloudx1_storage_getall_free
 - Custom preset management, 32
- cloudx1_storage_reader
 - Custom preset management, 32
- cloudx1_storage_reader_free
 - Custom preset management, 32
- cloudx1_storage_remove
 - Custom preset management, 34
- cloudx1_storage_rename
 - Custom preset management, 34
- cloudx1_storage_writer
 - Custom preset management, 34
- cloudx1_TerminateProcess
 - Process creation/destruction, 28
- cloudx1_WaitUpdateThreadReady
 - Update Management, 40
- cloudx1_Webserver
 - Web server, 62
- cloudx1_Webserver_Status
 - Web server, 63
- cloudx1_Webserver_Stop
 - Web server, 63
- cloudx1_Webserver_tcp
 - Web server, 64
- cloudx1_Webserver_tcp2
 - Web server, 64
- CPresetLoader
 - sound4::cloudx1::CPresetLoader, 118
 - sound4::cloudx1::dyn::CPresetLoader, 120
- Create
 - sound4::cloudx1::CInstance, 98
 - sound4::cloudx1::dyn::CInstance, 108
- Custom preset management, 29
 - change_kind_created, 35
 - change_kind_deleted, 35
 - change_kind_modified, 35
 - cloudx1_PresetChange_Kind, 35
 - cloudx1_PresetManager_InformChange, 35
 - cloudx1_SetPresetManager, 36
 - cloudx1_storage_exists, 30
 - cloudx1_storage_getall, 30
 - cloudx1_storage_getall_free, 32
 - cloudx1_storage_reader, 32
 - cloudx1_storage_reader_free, 32
 - cloudx1_storage_remove, 34
 - cloudx1_storage_rename, 34
 - cloudx1_storage_writer, 34
 - fs_char, 35
- DeleteClient
 - sound4::cloudx1::dyn::CDynLib, 84
- Direct processing, 40
 - cloudx1_GetBufferIn, 40
 - cloudx1_GetBufferOut, 41
 - cloudx1_GetEstimatedDelay, 41
 - cloudx1_ProcessAudio, 41
 - cloudx1_ProcessAudio_Planar, 42
- dyn, 69
- DynFunc_t
 - sound4::cloudx1::dyn::helper, 75
- DynFuncHolder
 - sound4::cloudx1::dyn::helper::DynFuncHolder< T >, 122
- DynLib_t
 - sound4::cloudx1::dyn::helper, 75
- Environment variables and parameters, 17
- error
 - Global setup, 21
- Exists
 - MyPresetManager, 124
 - sound4::cloudx1::CPresetLoader, 118
 - sound4::cloudx1::dyn::CPresetLoader, 120
- ExitProcess
 - sound4::cloudx1::dyn::CDynLib, 84
- F32_BE
 - Audio managing (any audio), 44
- F32_LE
 - Audio managing (any audio), 44
- F32_NATIVE
 - Audio managing (any audio), 44
- fatal
 - Global setup, 21
- format
 - sound4::cloudx1::dyn::helper::SampleFormat< float >, 127
 - sound4::cloudx1::dyn::helper::SampleFormat< int16_t >, 129
 - sound4::cloudx1::dyn::helper::SampleFormat< int32_t >, 130
 - sound4::cloudx1::helper::SampleFormat< float >, 128
 - sound4::cloudx1::helper::SampleFormat< int16_t >, 129
 - sound4::cloudx1::helper::SampleFormat< int32_t >, 131
- FreeJsonAnswer
 - sound4::cloudx1::dyn::CDynLib, 84
- FreeMetadataInfos
 - sound4::cloudx1::dyn::CDynLib, 85
- FreeParameters
 - sound4::cloudx1::dyn::CDynLib, 85
- FreeParameterValue

- sound4::cloudx1::dyn::CDynLib, [85](#)
- fs_char
 - Custom preset management, [35](#)
- fs_strdup
 - sound4.x1.cloud.hpp, [155](#)
 - sound4.x1.cloud_dyn.hpp, [164](#)
- GetAll
 - MyPresetManager, [124](#)
 - sound4::cloudx1::CPresetLoader, [118](#)
 - sound4::cloudx1::dyn::CPresetLoader, [121](#)
- GetAudio
 - sound4::cloudx1::CInstance, [99](#)
 - sound4::cloudx1::dyn::CDynLib, [85](#)
 - sound4::cloudx1::dyn::CInstance, [109](#)
- GetAudioInputCount
 - sound4::cloudx1::dyn::CDynLib, [85](#)
- GetAudioOutputCount
 - sound4::cloudx1::dyn::CDynLib, [85](#)
- GetBufferIn
 - sound4::cloudx1::CInstance, [99](#)
 - sound4::cloudx1::dyn::CDynLib, [86](#)
 - sound4::cloudx1::dyn::CInstance, [109](#)
- GetBufferOut
 - sound4::cloudx1::CInstance, [99](#)
 - sound4::cloudx1::dyn::CDynLib, [86](#)
 - sound4::cloudx1::dyn::CInstance, [109](#)
- GetBytesFromFormat
 - sound4::cloudx1::dyn::CDynLib, [86](#)
- GetChannelCount
 - sound4::cloudx1::dyn::CDynLib, [86](#)
- GetChunkFrames
 - sound4::cloudx1::CInstance, [100](#)
 - sound4::cloudx1::dyn::CInstance, [110](#)
- GetChunkSizeInFrames
 - sound4::cloudx1::dyn::CDynLib, [86](#)
- GetEnv
 - sound4.x1.cloud-pipe-cxx.cpp, [133](#)
 - sound4.x1.cloud-pipe-dyn.cpp, [137](#)
- GetEstimatedDelay
 - sound4::cloudx1::CInstance, [100](#)
 - sound4::cloudx1::dyn::CDynLib, [86](#)
 - sound4::cloudx1::dyn::CInstance, [110](#)
- GetFormatFromName
 - sound4::cloudx1::dyn::CDynLib, [87](#)
- GetFormatName
 - sound4::cloudx1::dyn::CDynLib, [87](#)
- GetMaxPacketFrame
 - sound4::cloudx1::dyn::CDynLib, [87](#)
- GetMetadataInfos
 - sound4::cloudx1::CInstance, [100](#)
 - sound4::cloudx1::dyn::CDynLib, [87](#)
 - sound4::cloudx1::dyn::CInstance, [110](#)
- GetOutputCount
 - sound4::cloudx1::dyn::CDynLib, [87](#)
- GetParam
 - sound4::cloudx1::CInstance, [101](#)
 - sound4::cloudx1::dyn::CInstance, [111](#)
- GetParameter
 - sound4::cloudx1::dyn::CDynLib, [87](#)
- GetPossibleChunkSizeInFrames
 - sound4::cloudx1::dyn::CDynLib, [88](#)
- GetProcessChunkFrames
 - sound4::cloudx1::dyn::CDynLib, [88](#)
- GetSampleRate
 - sound4::cloudx1::dyn::CDynLib, [88](#)
- GetSymbol
 - sound4::cloudx1::dyn::helper::CDynLoader, [95](#)
- GetSymbol_safe
 - sound4::cloudx1::dyn::helper::CDynLoader, [95](#)
- GetThisLibraryPath
 - sound4::cloudx1::dyn::helper::CDynLoader, [95](#)
- GetVersion
 - sound4::cloudx1::dyn::CDynLib, [88](#)
- Global setup, [18](#)
 - CLOUDX1_AUDIO_INPUT_COUNT, [19](#)
 - CLOUDX1_AUDIO_OUTPUT_COUNT, [19](#)
 - CLOUDX1_AUDIOFRAME_COUNT, [19](#)
 - CLOUDX1_CHANNEL_COUNT, [19](#)
 - cloudx1_GetAudioInputCount, [21](#)
 - cloudx1_GetAudioOutputCount, [21](#)
 - cloudx1_GetChannelCount, [21](#)
 - cloudx1_GetChunkSizeInFrames, [22](#)
 - cloudx1_GetPossibleChunkSizeInFrames, [22](#)
 - cloudx1_GetSampleRate, [22](#)
 - cloudx1_GetVersion, [23](#)
 - cloudx1_loggerfn, [20](#)
 - cloudx1_LogSeverity, [20](#)
 - CLOUDX1_SAMPLE_RATE, [20](#)
 - cloudx1_SetLoggerCallback, [23](#)
 - cloudx1_SetLogSeverity, [23](#)
 - error, [21](#)
 - fatal, [21](#)
 - info, [21](#)
 - none, [21](#)
 - verbose, [21](#)
 - verbose2, [21](#)
 - verbose3, [21](#)
 - verbose4, [21](#)
 - verbose5, [21](#)
 - warning, [21](#)
- info
 - Global setup, [21](#)
- InitProcess
 - sound4::cloudx1::dyn::CDynLib, [88](#)
- InitProcess2
 - sound4::cloudx1::dyn::CDynLib, [88](#)
- InitProcess3
 - sound4::cloudx1::dyn::CDynLib, [89](#)
- InputChannels
 - sound4::cloudx1, [71](#)
 - sound4::cloudx1::dyn, [74](#)
- InputSampleSize
 - sound4::cloudx1, [71](#)
 - sound4::cloudx1::dyn, [74](#)
- INVALID_FORMAT
 - Audio managing (any audio), [44](#)

- IsOk
 - sound4::cloudx1::CInstance, [101](#)
 - sound4::cloudx1::dyn::CDynLib, [82](#)
 - sound4::cloudx1::dyn::CInstance, [111](#)
 - sound4::cloudx1::dyn::helper::CDynLoader, [95](#)
 - sound4::cloudx1::dyn::helper::DynFuncHolder< T >, [123](#)
- IsReadOnly
 - MyPresetManager, [125](#)
 - sound4::cloudx1::CPresetLoader, [119](#)
 - sound4::cloudx1::dyn::CPresetLoader, [121](#)
- JSON syntax, [54](#)
- JSON syntax for internal setup, [58](#)
- Load
 - sound4::cloudx1::dyn::CDynLib, [83](#)
 - sound4::cloudx1::dyn::helper::CDynLoader, [96](#)
- log_cb_t
 - sound4::cloudx1, [70](#)
 - sound4::cloudx1::dyn, [73](#)
- LogSeverity
 - sound4::cloudx1, [70](#)
 - sound4::cloudx1::dyn, [73](#)
- main
 - sound4.x1.cloud-pipe-cxx.cpp, [133](#)
 - sound4.x1.cloud-pipe-dyn.cpp, [137](#)
 - sound4.x1.cloud-pipe.cpp, [143](#)
- Metadata Management, [37](#)
 - cloudx1_FreeMetadataInfos, [37](#)
 - cloudx1_GetMetadataInfos, [37](#)
 - cloudx1_SetMetadata, [38](#)
 - cloudx1_SetMetadataMulti, [38](#)
- MonoToStereo
 - sound4::cloudx1::dyn::CDynLib, [89](#)
- MonoToStereo_Planar
 - sound4::cloudx1::dyn::CDynLib, [89](#)
- MyLogger
 - sound4.x1.cloud-pipe-cxx.cpp, [134](#)
 - sound4.x1.cloud-pipe-dyn.cpp, [138](#)
 - sound4.x1.cloud-pipe.cpp, [143](#)
- MyPresetManager, [123](#)
 - ~MyPresetManager, [124](#)
 - Exists, [124](#)
 - GetAll, [124](#)
 - IsReadOnly, [125](#)
 - MyPresetManager, [124](#)
 - Read, [125](#)
 - Remove, [125](#)
 - Rename, [125](#)
 - SetupPath, [125](#)
 - Write, [126](#)
- NewClient
 - sound4::cloudx1::CInstance, [101](#)
 - sound4::cloudx1::dyn::CDynLib, [89](#)
 - sound4::cloudx1::dyn::CInstance, [111](#)
- NewParameters
 - sound4::cloudx1::dyn::CDynLib, [89](#)
- none
 - Global setup, [21](#)
- OnUpdateThreadStart
 - sound4::cloudx1::CInstance, [101](#)
 - sound4::cloudx1::dyn::CInstance, [111](#)
- OnUpdateThreadStop
 - sound4::cloudx1::CInstance, [102](#)
 - sound4::cloudx1::dyn::CInstance, [112](#)
- operator bool
 - sound4::cloudx1::dyn::helper::CDynLoader, [96](#)
 - sound4::cloudx1::dyn::helper::DynFuncHolder< T >, [123](#)
- operator T*
 - sound4::cloudx1::dyn::helper::DynFuncHolder< T >, [123](#)
- operator=
 - sound4::cloudx1::CInstance, [102](#)
 - sound4::cloudx1::CInstance::CClient, [78](#)
 - sound4::cloudx1::dyn::CInstance, [112](#)
 - sound4::cloudx1::dyn::CInstance::CClient, [80](#)
 - sound4::cloudx1::dyn::helper::CDynLoader, [96](#)
- OutputChannels
 - sound4::cloudx1, [71](#)
 - sound4::cloudx1::dyn, [74](#)
- OutputSampleSize
 - sound4::cloudx1, [72](#)
 - sound4::cloudx1::dyn, [74](#)
- PresetChange_Kind
 - sound4::cloudx1, [70](#)
 - sound4::cloudx1::dyn, [73](#)
- PresetManager_InformChange
 - sound4::cloudx1::CInstance, [102](#)
 - sound4::cloudx1::dyn::CDynLib, [89](#)
 - sound4::cloudx1::dyn::CInstance, [112](#)
- Process creation/destruction, [24](#)
 - cloudx1_ExitProcess, [24](#)
 - cloudx1_FreeParameters, [25](#)
 - cloudx1_FreeParameterValue, [25](#)
 - cloudx1_GetParameter, [25](#)
 - cloudx1_GetProcessChunkFrames, [25](#)
 - cloudx1_InitProcess, [26](#)
 - cloudx1_InitProcess2, [26](#)
 - cloudx1_InitProcess3, [26](#)
 - cloudx1_NewParameters, [28](#)
 - cloudx1_SetParameter, [28](#)
 - cloudx1_TerminateProcess, [28](#)
- ProcessAnyAudio
 - sound4::cloudx1::CInstance, [102](#)
 - sound4::cloudx1::dyn::CInstance, [112](#)
- ProcessAudio
 - sound4::cloudx1::CInstance, [103](#)
 - sound4::cloudx1::dyn::CDynLib, [90](#)
 - sound4::cloudx1::dyn::CInstance, [113](#)
- ProcessAudio_Planar
 - sound4::cloudx1::CInstance, [103](#)
 - sound4::cloudx1::dyn::CDynLib, [90](#)

- sound4::cloudx1::dyn::CInstance, 113
- ProcessJson
 - sound4::cloudx1::CInstance::CClient, 78
 - sound4::cloudx1::dyn::CDynLib, 90
 - sound4::cloudx1::dyn::CInstance::CClient, 80
- ProcessLoop
 - sound4.x1.cloud-pipe-cxx.cpp, 134
 - sound4.x1.cloud-pipe-dyn.cpp, 138
 - sound4.x1.cloud-pipe.cpp, 144
- Read
 - MyPresetManager, 125
 - sound4::cloudx1::CPresetLoader, 119
 - sound4::cloudx1::dyn::CPresetLoader, 121
- Remove
 - MyPresetManager, 125
 - sound4::cloudx1::CPresetLoader, 119
 - sound4::cloudx1::dyn::CPresetLoader, 121
- Rename
 - MyPresetManager, 125
 - sound4::cloudx1::CPresetLoader, 119
 - sound4::cloudx1::dyn::CPresetLoader, 121
- S16_BE
 - Audio managing (any audio), 44
- S16_LE
 - Audio managing (any audio), 44
- S16_NATIVE
 - Audio managing (any audio), 44
- S24_BE
 - Audio managing (any audio), 44
- S24_LE
 - Audio managing (any audio), 44
- S24_NATIVE
 - Audio managing (any audio), 44
- S32_BE
 - Audio managing (any audio), 44
- S32_LE
 - Audio managing (any audio), 44
- S32_NATIVE
 - Audio managing (any audio), 44
- Sample using C interface, 15
- Sample using C++ interface wrapper, 65
- Sample using C++ interface wrapper with dynamic library loading, 66
- SAMPLE_RATE
 - sound4.x1.cloud-pipe.cpp, 143
- SampleFormat
 - sound4::cloudx1, 71
 - sound4::cloudx1::dyn, 73
- SampleRate
 - sound4::cloudx1, 72
 - sound4::cloudx1::dyn, 74
- SaveState
 - sound4::cloudx1::dyn::CDynLib, 90
- SetLoggerCallback
 - sound4::cloudx1::dyn::CDynLib, 90
- SetLogSeverity
 - sound4::cloudx1::dyn::CDynLib, 90
- SetMetadata
 - sound4::cloudx1::CInstance, 104
 - sound4::cloudx1::dyn::CDynLib, 91
 - sound4::cloudx1::dyn::CInstance, 114
- SetMetadataMulti
 - sound4::cloudx1::CInstance, 104
 - sound4::cloudx1::dyn::CDynLib, 91
 - sound4::cloudx1::dyn::CInstance, 114
- SetParam
 - sound4::cloudx1::CInstance, 104
 - sound4::cloudx1::dyn::CInstance, 114
- SetParameter
 - sound4::cloudx1::dyn::CDynLib, 91
- SetPresetManager
 - sound4::cloudx1::CInstance, 105
 - sound4::cloudx1::dyn::CDynLib, 91
 - sound4::cloudx1::dyn::CInstance, 115
- SetupPath
 - MyPresetManager, 125
- sound4, 69
- sound4.x1.cloud-pipe-cxx.cpp, 133, 135
 - GetEnv, 133
 - main, 133
 - MyLogger, 134
 - ProcessLoop, 134
 - Usage, 134
- sound4.x1.cloud-pipe-dyn.cpp, 136, 139
 - GetEnv, 137
 - main, 137
 - MyLogger, 138
 - ProcessLoop, 138
 - Usage, 138
- sound4.x1.cloud-pipe.cpp, 142, 144
 - CHANNEL_COUNT, 142
 - CHUNK_SIZE, 143
 - main, 143
 - MyLogger, 143
 - ProcessLoop, 144
 - SAMPLE_RATE, 143
 - Usage, 144
- sound4.x1.cloud.h, 147, 150
 - CLOUDX1_DECL, 150
 - CLOUDX1_HAS_CLOUDBUS, 150
 - CLOUDX1_HAS_WEBSERVER, 150
- sound4.x1.cloud.hpp, 154, 156
 - fs_strdup, 155
- sound4.x1.cloud_dyn.hpp, 163, 165
 - fs_strdup, 164
- sound4::cloudx1, 69
 - ChunkFrames, 71
 - InputChannels, 71
 - InputSampleSize, 71
 - log_cb_t, 70
 - LogSeverity, 70
 - OutputChannels, 71
 - OutputSampleSize, 72
 - PresetChange_Kind, 70
 - SampleFormat, 71

- SampleRate, [72](#)
- sound4::cloudx1::CInstance, [96](#)
 - ~CInstance, [98](#)
 - AddAudio, [98](#)
 - CInstance, [97](#), [98](#)
 - Create, [98](#)
 - GetAudio, [99](#)
 - GetBufferIn, [99](#)
 - GetBufferOut, [99](#)
 - GetChunkFrames, [100](#)
 - GetEstimatedDelay, [100](#)
 - GetMetadataInfos, [100](#)
 - GetParam, [101](#)
 - IsOk, [101](#)
 - NewClient, [101](#)
 - OnUpdateThreadStart, [101](#)
 - OnUpdateThreadStop, [102](#)
 - operator=, [102](#)
 - PresetManager_InformChange, [102](#)
 - ProcessAnyAudio, [102](#)
 - ProcessAudio, [103](#)
 - ProcessAudio_Planar, [103](#)
 - SetMetadata, [104](#)
 - SetMetadataMulti, [104](#)
 - SetParam, [104](#)
 - SetPresetManager, [105](#)
 - StartWebServer, [105](#)
 - Stop, [105](#)
 - StopWebServer, [106](#)
 - Terminate, [106](#)
- sound4::cloudx1::CInstance::CClient, [77](#)
 - ~CClient, [78](#)
 - CClient, [77](#)
 - operator=, [78](#)
 - ProcessJson, [78](#)
- sound4::cloudx1::CPresetLoader, [117](#)
 - ~CPresetLoader, [118](#)
 - CPresetLoader, [118](#)
 - Exists, [118](#)
 - GetAll, [118](#)
 - IsReadOnly, [119](#)
 - Read, [119](#)
 - Remove, [119](#)
 - Rename, [119](#)
 - Write, [119](#)
- sound4::cloudx1::dyn, [72](#)
 - ChunkFrames, [74](#)
 - InputChannels, [74](#)
 - InputSampleSize, [74](#)
 - log_cb_t, [73](#)
 - LogSeverity, [73](#)
 - OutputChannels, [74](#)
 - OutputSampleSize, [74](#)
 - PresetChange_Kind, [73](#)
 - SampleFormat, [73](#)
 - SampleRate, [74](#)
- sound4::cloudx1::dyn::CDynLib, [81](#)
 - AddAudio, [83](#)
 - AddPadAudio, [83](#)
 - AudioConvertFrom, [83](#)
 - AudioConvertTo, [84](#)
 - AudioMonoFromLiveStereo, [84](#)
 - AudioMonoToLiveStereo, [84](#)
 - CDynLib, [82](#)
 - DeleteClient, [84](#)
 - ExitProcess, [84](#)
 - FreeJsonAnswer, [84](#)
 - FreeMetadataInfos, [85](#)
 - FreeParameters, [85](#)
 - FreeParameterValue, [85](#)
 - GetAudio, [85](#)
 - GetAudioInputCount, [85](#)
 - GetAudioOutputCount, [85](#)
 - GetBufferIn, [86](#)
 - GetBufferOut, [86](#)
 - GetBytesFromFormat, [86](#)
 - GetChannelCount, [86](#)
 - GetChunkSizeInFrames, [86](#)
 - GetEstimatedDelay, [86](#)
 - GetFormatFromName, [87](#)
 - GetFormatName, [87](#)
 - GetMaxPacketFrame, [87](#)
 - GetMetadataInfos, [87](#)
 - GetOutputCount, [87](#)
 - GetParameter, [87](#)
 - GetPossibleChunkSizeInFrames, [88](#)
 - GetProcessChunkFrames, [88](#)
 - GetSampleRate, [88](#)
 - GetVersion, [88](#)
 - InitProcess, [88](#)
 - InitProcess2, [88](#)
 - InitProcess3, [89](#)
 - IsOk, [82](#)
 - Load, [83](#)
 - MonoToStereo, [89](#)
 - MonoToStereo_Planar, [89](#)
 - NewClient, [89](#)
 - NewParameters, [89](#)
 - PresetManager_InformChange, [89](#)
 - ProcessAudio, [90](#)
 - ProcessAudio_Planar, [90](#)
 - ProcessJson, [90](#)
 - SaveState, [90](#)
 - SetLoggerCallback, [90](#)
 - SetLogSeverity, [90](#)
 - SetMetadata, [91](#)
 - SetMetadataMulti, [91](#)
 - SetParameter, [91](#)
 - SetPresetManager, [91](#)
 - StartUpdateThread, [91](#)
 - StereoToMono, [91](#)
 - StereoToMono_Planar, [92](#)
 - StopUpdateThread, [92](#)
 - TerminateProcess, [92](#)
 - WaitUpdateThreadReady, [92](#)
 - Webserver, [92](#)

- Webserver_Status, 92
- Webserver_Stop, 93
- Webserver_tcp, 93
- Webserver_tcp2, 93
- sound4::cloudx1::dyn::CInstance, 106
 - ~CInstance, 108
 - AddAudio, 108
 - CInstance, 108
 - Create, 108
 - GetAudio, 109
 - GetBufferIn, 109
 - GetBufferOut, 109
 - GetChunkFrames, 110
 - GetEstimatedDelay, 110
 - GetMetadataInfos, 110
 - GetParam, 111
 - IsOk, 111
 - NewClient, 111
 - OnUpdateThreadStart, 111
 - OnUpdateThreadStop, 112
 - operator=, 112
 - PresetManager_InformChange, 112
 - ProcessAnyAudio, 112
 - ProcessAudio, 113
 - ProcessAudio_Planar, 113
 - SetMetadata, 114
 - SetMetadataMulti, 114
 - SetParam, 114
 - SetPresetManager, 115
 - StartWebServer, 115
 - Stop, 115
 - StopWebServer, 116
 - Terminate, 116
- sound4::cloudx1::dyn::CInstance::CClient, 79
 - ~CClient, 80
 - CClient, 79
 - operator=, 80
 - ProcessJson, 80
- sound4::cloudx1::dyn::CPresetLoader, 120
 - ~CPresetLoader, 120
 - CPresetLoader, 120
 - Exists, 120
 - GetAll, 121
 - IsReadOnly, 121
 - Read, 121
 - Remove, 121
 - Rename, 121
 - Write, 121
- sound4::cloudx1::dyn::helper, 75
 - DynFunc_t, 75
 - DynLib_t, 75
- sound4::cloudx1::dyn::helper::CDynLoader, 93
 - ~CDynLoader, 94
 - CDynLoader, 94
 - Close, 95
 - GetSymbol, 95
 - GetSymbol_safe, 95
 - GetThisLibraryPath, 95
 - IsOk, 95
 - Load, 96
 - operator bool, 96
 - operator=, 96
- sound4::cloudx1::dyn::helper::DynFuncHolder< T >, 122
 - DynFuncHolder, 122
 - IsOk, 123
 - operator bool, 123
 - operator T*, 123
- sound4::cloudx1::dyn::helper::SampleFormat< float >, 127
 - format, 127
- sound4::cloudx1::dyn::helper::SampleFormat< int16_t >, 128
 - format, 129
- sound4::cloudx1::dyn::helper::SampleFormat< int32_t >, 130
 - format, 130
- sound4::cloudx1::dyn::helper::SampleFormat< T >, 126
 - format, 126
- sound4::cloudx1::helper, 76
- sound4::cloudx1::helper::SampleFormat< float >, 128
 - format, 128
- sound4::cloudx1::helper::SampleFormat< int16_t >, 129
 - format, 129
- sound4::cloudx1::helper::SampleFormat< int32_t >, 130
 - format, 131
- sound4::cloudx1::helper::SampleFormat< T >, 127
- SOUND4_INVALID_WEBSERVER_ID
 - Web server, 62
- SOUND4_WEBSERVER_HTTP_OK
 - Web server, 62
- SOUND4_WEBSERVER_HTTPS_OK
 - Web server, 62
- StartUpdateThread
 - sound4::cloudx1::dyn::CDynLib, 91
- StartWebServer
 - sound4::cloudx1::CInstance, 105
 - sound4::cloudx1::dyn::CInstance, 115
- std, 76
- StereoToMono
 - sound4::cloudx1::dyn::CDynLib, 91
- StereoToMono_Planar
 - sound4::cloudx1::dyn::CDynLib, 92
- Stop
 - sound4::cloudx1::CInstance, 105
 - sound4::cloudx1::dyn::CInstance, 115
- StopUpdateThread
 - sound4::cloudx1::dyn::CDynLib, 92
- StopWebServer
 - sound4::cloudx1::CInstance, 106
 - sound4::cloudx1::dyn::CInstance, 116
- Terminate
 - sound4::cloudx1::CInstance, 106
 - sound4::cloudx1::dyn::CInstance, 116

- TerminateProcess
 - sound4::cloudx1::dyn::CDynLib, [92](#)
- Update Management, [39](#)
 - cloudx1_StartUpdateThread, [39](#)
 - cloudx1_StopUpdateThread, [39](#)
 - cloudx1_WaitUpdateThreadReady, [40](#)
- Usage
 - sound4.x1.cloud-pipe-cxx.cpp, [134](#)
 - sound4.x1.cloud-pipe-dyn.cpp, [138](#)
 - sound4.x1.cloud-pipe.cpp, [144](#)
- verbose
 - Global setup, [21](#)
- verbose2
 - Global setup, [21](#)
- verbose3
 - Global setup, [21](#)
- verbose4
 - Global setup, [21](#)
- verbose5
 - Global setup, [21](#)
- WaitUpdateThreadReady
 - sound4::cloudx1::dyn::CDynLib, [92](#)
- warning
 - Global setup, [21](#)
- Web server, [61](#)
 - cloudx1_Webserver, [62](#)
 - cloudx1_Webserver_Status, [63](#)
 - cloudx1_Webserver_Stop, [63](#)
 - cloudx1_Webserver_tcp, [64](#)
 - cloudx1_Webserver_tcp2, [64](#)
 - SOUND4_INVALID_WEBSERVER_ID, [62](#)
 - SOUND4_WEBSERVER_HTTP_OK, [62](#)
 - SOUND4_WEBSERVER_HTTPS_OK, [62](#)
- Webserver
 - sound4::cloudx1::dyn::CDynLib, [92](#)
- Webserver_Status
 - sound4::cloudx1::dyn::CDynLib, [92](#)
- Webserver_Stop
 - sound4::cloudx1::dyn::CDynLib, [93](#)
- Webserver_tcp
 - sound4::cloudx1::dyn::CDynLib, [93](#)
- Webserver_tcp2
 - sound4::cloudx1::dyn::CDynLib, [93](#)
- Write
 - MyPresetManager, [126](#)
 - sound4::cloudx1::CPresetLoader, [119](#)
 - sound4::cloudx1::dyn::CPresetLoader, [121](#)