

OpenCTM

1.0.3

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Chapter 1

OpenCTM API Reference

1.1 Introduction

OpenCTM is an open file format for storing compressed triangle meshes. In order to easily read and write OpenCTM files (usually suffixed .ctm) an API (Application Program Interface) is provided that can easily be used from most modern programming languages.

The OpenCTM functionality itself is written in highly portable standard C (C99).

1.2 Usage

For information about how to use the OpenCTM API, see [openctm.h](#).

For information about the C++ wrapper classes, see [CTMImporter](#) and [CTMExporter](#).

1.3 Example usage

1.3.1 Loading a CTM file

Here is a simple example of loading a CTM file:

```
CTMcontext context;
CTMuint vertCount, triCount, * indices;
CTMfloat * vertices;

// Create a new context
context = ctmNewContext(CTM_IMPORT);

// Load the OpenCTM file
ctmLoad(context, "mymesh.ctm");
if(ctmGetError(context) == CTM_NONE)
{
    // Access the mesh data
    vertCount = ctmGetInteger(context, CTM_VERTEX_COUNT);
    vertices = ctmGetFloatArray(context, CTM_VERTICES);
    triCount = ctmGetInteger(context, CTM_TRIANGLE_COUNT);
    indices = ctmGetIntegerArray(context, CTM_INDICES);

    // Deal with the mesh (e.g. transcode it to our internal representation)
    // ...
}

// Free the context
ctmFreeContext(context);
```

1.3.2 Creating a CTM file

Here is a simple example of creating a CTM file:

```
CTMcontext context;
CTMuint    vertCount, triCount, * indices;
CTMfloat    * vertices;

// Create our mesh in memory
vertCount = 100;
triCount = 120;
vertices = (CTMfloat *) malloc(3 * sizeof(CTMfloat) * vertCount);
indices = (CTMuint *) malloc(3 * sizeof(CTMuint) * triCount);
// ...

// Create a new context
context = ctmNewContext(CTM_EXPORT);

// Define our mesh representation to OpenCTM (store references to it in
// the context)
ctmDefineMesh(context, vertices, vertCount, indices, triCount, NULL);

// Save the OpenCTM file
ctmSave(context, "mymesh.ctm");

// Free the context
ctmFreeContext(context);

// Free our mesh
free(indices);
free(vertices);
```


Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

CTMexporter	10
CTMimporter	14
std::exception	
ctm_error	9

Chapter 3

Class Index

3.1 Class List

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

ctm_error	OpenCTM exception	9
CTMexporter	OpenCTM exporter class	10
CTMimporter	OpenCTM importer class	14

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

openctm.h	19
openctmpp.h	41

Chapter 5

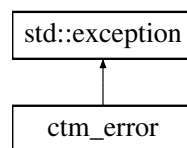
Class Documentation

5.1 `ctm_error` Class Reference

OpenCTM exception.

```
#include <openctmpp.h>
```

Inheritance diagram for `ctm_error`:



Public Member Functions

- `ctm_error` (`CTMenum aError`)
- virtual const char * `what` () const throw ()
- `CTMenum error_code` () const throw ()

5.1.1 Detailed Description

OpenCTM exception.

When an error occurs, a `ctm_error` exception is thrown. Its `what()` function returns the name of the OpenCTM error code (for instance "CTM_INVALID_OPERATION").

5.1.2 Constructor & Destructor Documentation

5.1.2.1 `ctm_error()`

```
ctm_error::ctm_error (  
    CTMenum aError) [inline], [explicit]
```

5.1.3 Member Function Documentation

5.1.3.1 error_code()

```
CTMenum ctm_error::error_code () const throw ( )    [inline]
```

5.1.3.2 what()

```
virtual const char * ctm_error::what () const throw ( )    [inline], [virtual]
```

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

- [openctmpp.h](#)

5.2 CTMexporter Class Reference

OpenCTM exporter class.

```
#include <openctmpp.h>
```

Public Member Functions

- [CTMexporter](#) ()
Constructor.
- [~CTMexporter](#) ()
Destructor.
- void [CompressionMethod](#) (CTMenum aMethod)
Wrapper for [ctmCompressionMethod\(\)](#)
- void [CompressionLevel](#) (CTMuint aLevel)
Wrapper for [ctmCompressionLevel\(\)](#)
- void [VertexPrecision](#) (CTMfloat aPrecision)
Wrapper for [ctmVertexPrecision\(\)](#)
- void [VertexPrecisionRel](#) (CTMfloat aRelPrecision)
Wrapper for [ctmVertexPrecisionRel\(\)](#)
- void [NormalPrecision](#) (CTMfloat aPrecision)
Wrapper for [ctmNormalPrecision\(\)](#)
- void [UVCoordPrecision](#) (CTMenum aUVMap, CTMfloat aPrecision)
Wrapper for [ctmUVCoordPrecision\(\)](#)
- void [AttribPrecision](#) (CTMenum aAttribMap, CTMfloat aPrecision)
Wrapper for [ctmAttribPrecision\(\)](#)
- void [FileComment](#) (const char *aFileComment)
Wrapper for [ctmFileComment\(\)](#)
- void [DefineMesh](#) (const CTMfloat *aVertices, CTMuint aVertexCount, const CTMuint *aIndices, CTMuint aTriangleCount, const CTMfloat *aNormals)
Wrapper for [ctmDefineMesh\(\)](#)
- CTMenum [AddUVMap](#) (const CTMfloat *aUVCoords, const char *aName, const char *aFileName)
Wrapper for [ctmAddUVMap\(\)](#)
- CTMenum [AddAttribMap](#) (const CTMfloat *aAttribValues, const char *aName)
Wrapper for [ctmAddAttribMap\(\)](#)
- void [Save](#) (const char *aFileName)
Wrapper for [ctmSave\(\)](#)
- void [SaveCustom](#) (CTMwritefn aWriteFn, void *aUserData)
Wrapper for [ctmSaveCustom\(\)](#)
- [CTMexporter](#) (const [CTMexporter](#) &v)
- [CTMexporter](#) & [operator=](#) (const [CTMexporter](#) &v)

5.2.1 Detailed Description

OpenCTM exporter class.

This is a C++ wrapper class for an OpenCTM export context. Usage example:

```
void MySaveFile(CTMuint aVertCount, CTMuint aTriCount, CTMfloat * aVertices,
CTMuint * aIndices, const char * aFileName)
{
    // Create a new OpenCTM exporter object
    CTMexporter ctm;

    // Define our mesh representation to OpenCTM (store references to it in
    // the context)
    ctm.DefineMesh(aVertices, aVertCount, aIndices, aTriCount, NULL);

    // Save the OpenCTM file
    ctm.Save(aFileName);
}
```

5.2.2 Constructor & Destructor Documentation

5.2.2.1 CTMexporter() [1/2]

```
CTMexporter::CTMexporter () [inline]
```

Constructor.

5.2.2.2 ~CTMexporter()

```
CTMexporter::~~CTMexporter () [inline]
```

Destructor.

5.2.2.3 CTMexporter() [2/2]

```
CTMexporter::CTMexporter (
    const CTMexporter & v)
```

5.2.3 Member Function Documentation

5.2.3.1 AddAttribMap()

```
CTMenum CTMexporter::AddAttribMap (
    const CTMfloat * aAttribValues,
    const char * aName) [inline]
```

Wrapper for [ctmAddAttribMap\(\)](#)

5.2.3.2 AddUVMap()

```
CTMenum CTMexporter::AddUVMap (
    const CTMfloat * aUVCoords,
    const char * aName,
    const char * aFileName) [inline]
```

Wrapper for [ctmAddUVMap\(\)](#)

5.2.3.3 AttribPrecision()

```
void CTMexporter::AttribPrecision (
    CTMenum aAttribMap,
    CTMfloat aPrecision) [inline]
```

Wrapper for [ctmAttribPrecision\(\)](#)

5.2.3.4 CompressionLevel()

```
void CTMexporter::CompressionLevel (
    CTMuint aLevel) [inline]
```

Wrapper for [ctmCompressionLevel\(\)](#)

5.2.3.5 CompressionMethod()

```
void CTMexporter::CompressionMethod (
    CTMenum aMethod) [inline]
```

Wrapper for [ctmCompressionMethod\(\)](#)

5.2.3.6 DefineMesh()

```
void CTMexporter::DefineMesh (
    const CTMfloat * aVertices,
    CTMuint aVertexCount,
    const CTMuint * aIndices,
    CTMuint aTriangleCount,
    const CTMfloat * aNormals) [inline]
```

Wrapper for [ctmDefineMesh\(\)](#)

5.2.3.7 FileComment()

```
void CTMexporter::FileComment (
    const char * aFileComment) [inline]
```

Wrapper for [ctmFileComment\(\)](#)

5.2.3.8 NormalPrecision()

```
void CTMexporter::NormalPrecision (
    CTMfloat aPrecision) [inline]
```

Wrapper for [ctmNormalPrecision\(\)](#)

5.2.3.9 operator=()

```
CTMexporter & CTMexporter::operator= (
    const CTMexporter & v)
```

5.2.3.10 Save()

```
void CTMexporter::Save (
    const char * aFileName) [inline]
```

Wrapper for [ctmSave\(\)](#)

5.2.3.11 SaveCustom()

```
void CTMexporter::SaveCustom (
    CTMwritefn aWriteFn,
    void * aUserData) [inline]
```

Wrapper for [ctmSaveCustom\(\)](#)

5.2.3.12 UVCoordPrecision()

```
void CTMexporter::UVCoordPrecision (
    CTMenum aUVMap,
    CTMfloat aPrecision) [inline]
```

Wrapper for [ctmUVCoordPrecision\(\)](#)

5.2.3.13 VertexPrecision()

```
void CTMexporter::VertexPrecision (
    CTMfloat aPrecision) [inline]
```

Wrapper for [ctmVertexPrecision\(\)](#)

5.2.3.14 VertexPrecisionRel()

```
void CTMexporter::VertexPrecisionRel (
    CTMfloat aRelPrecision) [inline]
```

Wrapper for [ctmVertexPrecisionRel\(\)](#)

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

- [openctmpp.h](#)

5.3 CTMImporter Class Reference

OpenCTM importer class.

```
#include <openctmpp.h>
```

Public Member Functions

- [CTMImporter](#) ()
Constructor.
- [~CTMImporter](#) ()
Destructor.
- [CTMuint GetInteger](#) (CTMenum aProperty)
Wrapper for [ctmGetInteger\(\)](#)
- [CTMfloat GetFloat](#) (CTMenum aProperty)
Wrapper for [ctmGetFloat\(\)](#)
- const [CTMuint](#) * [GetIntegerArray](#) (CTMenum aProperty)
Wrapper for [ctmGetIntegerArray\(\)](#)
- const [CTMfloat](#) * [GetFloatArray](#) (CTMenum aProperty)
Wrapper for [ctmGetFloatArray\(\)](#)
- [CTMenum GetNamedUVMap](#) (const char *aName)
Wrapper for [ctmGetNamedUVMap\(\)](#)
- const char * [GetUVMapString](#) (CTMenum aUVMap, CTMenum aProperty)
Wrapper for [ctmGetUVMapString\(\)](#)
- [CTMfloat GetUVMapFloat](#) (CTMenum aUVMap, CTMenum aProperty)
Wrapper for [ctmGetUVMapFloat\(\)](#)
- [CTMenum GetNamedAttribMap](#) (const char *aName)
Wrapper for [ctmGetNamedAttribMap\(\)](#)
- const char * [GetAttribMapString](#) (CTMenum aAttribMap, CTMenum aProperty)
Wrapper for [ctmGetAttribMapString\(\)](#)
- [CTMfloat GetAttribMapFloat](#) (CTMenum aAttribMap, CTMenum aProperty)
Wrapper for [ctmGetAttribMapFloat\(\)](#)
- const char * [GetString](#) (CTMenum aProperty)
Wrapper for [ctmGetString\(\)](#)
- void [Load](#) (const char *aFileName)
Wrapper for [ctmLoad\(\)](#)
- void [LoadCustom](#) (CTMreadfn aReadFn, void *aUserData)
Wrapper for [ctmLoadCustom\(\)](#)
- [CTMImporter](#) (const [CTMImporter](#) &v)
- [CTMImporter](#) & [operator=](#) (const [CTMImporter](#) &v)

5.3.1 Detailed Description

OpenCTM importer class.

This is a C++ wrapper class for an OpenCTM import context. Usage example:

```
// Create a new OpenCTM importer object
CTMImporter ctm;

// Load the OpenCTM file
ctm.Load("mymesh.ctm");

// Access the mesh data
vertCount = ctm.GetInteger(CTM_VERTEX_COUNT);
vertices = ctm.GetFloatArray(CTM_VERTICES);
triCount = ctm.GetInteger(CTM_TRIANGLE_COUNT);
indices = ctm.GetIntegerArray(CTM_INDICES);

// Deal with the mesh (e.g. transcode it to our internal representation)
// ...
```

5.3.2 Constructor & Destructor Documentation

5.3.2.1 CTMImporter() [1/2]

```
CTMImporter::CTMImporter () [inline]
```

Constructor.

5.3.2.2 ~CTMImporter()

```
CTMImporter::~~CTMImporter () [inline]
```

Destructor.

5.3.2.3 CTMImporter() [2/2]

```
CTMImporter::CTMImporter (  
    const CTMImporter & v)
```

5.3.3 Member Function Documentation

5.3.3.1 GetAttribMapFloat()

```
CTMfloat CTMImporter::GetAttribMapFloat (  
    CTMenum aAttribMap,  
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetAttribMapFloat\(\)](#)

5.3.3.2 GetAttribMapString()

```
const char * CTMImporter::GetAttribMapString (  
    CTMenum aAttribMap,  
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetAttribMapString\(\)](#)

5.3.3.3 GetFloat()

```
CTMfloat CTMImporter::GetFloat (  
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetFloat\(\)](#)

5.3.3.4 GetFloatArray()

```
const CTMfloat * CTMImporter::GetFloatArray (  
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetFloatArray\(\)](#)

5.3.3.5 GetInteger()

```
CTMuint CTMImporter::GetInteger (  
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetInteger\(\)](#)

5.3.3.6 GetIntegerArray()

```
const CTMuint * CTMImporter::GetIntegerArray (  
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetIntegerArray\(\)](#)

5.3.3.7 GetNamedAttribMap()

```
CTMenum CTMImporter::GetNamedAttribMap (  
    const char * aName) [inline]
```

Wrapper for [ctmGetNamedAttribMap\(\)](#)

5.3.3.8 GetNamedUVMap()

```
CTMenum CTMImporter::GetNamedUVMap (  
    const char * aName) [inline]
```

Wrapper for [ctmGetNamedUVMap\(\)](#)

5.3.3.9 GetString()

```
const char * CTMImporter::GetString (  
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetString\(\)](#)

5.3.3.10 GetUVMapFloat()

```
CTMfloat CTMImporter::GetUVMapFloat (  
    CTMenum aUVMap,  
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetUVMapFloat\(\)](#)

5.3.3.11 GetUVMapString()

```
const char * CTMImporter::GetUVMapString (
    CTMenum aUVMap,
    CTMenum aProperty) [inline]
```

Wrapper for [ctmGetUVMapString\(\)](#)

5.3.3.12 Load()

```
void CTMImporter::Load (
    const char * aFileName) [inline]
```

Wrapper for [ctmLoad\(\)](#)

5.3.3.13 LoadCustom()

```
void CTMImporter::LoadCustom (
    CTMreadfn aReadFn,
    void * aUserData) [inline]
```

Wrapper for [ctmLoadCustom\(\)](#)

5.3.3.14 operator=()

```
CTMImporter & CTMImporter::operator= (
    const CTMImporter & v)
```

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

- [openctm.h](#)

Chapter 6

File Documentation

6.1 openctm.h File Reference

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

Macros

- #define [CTM_API_VERSION](#) 0x00000100
OpenCTM API version (1.0).
- #define [CTM_TRUE](#) 1
Boolean TRUE.
- #define [CTM_FALSE](#) 0
Boolean FALSE.

Typedefs

- typedef float [CTMfloat](#)
Single precision floating point type (IEEE 754 32 bits wide).
- typedef int32_t [CTMint](#)
Signed integer (32 bits wide).
- typedef uint32_t [CTMuint](#)
Unsigned integer (32 bits wide).
- typedef void * [CTMcontext](#)
OpenCTM context handle.
- typedef [CTMuint](#)(CTMCALL * [CTMreadfn](#)) (void *aBuf, [CTMuint](#) aCount, void *aUserData)
Stream read() function pointer.
- typedef [CTMuint](#)(CTMCALL * [CTMwritefn](#)) (const void *aBuf, [CTMuint](#) aCount, void *aUserData)
Stream write() function pointer.

Enumerations

- enum `CTMenum` {
 - `CTM_NONE` = 0x0000 ,
 - `CTM_INVALID_CONTEXT` = 0x0001 ,
 - `CTM_INVALID_ARGUMENT` = 0x0002 ,
 - `CTM_INVALID_OPERATION` = 0x0003 ,
 - `CTM_INVALID_MESH` = 0x0004 ,
 - `CTM_OUT_OF_MEMORY` = 0x0005 ,
 - `CTM_FILE_ERROR` = 0x0006 ,
 - `CTM_BAD_FORMAT` = 0x0007 ,
 - `CTM_LZMA_ERROR` = 0x0008 ,
 - `CTM_INTERNAL_ERROR` = 0x0009 ,
 - `CTM_UNSUPPORTED_FORMAT_VERSION` = 0x000A ,
 - `CTM_IMPORT` = 0x0101 ,
 - `CTM_EXPORT` = 0x0102 ,
 - `CTM_METHOD_RAW` = 0x0201 ,
 - `CTM_METHOD_MG1` = 0x0202 ,
 - `CTM_METHOD_MG2` = 0x0203 ,
 - `CTM_VERTEX_COUNT` = 0x0301 ,
 - `CTM_TRIANGLE_COUNT` = 0x0302 ,
 - `CTM_HAS_NORMALS` = 0x0303 ,
 - `CTM_UV_MAP_COUNT` = 0x0304 ,
 - `CTM_ATTRIB_MAP_COUNT` = 0x0305 ,
 - `CTM_VERTEX_PRECISION` = 0x0306 ,
 - `CTM_NORMAL_PRECISION` = 0x0307 ,
 - `CTM_COMPRESSION_METHOD` = 0x0308 ,
 - `CTM_FILE_COMMENT` = 0x0309 ,
 - `CTM_NAME` = 0x0501 ,
 - `CTM_FILE_NAME` = 0x0502 ,
 - `CTM_PRECISION` = 0x0503 ,
 - `CTM_INDICES` = 0x0601 ,
 - `CTM_VERTICES` = 0x0602 ,
 - `CTM_NORMALS` = 0x0603 ,
 - `CTM_UV_MAP_1` = 0x0700 ,
 - `CTM_UV_MAP_2` = 0x0701 ,
 - `CTM_UV_MAP_3` = 0x0702 ,
 - `CTM_UV_MAP_4` = 0x0703 ,
 - `CTM_UV_MAP_5` = 0x0704 ,
 - `CTM_UV_MAP_6` = 0x0705 ,
 - `CTM_UV_MAP_7` = 0x0706 ,
 - `CTM_UV_MAP_8` = 0x0707 ,
 - `CTM_ATTRIB_MAP_1` = 0x0800 ,
 - `CTM_ATTRIB_MAP_2` = 0x0801 ,
 - `CTM_ATTRIB_MAP_3` = 0x0802 ,
 - `CTM_ATTRIB_MAP_4` = 0x0803 ,
 - `CTM_ATTRIB_MAP_5` = 0x0804 ,
 - `CTM_ATTRIB_MAP_6` = 0x0805 ,
 - `CTM_ATTRIB_MAP_7` = 0x0806 ,
 - `CTM_ATTRIB_MAP_8` = 0x0807 }

OpenCTM specific enumerators.

Functions

- CTMEXPORT `CTMcontext` CTMCALL `ctmNewContext` (`CTMenum` aMode)
 - Create a new OpenCTM context.*
- CTMEXPORT void CTMCALL `ctmFreeContext` (`CTMcontext` aContext)

- Free an OpenCTM context.*
- CTMEXPORT CTMenum CTMCALL [ctmGetError](#) (CTMcontext aContext)
Returns the latest error.
 - CTMEXPORT const char *CTMCALL [ctmErrorString](#) (CTMenum aError)
Converts an OpenCTM error code to a zero-terminated string.
 - CTMEXPORT CTMuint CTMCALL [ctmGetInteger](#) (CTMcontext aContext, CTMenum aProperty)
Get information about an OpenCTM context.
 - CTMEXPORT CTMfloat CTMCALL [ctmGetFloat](#) (CTMcontext aContext, CTMenum aProperty)
Get information about an OpenCTM context.
 - CTMEXPORT const CTMuint *CTMCALL [ctmGetIntegerArray](#) (CTMcontext aContext, CTMenum aProperty)
Get an integer array from an OpenCTM context.
 - CTMEXPORT const CTMfloat *CTMCALL [ctmGetFloatArray](#) (CTMcontext aContext, CTMenum aProperty)
Get a floating point array from an OpenCTM context.
 - CTMEXPORT CTMenum CTMCALL [ctmGetNamedUVMap](#) (CTMcontext aContext, const char *aName)
Get a reference to the named UV map.
 - CTMEXPORT const char *CTMCALL [ctmGetUVMapString](#) (CTMcontext aContext, CTMenum aUVMap, CTMenum aProperty)
Get information about a UV map.
 - CTMEXPORT CTMfloat CTMCALL [ctmGetUVMapFloat](#) (CTMcontext aContext, CTMenum aUVMap, CTMenum aProperty)
Get information about a UV map.
 - CTMEXPORT CTMenum CTMCALL [ctmGetNamedAttribMap](#) (CTMcontext aContext, const char *aName)
Get a reference to the named vertex attribute map.
 - CTMEXPORT const char *CTMCALL [ctmGetAttribMapString](#) (CTMcontext aContext, CTMenum aAttribMap, CTMenum aProperty)
Get information about a vertex attribute map.
 - CTMEXPORT CTMfloat CTMCALL [ctmGetAttribMapFloat](#) (CTMcontext aContext, CTMenum aAttribMap, CTMenum aProperty)
Get information about a vertex attribute map.
 - CTMEXPORT const char *CTMCALL [ctmGetString](#) (CTMcontext aContext, CTMenum aProperty)
Get information about an OpenCTM context.
 - CTMEXPORT void CTMCALL [ctmCompressionMethod](#) (CTMcontext aContext, CTMenum aMethod)
Set which compression method to use for the given OpenCTM context.
 - CTMEXPORT void CTMCALL [ctmCompressionLevel](#) (CTMcontext aContext, CTMuint aLevel)
Set which LZMA compression level to use for the given OpenCTM context.
 - CTMEXPORT void CTMCALL [ctmVertexPrecision](#) (CTMcontext aContext, CTMfloat aPrecision)
Set the vertex coordinate precision (only used by the MG2 compression method).
 - CTMEXPORT void CTMCALL [ctmVertexPrecisionRel](#) (CTMcontext aContext, CTMfloat aRelPrecision)
Set the vertex coordinate precision, relative to the mesh dimensions (only used by the MG2 compression method).
 - CTMEXPORT void CTMCALL [ctmNormalPrecision](#) (CTMcontext aContext, CTMfloat aPrecision)
Set the normal precision (only used by the MG2 compression method).
 - CTMEXPORT void CTMCALL [ctmUVCoordPrecision](#) (CTMcontext aContext, CTMenum aUVMap, CTMfloat aPrecision)
Set the coordinate precision for the specified UV map (only used by the MG2 compression method).
 - CTMEXPORT void CTMCALL [ctmAttribPrecision](#) (CTMcontext aContext, CTMenum aAttribMap, CTMfloat aPrecision)
Set the attribute value precision for the specified attribute map (only used by the MG2 compression method).
 - CTMEXPORT void CTMCALL [ctmFileComment](#) (CTMcontext aContext, const char *aFileComment)
Set the file comment for the given OpenCTM context.
 - CTMEXPORT void CTMCALL [ctmDefineMesh](#) (CTMcontext aContext, const CTMfloat *aVertices, CTMuint aVertexCount, const CTMuint *aIndices, CTMuint aTriangleCount, const CTMfloat *aNormals)
Define a triangle mesh.

- CTMEXPORT CTMenum CTMCALL [ctmAddUVMap](#) (CTMcontext aContext, const CTMfloat *aUVCoords, const char *aName, const char *aFileName)
Define a UV map.
- CTMEXPORT CTMenum CTMCALL [ctmAddAttribMap](#) (CTMcontext aContext, const CTMfloat *aAttrib↵
Values, const char *aName)
Define a custom vertex attribute map.
- CTMEXPORT void CTMCALL [ctmLoad](#) (CTMcontext aContext, const char *aFileName)
Load an OpenCTM format file into the context.
- CTMEXPORT void CTMCALL [ctmLoadCustom](#) (CTMcontext aContext, CTMreadfn aReadFn, void *aUser↵
Data)
Load an OpenCTM format file using a custom stream read function.
- CTMEXPORT void CTMCALL [ctmSave](#) (CTMcontext aContext, const char *aFileName)
Save an OpenCTM format file.
- CTMEXPORT void CTMCALL [ctmSaveCustom](#) (CTMcontext aContext, CTMwritefn aWriteFn, void *aUser↵
Data)
Save an OpenCTM format file using a custom stream write function.

6.1.1 Macro Definition Documentation

6.1.1.1 CTM_API_VERSION

```
#define CTM_API_VERSION 0x00000100
```

OpenCTM API version (1.0).

6.1.1.2 CTM_FALSE

```
#define CTM_FALSE 0
```

Boolean FALSE.

6.1.1.3 CTM_TRUE

```
#define CTM_TRUE 1
```

Boolean TRUE.

6.1.2 Typedef Documentation

6.1.2.1 CTMcontext

```
typedef void* CTMcontext
```

OpenCTM context handle.

6.1.2.2 CTMfloat

```
typedef float CTMfloat
```

Single precision floating point type (IEEE 754 32 bits wide).

6.1.2.3 CTMint

```
typedef int32_t CTMint
```

Signed integer (32 bits wide).

6.1.2.4 CTMreadfn

```
typedef CTMuint (CTMCALL * CTMreadfn) (void *aBuf, CTMuint aCount, void *aUserData)
```

Stream read() function pointer.

Parameters

in	<i>aBuf</i>	Pointer to the memory buffer to which data should be read.
in	<i>aCount</i>	The number of bytes to read.
in	<i>aUserData</i>	The custom user data that was passed to the ctmLoadCustom() function.

Returns

The number of bytes actually read (if this is less than aCount, it indicates that an error occurred or the end of file was reached before all bytes were read).

6.1.2.5 CTMuint

```
typedef uint32_t CTMuint
```

Unsigned integer (32 bits wide).

6.1.2.6 CTMwritefn

```
typedef CTMuint (CTMCALL * CTMwritefn) (const void *aBuf, CTMuint aCount, void *aUserData)
```

Stream write() function pointer.

Parameters

in	<i>aBuf</i>	Pointer to the memory buffer from which data should be written.
in	<i>aCount</i>	The number of bytes to write.
in	<i>aUserData</i>	The custom user data that was passed to the ctmSaveCustom() function.

Returns

The number of bytes actually written (if this is less than aCount, it indicates that an error occurred).

6.1.3 Enumeration Type Documentation

6.1.3.1 CTMenum

enum [CTMenum](#)

OpenCTM specific enumerators.

Note

For the information query functions, it is an error to query a value of the wrong type (e.g. to query a string value with the [ctmGetInteger\(\)](#) function).

Enumerator

CTM_NONE	No error has occurred (everything is OK). Also used as an error return value for functions that should return a CTMenum value.
CTM_INVALID_CONTEXT	The OpenCTM context was invalid (e.g. NULL).
CTM_INVALID_ARGUMENT	A function argument was invalid.
CTM_INVALID_OPERATION	The operation is not allowed.
CTM_INVALID_MESH	The mesh was invalid (e.g. no vertices).
CTM_OUT_OF_MEMORY	Not enough memory to proceed.
CTM_FILE_ERROR	File I/O error.
CTM_BAD_FORMAT	File format error (e.g. unrecognized format or corrupted file).
CTM_LZMA_ERROR	An error occurred within the LZMA library.
CTM_INTERNAL_ERROR	An internal error occurred (indicates a bug).
CTM_UNSUPPORTED_FORMAT_VERSION	Unsupported file format version.
CTM_IMPORT	The OpenCTM context will be used for importing data.
CTM_EXPORT	The OpenCTM context will be used for exporting data.
CTM_METHOD_RAW	Just store the raw data.
CTM_METHOD_MG1	Lossless compression (floating point).
CTM_METHOD_MG2	Lossless compression (fixed point).
CTM_VERTEX_COUNT	Number of vertices in the mesh (integer).
CTM_TRIANGLE_COUNT	Number of triangles in the mesh (integer).
CTM_HAS_NORMALS	CTM_TRUE if the mesh has normals (integer).
CTM_UV_MAP_COUNT	Number of UV coordinate sets (integer).
CTM_ATTRIB_MAP_COUNT	Number of custom attribute sets (integer).
CTM_VERTEX_PRECISION	Vertex precision - for MG2 (float).
CTM_NORMAL_PRECISION	Normal precision - for MG2 (float).
CTM_COMPRESSION_METHOD	Compression method (integer).
CTM_FILE_COMMENT	File comment (string).
CTM_NAME	Unique name (UV/attrib map string).
CTM_FILE_NAME	File name reference (UV map string).
CTM_PRECISION	Value precision (UV/attrib map float).
CTM_INDICES	Triangle indices (integer array).
CTM_VERTICES	Vertex point coordinates (float array).
CTM_NORMALS	Per vertex normals (float array).
CTM_UV_MAP_1	Per vertex UV map 1 (float array).
CTM_UV_MAP_2	Per vertex UV map 2 (float array).

Enumerator

CTM_UV_MAP_3	Per vertex UV map 3 (float array).
CTM_UV_MAP_4	Per vertex UV map 4 (float array).
CTM_UV_MAP_5	Per vertex UV map 5 (float array).
CTM_UV_MAP_6	Per vertex UV map 6 (float array).
CTM_UV_MAP_7	Per vertex UV map 7 (float array).
CTM_UV_MAP_8	Per vertex UV map 8 (float array).
CTM_ATTRIB_MAP_1	Per vertex attribute map 1 (float array).
CTM_ATTRIB_MAP_2	Per vertex attribute map 2 (float array).
CTM_ATTRIB_MAP_3	Per vertex attribute map 3 (float array).
CTM_ATTRIB_MAP_4	Per vertex attribute map 4 (float array).
CTM_ATTRIB_MAP_5	Per vertex attribute map 5 (float array).
CTM_ATTRIB_MAP_6	Per vertex attribute map 6 (float array).
CTM_ATTRIB_MAP_7	Per vertex attribute map 7 (float array).
CTM_ATTRIB_MAP_8	Per vertex attribute map 8 (float array).

6.1.4 Function Documentation

6.1.4.1 ctmAddAttribMap()

```
CTMEXPORT CTMenum CTMCALL ctmAddAttribMap (
    CTMcontext aContext,
    const CTMfloat * aAttribValues,
    const char * aName)
```

Define a custom vertex attribute map.

Custom vertex attributes can be used for defining special per-vertex attributes, such as color, weight, ambient occlusion factor, etc.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aAttribValues</i>	An array of attribute values. Each attribute value is made up by four consecutive floats, and there must be as many values as there are vertices in the mesh.
in	<i>aName</i>	A unique name for this attribute map (zero terminated UTF-8 string).

Returns

A attribute map index (CTM_ATTRIB_MAP_1 and higher). If the function failed, it will return the zero valued CTM_NONE (use [ctmGetError\(\)](#) to determine the cause of the error).

Note

A triangle mesh must have been defined before calling this function, since the number of vertices is defined by the triangle mesh.

See also

[ctmDefineMesh\(\)](#).

6.1.4.2 ctmAddUVMap()

```
CTMEXPORT CTMenum CTMCALL ctmAddUVMap (
    CTMcontext aContext,
    const CTMfloat * aUVCoords,
    const char * aName,
    const char * aFileName)
```

Define a UV map.

There can be several UV maps in a mesh. A UV map is typically used for 2D texture mapping.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aUVCoords</i>	An array of UV coordinates. Each UV coordinate is made up by two consecutive floats, and there must be as many coordinates as there are vertices in the mesh.
in	<i>aName</i>	A unique name for this UV map (zero terminated UTF-8 string).
in	<i>aFileName</i>	A reference to a image file (zero terminated UTF-8 string). If no file name reference exists, pass NULL.

Returns

A UV map index (CTM_UV_MAP_1 and higher). If the function failed, it will return the zero valued CTM_NONE (use [ctmGetError\(\)](#) to determine the cause of the error).

Note

A triangle mesh must have been defined before calling this function, since the number of vertices is defined by the triangle mesh.

See also

[ctmDefineMesh\(\)](#).

6.1.4.3 ctmAttribPrecision()

```
CTMEXPORT void CTMCALL ctmAttribPrecision (
    CTMcontext aContext,
    CTMenum aAttribMap,
    CTMfloat aPrecision)
```

Set the attribute value precision for the specified attribute map (only used by the MG2 compression method).

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aAttribMap</i>	An attribute map specifier for a defined attribute map (CTM_ATTRIB_MAP_1, ...).
in	<i>aPrecision</i>	Fixed point precision. For instance, if this value is 0.001, all attribute values will be rounded to three decimals. If the attributes represent integer values, set the precision to 1.0. The default attribute precision is $2^{-8} \approx 0.0039$.

See also

[ctmAddAttribMap\(\)](#).

6.1.4.4 ctmCompressionLevel()

```
CTMEXPORT void CTMCALL ctmCompressionLevel (
    CTMcontext aContext,
    CTMuint aLevel)
```

Set which LZMA compression level to use for the given OpenCTM context.

The compression level can be between 0 (fastest) and 9 (best). The higher the compression level, the more memory is required for compression and decompression. The default compression level is 1.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aLevel</i>	Which compression level to use (0 to 9).

6.1.4.5 ctmCompressionMethod()

```
CTMEXPORT void CTMCALL ctmCompressionMethod (
    CTMcontext aContext,
    CTMenum aMethod)
```

Set which compression method to use for the given OpenCTM context.

The selected compression method will be used when calling the [ctmSave\(\)](#) function.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aMethod</i>	Which compression method to use: CTM_METHOD_RAW, CTM_METHOD_MG1 or CTM_METHOD_MG2 (the default method is CTM_METHOD_MG1).

See also

[CTM_METHOD_RAW](#), [CTM_METHOD_MG1](#), [CTM_METHOD_MG2](#)

6.1.4.6 ctmDefineMesh()

```
CTMEXPORT void CTMCALL ctmDefineMesh (
    CTMcontext aContext,
    const CTMfloat * aVertices,
    CTMuint aVertexCount,
    const CTMuint * aIndices,
    CTMuint aTriangleCount,
    const CTMfloat * aNormals)
```

Define a triangle mesh.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aVertices</i>	An array of vertices (three consecutive floats make one vertex).
in	<i>aVertexCount</i>	The number of vertices in <i>aVertices</i> (and optionally <i>aTexCoords</i>).
in	<i>aIndices</i>	An array of vertex indices (three consecutive integers make one triangle).
in	<i>aTriangleCount</i>	The number of triangles in <i>aIndices</i> (there must be exactly 3 x <i>aTriangleCount</i> indices in <i>aIndices</i>).
in	<i>aNormals</i>	An array of per-vertex normals (or NULL if there are no normals). Each normal is made up by three consecutive floats, and there must be <i>aVertexCount</i> normals.

See also

[ctmAddUVMap\(\)](#), [ctmAddAttribMap\(\)](#), [ctmSave\(\)](#), [ctmSaveCustom\(\)](#).

6.1.4.7 ctmErrorString()

```
CTMEXPORT const char *CTMCALL ctmErrorString (
    CTMenum aError)
```

Converts an OpenCTM error code to a zero-terminated string.

Parameters

in	<i>aError</i>	An OpenCTM error code, as returned by ctmGetError() .
----	---------------	---

Returns

A zero terminated string that describes the error. For instance, if *aError* is CTM_INVALID_OPERATION, then the return value will be "CTM_INVALID_OPERATION".

See also

[CTMenum](#)

6.1.4.8 ctmFileComment()

```
CTMEXPORT void CTMCALL ctmFileComment (
    CTMcontext aContext,
    const char * aFileComment)
```

Set the file comment for the given OpenCTM context.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aFileComment</i>	The file comment (zero terminated UTF-8 string).

6.1.4.9 ctmFreeContext()

```
CTMEXPORT void CTMCALL ctmFreeContext (
    CTMcontext aContext)
```

Free an OpenCTM context.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
----	-----------------	---

See also

[ctmNewContext\(\)](#)

6.1.4.10 ctmGetAttribMapFloat()

```
CTMEXPORT CTMfloat CTMCALL ctmGetAttribMapFloat (
    CTMcontext aContext,
    CTMenum aAttribMap,
    CTMenum aProperty)
```

Get information about a vertex attribute map.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aAttribMap</i>	Which vertex attribute map to query (CTM_ATTRIB_MAP_1 or higher).
in	<i>aProperty</i>	Which vertex attribute map property to return.

Returns

A floating point value, representing the vertex attribute map property given by *aProperty*.

See also

[CTMenum](#)

6.1.4.11 ctmGetAttribMapString()

```
CTMEXPORT const char *CTMCALL ctmGetAttribMapString (
    CTMcontext aContext,
    CTMenum aAttribMap,
    CTMenum aProperty)
```

Get information about a vertex attribute map.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aAttribMap</i>	Which vertex attribute map to query (CTM_ATTRIB_MAP_1 or higher).
in	<i>aProperty</i>	Which vertex attribute map property to return.

Returns

A string value, representing the vertex attribute map property given by `aProperty`.

Note

The string is only valid as long as the vertex attribute map within the OpenCTM context is valid. Trying to access an invalid string will result in undefined behaviour. Therefore it is recommended that the string is copied to a new variable if it is to be used other than directly after the call to `ctmGetAttribMapString()`.

See also

[CTMenum](#)

6.1.4.12 ctmGetError()

```
CTMEXPORT CTMenum CTMCALL ctmGetError (
    CTMcontext aContext)
```

Returns the latest error.

Calling this function will return the last produced error code, or CTM_NO_ERROR (zero) if no error has occurred since the last call to `ctmGetError()`. When this function is called, the internal error variable will be reset to CTM_↔ NONE.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by <code>ctmNewContext()</code> .
----	-----------------	--

Returns

An OpenCTM error code.

See also

[CTMenum](#)

6.1.4.13 ctmGetFloat()

```
CTMEXPORT CTMfloat CTMCALL ctmGetFloat (
    CTMcontext aContext,
    CTMenum aProperty)
```

Get information about an OpenCTM context.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by <code>ctmNewContext()</code> .
in	<i>aProperty</i>	Which property to return.

Returns

A floating point value, representing the OpenCTM context property given by `aProperty`.

See also

[CTMenum](#)

6.1.4.14 ctmGetFloatArray()

```
CTMEXPORT const CTMfloat *CTMCALL ctmGetFloatArray (  
    CTMcontext aContext,  
    CTMenum aProperty)
```

Get a floating point array from an OpenCTM context.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aProperty</i>	Which array to return.

Returns

A floating point array. If the requested array does not exist, or if *aProperty* does not indicate a float array, the function returns NULL.

Note

The array is only valid as long as the OpenCTM context is valid, or until the corresponding array changes within the OpenCTM context. Trying to access an invalid array will result in undefined behaviour. Therefore it is recommended that the array is copied to a new variable if it is to be used other than directly after the call to [ctmGetFloatArray\(\)](#).

See also

[CTMenum](#)

6.1.4.15 ctmGetInteger()

```
CTMEXPORT CTMuint CTMCALL ctmGetInteger (  
    CTMcontext aContext,  
    CTMenum aProperty)
```

Get information about an OpenCTM context.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aProperty</i>	Which property to return.

Returns

An integer value, representing the OpenCTM context property given by *aProperty*.

See also

[CTMenum](#)

6.1.4.16 ctmGetIntegerArray()

```
CTMEXPORT const CTMuint *CTMCALL ctmGetIntegerArray (  
    CTMcontext aContext,  
    CTMenum aProperty)
```

Get an integer array from an OpenCTM context.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aProperty</i>	Which array to return.

Returns

An integer array. If the requested array does not exist, or if `aProperty` does not indicate an integer array, the function returns NULL.

Note

The array is only valid as long as the OpenCTM context is valid, or until the corresponding array changes within the OpenCTM context. Trying to access an invalid array will result in undefined behaviour. Therefore it is recommended that the array is copied to a new variable if it is to be used other than directly after the call to [ctmGetIntegerArray\(\)](#).

See also

[CTMenum](#)

6.1.4.17 ctmGetNamedAttribMap()

```
CTMEXPORT CTMenum CTMCALL ctmGetNamedAttribMap (
    CTMcontext aContext,
    const char * aName)
```

Get a reference to the named vertex attribute map.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aName</i>	The name of the attribute map that should be returned.

Returns

A reference to an attribute map. If the attribute map was found, a value of `CTM_ATTRIB_MAP_1` or higher is returned, otherwise `CTM_NONE` is returned.

6.1.4.18 ctmGetNamedUVMap()

```
CTMEXPORT CTMenum CTMCALL ctmGetNamedUVMap (
    CTMcontext aContext,
    const char * aName)
```

Get a reference to the named UV map.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aName</i>	The name of the UV map that should be returned.

Returns

A reference to a UV map. If the UV map was found, a value of CTM_UV_MAP_1 or higher is returned, otherwise CTM_NONE is returned.

6.1.4.19 ctmGetString()

```
CTMEXPORT const char *CTMCALL ctmGetString (
    CTMcontext aContext,
    CTMenum aProperty)
```

Get information about an OpenCTM context.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aProperty</i>	Which property to return.

Returns

A string value, representing the OpenCTM context property given by *aProperty*.

Note

The string is only valid as long as the OpenCTM context is valid, or until the corresponding string changes within the OpenCTM context (e.g. calling [ctmFileComment\(\)](#) invalidates the CTM_FILE_COMMENT string). Trying to access an invalid string will result in undefined behaviour. Therefore it is recommended that the string is copied to a new variable if it is to be used other than directly after the call to [ctmGetString\(\)](#).

See also

[CTMenum](#)

6.1.4.20 ctmGetUVMapFloat()

```
CTMEXPORT CTMfloat CTMCALL ctmGetUVMapFloat (
    CTMcontext aContext,
    CTMenum aUVMap,
    CTMenum aProperty)
```

Get information about a UV map.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aUVMap</i>	Which UV map to query (CTM_UV_MAP_1 or higher).
in	<i>aProperty</i>	Which UV map property to return.

Returns

A floating point value, representing the UV map property given by *aProperty*.

See also

[CTMenum](#)

6.1.4.21 ctmGetUVMapString()

```
CTMEXPORT const char *CTMCALL ctmGetUVMapString (
    CTMcontext aContext,
    CTMenum aUVMap,
    CTMenum aProperty)
```

Get information about a UV map.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aUVMap</i>	Which UV map to query (CTM_UV_MAP_1 or higher).
in	<i>aProperty</i>	Which UV map property to return.

Returns

A string value, representing the UV map property given by *aProperty*.

Note

The string is only valid as long as the UV map within the OpenCTM context is valid. Trying to access an invalid string will result in undefined behaviour. Therefore it is recommended that the string is copied to a new variable if it is to be used other than directly after the call to [ctmGetUVMapString\(\)](#).

See also

[CTMenum](#)

6.1.4.22 ctmLoad()

```
CTMEXPORT void CTMCALL ctmLoad (
    CTMcontext aContext,
    const char * aFileName)
```

Load an OpenCTM format file into the context.

The mesh data can be retrieved with the various [ctmGet](#) functions.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aFileName</i>	The name of the file to be loaded.

6.1.4.23 ctmLoadCustom()

```
CTMEXPORT void CTMCALL ctmLoadCustom (
    CTMcontext aContext,
    CTMreadfn aReadFn,
    void * aUserData)
```

Load an OpenCTM format file using a custom stream read function.

The mesh data can be retrieved with the various ctmGet functions.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aReadFn</i>	Pointer to a custom stream read function.
in	<i>aUserData</i>	Custom user data, which can be a C language FILE handle, C++ istream object, or a custom object pointer of any type. The user data pointer will be passed to the custom stream read function.

See also

[CTMreadfn](#).

6.1.4.24 ctmNewContext()

```
CTMEXPORT CTMcontext CTMCALL ctmNewContext (
    CTMenum aMode)
```

Create a new OpenCTM context.

The context is used for all subsequent OpenCTM function calls. Several contexts can coexist at the same time.

Parameters

in	<i>aMode</i>	An OpenCTM context mode. Set this to CTM_IMPORT if the context will be used for importing data, or set it to CTM_EXPORT if it will be used for exporting data.
----	--------------	--

Returns

An OpenCTM context handle (or NULL if no context could be created).

6.1.4.25 ctmNormalPrecision()

```
CTMEXPORT void CTMCALL ctmNormalPrecision (
    CTMcontext aContext,
    CTMfloat aPrecision)
```

Set the normal precision (only used by the MG2 compression method).

The normal is represented in spherical coordinates in the MG2 compression method, and the normal precision controls the angular and radial resolution.

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aPrecision</i>	Fixed point precision. For the angular information, this value represents the angular precision. For the radial information, this value is the linear resolution. For instance, 0.01 means that the circle is divided into 100 steps, and the normal magnitude is rounded to 2 decimals. The default normal precision is $2^{-8} \approx 0.0039$.

6.1.4.26 ctmSave()

```
CTMEXPORT void CTMCALL ctmSave (
    CTMcontext aContext,
    const char * aFileName)
```

Save an OpenCTM format file.

The mesh must have been defined by [ctmDefineMesh\(\)](#).

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aFileName</i>	The name of the file to be saved.

6.1.4.27 ctmSaveCustom()

```
CTMEXPORT void CTMCALL ctmSaveCustom (
    CTMcontext aContext,
    CTMwritefn aWriteFn,
    void * aUserData)
```

Save an OpenCTM format file using a custom stream write function.

The mesh must have been defined by [ctmDefineMesh\(\)](#).

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aWriteFn</i>	Pointer to a custom stream write function.
in	<i>aUserData</i>	Custom user data, which can be a C language FILE handle, C++ ostream object, or a custom object pointer of any type. The user data pointer will be passed to the custom stream write function.

See also

[CTMwritefn](#).

6.1.4.28 ctmUVCoordPrecision()

```
CTMEXPORT void CTMCALL ctmUVCoordPrecision (
    CTMcontext aContext,
    CTMenum aUVMap,
    CTMfloat aPrecision)
```

Set the coordinate precision for the specified UV map (only used by the MG2 compression method).

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aUVMap</i>	A UV map specifier for a defined UV map (CTM_UV_MAP_1, ...).
in	<i>aPrecision</i>	Fixed point precision. For instance, if this value is 0.001, all UV coordinates will be rounded to three decimals. The default UV coordinate precision is $2^{-12} \approx 0.00024$.

See also

[ctmAddUVMap\(\)](#).

6.1.4.29 ctmVertexPrecision()

```
CTMEXPORT void CTMCALL ctmVertexPrecision (
    CTMcontext aContext,
    CTMfloat aPrecision)
```

Set the vertex coordinate precision (only used by the MG2 compression method).

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aPrecision</i>	Fixed point precision. For instance, if this value is 0.001, all vertex coordinates will be rounded to three decimals. The default vertex coordinate precision is $2^{-10} \approx 0.00098$.

6.1.4.30 ctmVertexPrecisionRel()

```
CTMEXPORT void CTMCALL ctmVertexPrecisionRel (
    CTMcontext aContext,
    CTMfloat aRelPrecision)
```

Set the vertex coordinate precision, relative to the mesh dimensions (only used by the MG2 compression method).

Parameters

in	<i>aContext</i>	An OpenCTM context that has been created by ctmNewContext() .
in	<i>aRelPrecision</i>	Relative precision. This factor is multiplied by the average triangle edge length in the mesh in order to obtain the final, fixed point precision. For instance, if aRelPrecision is 0.01, and the average edge length is 3.7, then the fixed point precision is set to 0.037.

Note

The mesh must have been defined using the [ctmDefineMesh\(\)](#) function before calling this function.

See also

[ctmVertexPrecision\(\)](#).

6.2 openctm.h

[Go to the documentation of this file.](#)

```

00001 //-----
00002 // Product:      OpenCTM
00003 // File:         openctm.h
00004 // Description:   OpenCTM API definition.
00005 //-----
00006 // Copyright (c) 2009-2010 Marcus Geelnard
00007 //
00008 // This software is provided 'as-is', without any express or implied
00009 // warranty. In no event will the authors be held liable for any damages
00010 // arising from the use of this software.
00011 //
00012 // Permission is granted to anyone to use this software for any purpose,
00013 // including commercial applications, and to alter it and redistribute it
00014 // freely, subject to the following restrictions:
00015 //
00016 //     1. The origin of this software must not be misrepresented; you must not
00017 //        claim that you wrote the original software. If you use this software
00018 //        in a product, an acknowledgment in the product documentation would be
00019 //        appreciated but is not required.
00020 //
00021 //     2. Altered source versions must be plainly marked as such, and must not
00022 //        be misrepresented as being the original software.
00023 //
00024 //     3. This notice may not be removed or altered from any source
00025 //        distribution.
00026 //-----
00027
00028 #ifndef __OPENCTM_H_
00029 #define __OPENCTM_H_
00030
00031
00032 #ifdef __cplusplus
00033 extern "C" {
00034 #endif
00035
00036 // Declare calling conventions etc.
00037 #if defined(WIN32) || defined(_WIN32)
00038     // Windows
00039     #if defined(OPENCTM_STATIC)
00040         #define CTMEXPORT
00041     #else
00042         #if defined(OPENCTM_BUILD)
00043             #define CTMEXPORT __declspec(dllexport)
00044         #else
00045             #define CTMEXPORT __declspec(dllimport)
00046         #endif
00047     #endif
00048     #if defined(__MINGW32__)
00049         #define CTMCALL __attribute__((__stdcall__))
00050     #elif (defined(_M_MRX000) || defined(_M_IX86) || defined(_M_ALPHA) || defined(_M_PPC)) &&
00051         !defined(MIDL_PASS)
00052         #define CTMCALL __stdcall
00053     #else
00054         #define CTMCALL
00055     #endif
00056 #endif
00057
00058 // Unix
00059 #if !defined(OPENCTM_STATIC) && !defined(OPENCTM_BUILD)
00060     #define CTMEXPORT extern
00061 #else
00062     #if defined(OPENCTM_BUILD) && defined(__GNUC__) && (__GNUC__ >= 4)
00063         #define CTMEXPORT __attribute__((visibility("default")))
00064     #else
00065         #define CTMEXPORT
00066     #endif
00067 #endif
00068 #define CTMCALL
00069 #endif
00070
00071 // Get system specific type definitions for sized integers. We use the C99
00072 // standard stdint.h for this.
00073 #ifdef _MSC_VER
00074     // MS Visual Studio does not support C99
00075     typedef int int32_t;
00076     typedef unsigned int uint32_t;
00077 #else
00078     #include <stdint.h>
00079 #endif
00080
00081
00082

```

```

00168 #define CTM_API_VERSION 0x00000100
00169
00171 #define CTM_TRUE 1
00172
00174 #define CTM_FALSE 0
00175
00177 typedef float CTMfloat;
00178
00180 typedef int32_t CTMint;
00181
00183 typedef uint32_t CTMuint;
00184
00186 typedef void * CTMcontext;
00187
00192 typedef enum {
00193     // Error codes (see ctmGetError())
00194     CTM_NONE = 0x0000,
00198     CTM_INVALID_CONTEXT = 0x0001,
00199     CTM_INVALID_ARGUMENT = 0x0002,
00200     CTM_INVALID_OPERATION = 0x0003,
00201     CTM_INVALID_MESH = 0x0004,
00202     CTM_OUT_OF_MEMORY = 0x0005,
00203     CTM_FILE_ERROR = 0x0006,
00204     CTM_BAD_FORMAT = 0x0007,
00205     CTM_LZMA_ERROR = 0x0008,
00206     CTM_INTERNAL_ERROR = 0x0009,
00207     CTM_UNSUPPORTED_FORMAT_VERSION = 0x000A,
00208
00209     // OpenCTM context modes
00210     CTM_IMPORT = 0x0101,
00211     CTM_EXPORT = 0x0102,
00212
00213     // Compression methods
00214     CTM_METHOD_RAW = 0x0201,
00215     CTM_METHOD_MG1 = 0x0202,
00216     CTM_METHOD_MG2 = 0x0203,
00217
00218     // Context queries
00219     CTM_VERTEX_COUNT = 0x0301,
00220     CTM_TRIANGLE_COUNT = 0x0302,
00221     CTM_HAS_NORMALS = 0x0303,
00222     CTM_UV_MAP_COUNT = 0x0304,
00223     CTM_ATTRIB_MAP_COUNT = 0x0305,
00224     CTM_VERTEX_PRECISION = 0x0306,
00225     CTM_NORMAL_PRECISION = 0x0307,
00226     CTM_COMPRESSION_METHOD = 0x0308,
00227     CTM_FILE_COMMENT = 0x0309,
00228
00229     // UV/attribute map queries
00230     CTM_NAME = 0x0501,
00231     CTM_FILE_NAME = 0x0502,
00232     CTM_PRECISION = 0x0503,
00233
00234     // Array queries
00235     CTM_INDICES = 0x0601,
00236     CTM_VERTICES = 0x0602,
00237     CTM_NORMALS = 0x0603,
00238     CTM_UV_MAP_1 = 0x0700,
00239     CTM_UV_MAP_2 = 0x0701,
00240     CTM_UV_MAP_3 = 0x0702,
00241     CTM_UV_MAP_4 = 0x0703,
00242     CTM_UV_MAP_5 = 0x0704,
00243     CTM_UV_MAP_6 = 0x0705,
00244     CTM_UV_MAP_7 = 0x0706,
00245     CTM_UV_MAP_8 = 0x0707,
00246     CTM_ATTRIB_MAP_1 = 0x0800,
00247     CTM_ATTRIB_MAP_2 = 0x0801,
00248     CTM_ATTRIB_MAP_3 = 0x0802,
00249     CTM_ATTRIB_MAP_4 = 0x0803,
00250     CTM_ATTRIB_MAP_5 = 0x0804,
00251     CTM_ATTRIB_MAP_6 = 0x0805,
00252     CTM_ATTRIB_MAP_7 = 0x0806,
00253     CTM_ATTRIB_MAP_8 = 0x0807
00254 } CTMenum;
00255
00264 typedef CTMuint (CTMCALL * CTMreadfn)(void * aBuf, CTMuint aCount, void * aUserData);
00265
00273 typedef CTMuint (CTMCALL * CTMwritefn)(const void * aBuf, CTMuint aCount, void * aUserData);
00274
00281 CTMEXPORT CTMcontext CTMCALL ctmNewContext(CTMenum aMode);
00282
00287 CTMEXPORT void CTMCALL ctmFreeContext(CTMcontext aContext);
00288
00297 CTMEXPORT CTMenum CTMCALL ctmGetError(CTMcontext aContext);
00298
00305 CTMEXPORT const char * CTMCALL ctmErrorString(CTMenum aError);
00306

```

```

00314 CTMEXPORT CTMuint CTMCALL ctmGetInteger(CTMcontext aContext, CTMenum aProperty);
00315
00323 CTMEXPORT CTMfloat CTMCALL ctmGetFloat(CTMcontext aContext, CTMenum aProperty);
00324
00339 CTMEXPORT const CTMuint * CTMCALL ctmGetIntegerArray(CTMcontext aContext,
00340 CTMenum aProperty);
00341
00356 CTMEXPORT const CTMfloat * CTMCALL ctmGetFloatArray(CTMcontext aContext,
00357 CTMenum aProperty);
00358
00366 CTMEXPORT CTMenum CTMCALL ctmGetNamedUVMMap(CTMcontext aContext,
00367 const char * aName);
00368
00382 CTMEXPORT const char * CTMCALL ctmGetUVMMapString(CTMcontext aContext,
00383 CTMenum aUVMMap, CTMenum aProperty);
00384
00393 CTMEXPORT CTMfloat CTMCALL ctmGetUVMMapFloat(CTMcontext aContext,
00394 CTMenum aUVMMap, CTMenum aProperty);
00395
00403 CTMEXPORT CTMenum CTMCALL ctmGetNamedAttribMap(CTMcontext aContext,
00404 const char * aName);
00405
00420 CTMEXPORT const char * CTMCALL ctmGetAttribMapString(CTMcontext aContext,
00421 CTMenum aAttribMap, CTMenum aProperty);
00422
00432 CTMEXPORT CTMfloat CTMCALL ctmGetAttribMapFloat(CTMcontext aContext,
00433 CTMenum aAttribMap, CTMenum aProperty);
00434
00449 CTMEXPORT const char * CTMCALL ctmGetString(CTMcontext aContext,
00450 CTMenum aProperty);
00451
00461 CTMEXPORT void CTMCALL ctmCompressionMethod(CTMcontext aContext,
00462 CTMenum aMethod);
00463
00471 CTMEXPORT void CTMCALL ctmCompressionLevel(CTMcontext aContext,
00472 CTMuint aLevel);
00473
00481 CTMEXPORT void CTMCALL ctmVertexPrecision(CTMcontext aContext,
00482 CTMfloat aPrecision);
00483
00496 CTMEXPORT void CTMCALL ctmVertexPrecisionRel(CTMcontext aContext,
00497 CTMfloat aRelPrecision);
00498
00510 CTMEXPORT void CTMCALL ctmNormalPrecision(CTMcontext aContext,
00511 CTMfloat aPrecision);
00512
00523 CTMEXPORT void CTMCALL ctmUVCoordPrecision(CTMcontext aContext,
00524 CTMenum aUVMMap, CTMfloat aPrecision);
00525
00537 CTMEXPORT void CTMCALL ctmAttribPrecision(CTMcontext aContext,
00538 CTMenum aAttribMap, CTMfloat aPrecision);
00539
00544 CTMEXPORT void CTMCALL ctmFileComment(CTMcontext aContext,
00545 const char * aFileComment);
00546
00562 CTMEXPORT void CTMCALL ctmDefineMesh(CTMcontext aContext,
00563 const CTMfloat * aVertices, CTMuint aVertexCount, const CTMuint * aIndices,
00564 CTMuint aTriangleCount, const CTMfloat * aNormals);
00565
00583 CTMEXPORT CTMenum CTMCALL ctmAddUVMMap(CTMcontext aContext,
00584 const CTMfloat * aUVCoords, const char * aName, const char * aFileName);
00585
00602 CTMEXPORT CTMenum CTMCALL ctmAddAttribMap(CTMcontext aContext,
00603 const CTMfloat * aAttribValues, const char * aName);
00604
00610 CTMEXPORT void CTMCALL ctmLoad(CTMcontext aContext, const char * aFileName);
00611
00622 CTMEXPORT void CTMCALL ctmLoadCustom(CTMcontext aContext, CTMreadfn aReadFn,
00623 void * aUserData);
00624
00630 CTMEXPORT void CTMCALL ctmSave(CTMcontext aContext, const char * aFileName);
00631
00642 CTMEXPORT void CTMCALL ctmSaveCustom(CTMcontext aContext, CTMwritefn aWriteFn,
00643 void * aUserData);
00644
00645 #ifdef __cplusplus
00646 }
00647 #endif
00648
00649
00650 // C++ extensions to the API (to disable C++ extensions, define OPENCTM_NO_CPP)
00651 #if defined(__cplusplus) && !defined(OPENCTM_NO_CPP)
00652 #include "openctmpp.h"
00653 #endif
00654
00655 #endif // __OPENCTM_H_

```

6.3 openctm.h File Reference

```
#include "openctm.h"
#include <exception>
```

Classes

- class `ctm_error`
OpenCTM exception.
- class `CTMImporter`
OpenCTM importer class.
- class `CTMExporter`
OpenCTM exporter class.

6.4 openctm.h

[Go to the documentation of this file.](#)

```
00001 //-----
00002 // Product:      OpenCTM
00003 // File:         openctm.h
00004 // Description:  C++ wrapper for the OpenCTM API.
00005 //-----
00006 // Copyright (c) 2009-2010 Marcus Geelnard
00007 //
00008 // This software is provided 'as-is', without any express or implied
00009 // warranty. In no event will the authors be held liable for any damages
00010 // arising from the use of this software.
00011 //
00012 // Permission is granted to anyone to use this software for any purpose,
00013 // including commercial applications, and to alter it and redistribute it
00014 // freely, subject to the following restrictions:
00015 //
00016 //     1. The origin of this software must not be misrepresented; you must not
00017 //        claim that you wrote the original software. If you use this software
00018 //        in a product, an acknowledgment in the product documentation would be
00019 //        appreciated but is not required.
00020 //
00021 //     2. Altered source versions must be plainly marked as such, and must not
00022 //        be misrepresented as being the original software.
00023 //
00024 //     3. This notice may not be removed or altered from any source
00025 //        distribution.
00026 //-----
00027
00028 // To disable C++ extensions, define OPENCTM_NO_CPP
00029 #ifndef OPENCTM_NO_CPP
00030
00031 #ifndef __OPENCCTMPP_H_
00032 #define __OPENCCTMPP_H_
00033
00034 // Just in case (if this file was included from outside openctm.h)...
00035 #ifndef __OPENCTM_H_
00036 #include "openctm.h"
00037 #endif
00038
00039 #include <exception>
00040
00041 class ctm_error: public std::exception
00042 {
00043 private:
00044     CTMenum mErrorCode;
00045
00046 public:
00047     explicit ctm_error(CTMenum aError)
00048     {
00049         mErrorCode = aError;
00050     }
00051
00052     virtual const char* what() const throw()
```

```

00056     {
00057         return ctmErrorString(mErrorCode);
00058     }
00059
00060     CTMenum error_code() const throw()
00061     {
00062         return mErrorCode;
00063     }
00064 };
00065
00066
00086
00087 class CTMImporter {
00088 private:
00089     CTMcontext mContext;
00090
00091     void CheckError()
00092     {
00093         CTMenum err = ctmGetError(mContext);
00094         if(err != CTM_NONE)
00095             throw ctm_error(err);
00096     }
00097
00100 public:
00101     CTMImporter()
00102     {
00103         mContext = ctmNewContext(CTM_IMPORT);
00104     }
00105
00106     ~CTMImporter()
00107     {
00108         ctmFreeContext(mContext);
00109     }
00110
00111     CTMuint GetInteger(CTMenum aProperty)
00112     {
00113         CTMuint res = ctmGetInteger(mContext, aProperty);
00114         CheckError();
00115         return res;
00116     }
00117
00118     CTMfloat GetFloat(CTMenum aProperty)
00119     {
00120         CTMfloat res = ctmGetFloat(mContext, aProperty);
00121         CheckError();
00122         return res;
00123     }
00124
00125     const CTMuint * GetIntegerArray(CTMenum aProperty)
00126     {
00127         const CTMuint * res = ctmGetIntegerArray(mContext, aProperty);
00128         CheckError();
00129         return res;
00130     }
00131
00132     const CTMfloat * GetFloatArray(CTMenum aProperty)
00133     {
00134         const CTMfloat * res = ctmGetFloatArray(mContext, aProperty);
00135         CheckError();
00136         return res;
00137     }
00138
00139     CTMenum GetNamedUVMap(const char * aName)
00140     {
00141         CTMenum res = ctmGetNamedUVMap(mContext, aName);
00142         CheckError();
00143         return res;
00144     }
00145
00146     const char * GetUVMapString(CTMenum aUVMap, CTMenum aProperty)
00147     {
00148         const char * res = ctmGetUVMapString(mContext, aUVMap, aProperty);
00149         CheckError();
00150         return res;
00151     }
00152
00153     CTMfloat GetUVMapFloat(CTMenum aUVMap, CTMenum aProperty)
00154     {
00155         CTMfloat res = ctmGetUVMapFloat(mContext, aUVMap, aProperty);
00156         CheckError();
00157         return res;
00158     }
00159
00160     CTMenum GetNamedAttribMap(const char * aName)
00161     {
00162         CTMenum res = ctmGetNamedAttribMap(mContext, aName);
00163         CheckError();
00164     }
00165
00166
00167
00168
00169
00170
00171
00172
00173
00174

```



```

00175     return res;
00176 }
00177
00179 const char * GetAttribMapString(CTMenum aAttribMap, CTMenum aProperty)
00180 {
00181     const char * res = ctmGetAttribMapString(mContext, aAttribMap, aProperty);
00182     CheckError();
00183     return res;
00184 }
00185
00187 CTMfloat GetAttribMapFloat(CTMenum aAttribMap, CTMenum aProperty)
00188 {
00189     CTMfloat res = ctmGetAttribMapFloat(mContext, aAttribMap, aProperty);
00190     CheckError();
00191     return res;
00192 }
00193
00195 const char * GetString(CTMenum aProperty)
00196 {
00197     const char * res = ctmGetString(mContext, aProperty);
00198     CheckError();
00199     return res;
00200 }
00201
00203 void Load(const char * aFileName)
00204 {
00205     ctmLoad(mContext, aFileName);
00206     CheckError();
00207 }
00208
00210 void LoadCustom(CTMreadfn aReadFn, void * aUserData)
00211 {
00212     ctmLoadCustom(mContext, aReadFn, aUserData);
00213     CheckError();
00214 }
00215
00216 // You can not copy nor assign from one CTMImporter object to another, since
00217 // the object contains hidden state. By declaring these dummy prototypes
00218 // without an implementation, you will at least get linker errors if you try
00219 // to copy or assign a CTMImporter object.
00220 CTMImporter(const CTMImporter& v);
00221 CTMImporter& operator=(const CTMImporter& v);
00222 };
00223
00224
00242
00243 class CTMexporter {
00244 private:
00246     CTMcontext mContext;
00247
00250     void CheckError()
00251     {
00252         CTMenum err = ctmGetError(mContext);
00253         if(err != CTM_NONE)
00254             throw ctm_error(err);
00255     }
00256
00257 public:
00259     CTMexporter()
00260     {
00261         mContext = ctmNewContext(CTM_EXPORT);
00262     }
00263
00265     ~CTMexporter()
00266     {
00267         ctmFreeContext(mContext);
00268     }
00269
00271     void CompressionMethod(CTMenum aMethod)
00272     {
00273         ctmCompressionMethod(mContext, aMethod);
00274         CheckError();
00275     }
00276
00278     void CompressionLevel(CTMuint aLevel)
00279     {
00280         ctmCompressionLevel(mContext, aLevel);
00281         CheckError();
00282     }
00283
00285     void VertexPrecision(CTMfloat aPrecision)
00286     {
00287         ctmVertexPrecision(mContext, aPrecision);
00288         CheckError();
00289     }
00290
00292     void VertexPrecisionRel(CTMfloat aRelPrecision)

```

```

00293     {
00294         ctmVertexPrecisionRel(mContext, aRelPrecision);
00295         CheckError();
00296     }
00297
00299     void NormalPrecision(CTMfloat aPrecision)
00300     {
00301         ctmNormalPrecision(mContext, aPrecision);
00302         CheckError();
00303     }
00304
00306     void UVCoordPrecision(CTMenum aUVMMap, CTMfloat aPrecision)
00307     {
00308         ctmUVCoordPrecision(mContext, aUVMMap, aPrecision);
00309         CheckError();
00310     }
00311
00313     void AttribPrecision(CTMenum aAttribMap, CTMfloat aPrecision)
00314     {
00315         ctmAttribPrecision(mContext, aAttribMap, aPrecision);
00316         CheckError();
00317     }
00318
00320     void FileComment(const char * aFileComment)
00321     {
00322         ctmFileComment(mContext, aFileComment);
00323         CheckError();
00324     }
00325
00327     void DefineMesh(const CTMfloat * aVertices, CTMuint aVertexCount,
00328                     const CTMuint * aIndices, CTMuint aTriangleCount,
00329                     const CTMfloat * aNormals)
00330     {
00331         ctmDefineMesh(mContext, aVertices, aVertexCount, aIndices, aTriangleCount,
00332                       aNormals);
00333         CheckError();
00334     }
00335
00337     CTMenum AddUVMMap(const CTMfloat * aUVCoords, const char * aName,
00338                      const char * aFileName)
00339     {
00340         CTMenum res = ctmAddUVMMap(mContext, aUVCoords, aName, aFileName);
00341         CheckError();
00342         return res;
00343     }
00344
00346     CTMenum AddAttribMap(const CTMfloat * aAttribValues, const char * aName)
00347     {
00348         CTMenum res = ctmAddAttribMap(mContext, aAttribValues, aName);
00349         CheckError();
00350         return res;
00351     }
00352
00354     void Save(const char * aFileName)
00355     {
00356         ctmSave(mContext, aFileName);
00357         CheckError();
00358     }
00359
00361     void SaveCustom(CTMwritefn aWriteFn, void * aUserData)
00362     {
00363         ctmSaveCustom(mContext, aWriteFn, aUserData);
00364         CheckError();
00365     }
00366
00367     // You can not copy nor assign from one CTMexporter object to another, since
00368     // the object contains hidden state. By declaring these dummy prototypes
00369     // without an implementation, you will at least get linker errors if you try
00370     // to copy or assign a CTMexporter object.
00371     CTMexporter(const CTMexporter& v);
00372     CTMexporter& operator=(const CTMexporter& v);
00373 };
00374
00375 #endif // __OPENCTMPP_H_
00376
00377 #endif // OPENCTM_NO_CPP

```

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