

# **CAST3D XML Schema for .XC3 file format**

**Specifications**

**Version 0.9**

**Draft**

**March 2008**

## About this document

This document describes the format of .xc3 data file for Cast3D animation framework library. For more information on Cast3D visit <http://cast3d.org>.

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## Requirements and assumptions

Document assumes that reader is familiar with:

- Extensible Markup Language (XML) 1.0, 2nd Edition  
<http://www.w3.org/TR/REC-xml/>
- Basic concepts of 3D computer graphics.
- 3D modeling and key-framed animation.

## Convention

Certain Typographic Conventions are used throughout this manual to clarify the meaning of the text:

Regular text	Descriptive text
Courier-type font	References to class, method, and variable names
<b>Courier bold</b>	Samples
<i>Italic</i>	Predefined values
<a href="#">blue</a>	Hyperlinks

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# Chapter 1 Overview

## Introduction

Cast3D is framework library with supports visualization of 3D models and key-framed animation, at the moment this document is written, implemented in Adobe ActionScript for Flash.

Cast3D animation framework library supports .xc3 XML data files. Which means it is capable of reading, parsing and visualizing content of a correctly formed .xc3 file.

The content of .xc3 file is XML data formed in accordance with schema described in this document.

## Concept and structure

The data in Cast3D is partitioned by *scenes*. Any *Scene* may include collection of 3D geometrical objects, light(s) information, sound, video, point of view etc..., and definition of motion or change of state of any type of listed above.

The definition of motion, in turn, includes collection of *key-frames*. *Key frame* represents a 3D scene that is being visualized at current moment (time) in animation sequence. And it consists of a number of nodes which can reference geometrical object, light, point of view (camera) etc... , and has a history of stage change for each time in key-frame. This history object can have spatial geometry transformation or change of color or something else, and it is called *track*.

The XML data structure of .xc3 file directly reflects layout described above. The root element is <CAST3D> .

There are few top level elements below root:

- <description> - descriptive file information block.
- <lighting> - optional global light information.
- <background> - optional background information block.
- <scene> - 3D scene information.

The most interesting is <scene> element. Let's quickly review it. Detailed description is provided below in 'Element reference' chapter.

Possible sub-elements of it are representing collections of different kind of data, required to visualize and animate scene:

- <data> - raw data arrays
- <assets> - definition of assets like, images, sound, video, etc...
- <materials> - geometrical object's material data definitions
- <geoms> - geometry definitions
- <objects> - definition of objects, like geometry meshes, camera etc...
- <sampling> - motion state and interpolation keys

<tracks> - motion state data definitions  
<nodes> - instance of 3D scene objects  
<frames> - collection of key frames in animation sequence

There is a special XML element <bind> that helps establish relationships between elements under certain context. Context is pure discretion of element within which <bind> element appears on how to interpret referenced item.

## ***Usage and Implementation details***

Sometimes it may be useful to know the way Cast3D library parses the file.

After the files is loaded for each scene Cast3D looks for key-frame collection and instantiate nodes and perfectly 3D geometry data associated with them.

The nodes that are not in the list of any key-frame and no have parent node will never be instantiated, although are present in a file.

All the instances of any object that has unique identifier will be placed Source3D class heap, and can be retrieved any time during execution by identifier string.

The best way to create valid .xc3 file is to use ImportCast3D C++ library API. It guaranties that file will be correctly formed. There are few import utilities for a number of 3D data file formats, like 3dsMAX .3ds, Quake II .md2 and COLLADA, are built using import library. Due to limitations of file format or 3D model data, not always all desired data can be imported from a single source.

So, sometimes manual intervention is required to update, modify .xc3 file. For example, replacing texture image file name requires update of corresponding <asset> element in order to Cast3D can apply texture.

For this purposes an XML editor or just text editor can be used, until more sophisticated modeling studio environment will be created.

Since, .xc3 file is a text XML file most of the time being imported for other 3D files , it may get fairly big in size. So please use discretion on 3D scene polygon size. At the moment thins document is written, Flash can handle no more than 10K polygon models, 3-4K would be about the right size.

To minimize network traffic and speed up loading of 3D data file' **deflate**' utility was introduced. This utility converts .xc3 text XML file into.zc3 file, which is just compressed version of original file, but also can be loaded buy Cast3D library.

For more details, please, visit [cast3d.org](http://cast3d.org).

## ***Syntax and element addressing***

XML element names attributes and values used in .xc3 file are case insensitive.

There is a special purpose element <bind>, which is used to reference the other element within <scene>.

## Chapter 2Element reference

## asset

---

### Description

Defines information about external asset file, like image, sound etc...

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>source</b>	required	URL path to a file.
<b>type</b>	required	String describing on how to interpret source, Possible values: <i>image, sound, video, movie</i> .
<b>source_type</b>	optional	source data format

### Related Elements

Occurrence	0 or more
Parent elements	<assets>

### Child Elements

None.

### Remarks

### Example

```
<assets>  
  <asset id="Material #1_matdata" type="image"  
  source="STEALTH.JPG" source_type="jpeg"></asset>  
</assets>
```

## **assets**

---

### **Description**

Declares collection of <asset> elements.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<scene>

### **Child Elements**

<asset>	0 or more
---------	-----------

### **Remarks**

### **Example**

**<assets>**

```
  <asset id="Material #1_matdata" type="image"
source="STEALTH.JPG" source_type="jpeg"></asset>
```

**</assets>**

## **author**

---

### **Description**

Defines descriptive information about author of data.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<description>

### **Child Elements**

None.

### **Remarks**

### **Example**

```
<description>  
  <author>Peter the Great</author>  
</description>
```

## **authoring\_tool**

---

### **Description**

Defines descriptive information about tool data has been created.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<description>

### **Child Elements**

None.

### **Remarks**

### **Example**

```
<description>  
    <authoring_tool>Blender v. 2.01 </authoring_tool>  
</description>
```

## background

---

### Description

Defines information about background of 3D scene.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>type</b>	required	String describing on how to interpret source, Possible values: <i>image</i> , <i>sound</i> , <i>video</i> , <i>movie</i> .

### Related Elements

Occurrence	0 or 1
Parent elements	<scene>

### Child Elements

<rgba>	0 or 1
<image>	0 or 1

### Remarks

### Example

```
<background id="back_1" type="texture">  
  <image source="sky.jpg" source_type="jpeg"></image>  
</background>
```

## bezier

---

### Description

Declares holder for <keys> elements containing data keys of *bezier* interpolation type.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
-----------	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<sampling>

### Child Elements

<keys>	0 or 1
--------	--------

### Remarks

Bezier interpolation key has 3 values.

- time* - integer number, represents a frame number in animation sequence.
- easeTo* - real value for incoming easing.
- easeFrom* - real value for outgoing easing.

### Example

```
<bezier id="stealth_pos_track_keys">  
  <keys count="1">0 0 0 </keys>  
</bezier>
```

## bind

---

### Description

This element is used to create relationship between XML elements.

### Attributes

<b>bind_id</b>	required	Text string containing identifier of the element to refer to.
<b>path</b>	required	Path to the parent of element to bind in a scope of current <scene> element.
<b>context</b>	required	Context string under which element is being bound. The value depends on what

### Related Elements

Occurrence	0 or more
Parent elements	<...>

### Child Elements

None.

### Remarks

### Example

```
<positiontrack id="stealth_track" start="0" end="0"
enabled="true" timeline="CLAMP" offset="0">
  <bind bind_id="pos_keys" context="spline"
path="sampling"></bind>
  <bind bind_id="pos_track" context="trackdata"
path="data"></bind>
</positiontrack>
```

## bone

---

### Description

Contains information about node participation and weight in parent <skin> element motion.

### Attributes

<b>weight</b>	required	Real value in range 0..1.
---------------	----------	---------------------------

### Related Elements

Occurrence	0 or 1
Parent elements	<skin>

### Child Elements

<bind>	0 or 1
<matrix>	0 or 1

### Remarks

Possible context values for <bind> element: *vertex\_index*, indication the index of vertices participating in transformations.

Total sum of weights of bones participating in skin motion should be equal to 1.

### Example

```
<skin id="skin_1" >
  <bone weight="1">
    <bind bind_id="hand_right" context="target"
path="objects"></bind>
    <bind bind_id="coords_list1" context="vertex_index"
path="data"></bind>
  </bone>
</skin>
```

## bytearray

---

### Description

Declares storage for array of octet values.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>count</b>	required	Number of values in array.
<b>context</b>	required	String describing context of data. Possible values.
<b>period</b>	required	Integer number of values representing a single information unit.

### Related Elements

Occurrence	0 or more
Parent elements	<data>

### Child Elements

None

### Remarks

### Example

```
<data>  
  <bytearray id="WSPHERE_vis_track_data" count="2"  
context="visibility" period="1">  
  0 1  
  </bytearray>  
</data>
```

## camera

---

### Description

Declares information about user point of view in 3D space.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>position</b>	required	3 space-separated real values. Define a user point of view location in 3D space world coordinates.
<b>target</b>	optional	3 space-separated real values. Define a user point of view location in 3D space world coordinates.
<b>up</b>	optional	Vertical Axis of camera.
<b>far</b>	required	Distance to far clipping plane of camera.
<b>near</b>	required	Distance to near clipping plane of camera.
<b>roll</b>	optional	Roll angle of camera along vertical axis..
<b>fov</b>	optional	Field of view angle of camera (default 45).

### Related Elements

Occurrence	0 or 1
Parent elements	<objects>

### Child Elements

None.

### Remarks

### Example

```
<objects>
  <camera id="Camera01_camera" position="-4483.17
-2324.18 -2651.37" target="1389.51 27.4691 487.332" up="0 1
0" near="0" far="1000" roll="0" fov="48">
    </camera>
</objects>
```

## cameranode

---

### Description

Declares information about user point of view in 3D space.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>parent_id</b>	required	Text string containing unique identifier of the instance of the element.

### Related Elements

Occurrence	0 or 1
Parent elements	<nodes>

### Child Elements

<bind>	0 or more
<matrix>	0 or 1
<rotate>	0 or more
<matrix>	0 or more
<pivot>	0 or 1

### Remarks

Possible context values for <bind> element: *target*, *track*. Context *target* should refer to <camera> element definition.

### Example

```
<nodes>
  <cameranode id="Camera01_node" parent="">
    <bind bind_id="Camera01_camera" context="target"
path="objects"></bind>
    <bind bind_id="Camera01_pos_track" context="track"
path="tracks"></bind>
    <bind bind_id="Camera01_fov_track" context="track"
path="tracks"></bind>
    <bind bind_id="Camera01_roll_track" context="track"
path="tracks"></bind>
  </cameranode>
</nodes>
```

## Cast3D

---

### Description

Defines root element of the file.

### Attributes

<b>version</b>	required	Text string containing version of file.
----------------	----------	---

### Related Elements

Occurrence	1
Parent elements	None.

### Child Elements

<scene>	0 or more
<lighting>	0 or 1
<background>	0 or 1
<description>	0 or 1

### Remarks

### Example

```
<CAST3D version="1.0.0">  
</CAST3D>
```

## color

---

### Description

Defines color information.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
-----------	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<materials> <background>

### Child Elements

<ambient>	0 or 1
<diffuse>	0 or 1
<specular>	0 or 1

### Remarks

### Example

```
<materials>
  <color id="SPHERE_matdata">
    <ambient>
      <rgba r="0.231373" g="0.231373" b="1"
a="1"></rgba>
    </ambient>
    <diffuse>
      <rgba r="0.231373" g="0.231373" b="1"
a="1"></rgba>
    </diffuse>
    <specular>
      <rgba r="1" g="1" b="1" a="1"></rgba>
    </specular>
  </color>
</materials>
```

## comments

---

### Description

Defines descriptive additional information about data.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<description>

### Child Elements

None.

### Remarks

### Example

```
<description>
  <version>0.9 Alpha</version>
  <author></author>
  <authoring_tool>Morphing Sphere generator
sample.</authoring_tool>
  <source></source>
  <created>Thu Jan 24 12:31:50 2008
</created>
  <modified>Thu Jan 24 12:31:50 2008
</modified>
  <copyright></copyright>
  <comments>Animated sample with generated Sphere
geometry colapses to flat XZ plane and expands
back.</comments>
</description>
```

## copyright

---

### Description

Defines descriptive information about data copyrights.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<description>

### Child Elements

None.

### Remarks

### Example

```
<description>
  <version>0.9 Alpha</version>
  <author>Peter the Great</author>
  <authoring_tool>Cool model.</authoring_tool>
  <copyright>This model provided under MIT
licence</copyright>
</description>
```

## cosine

---

### Description

Defines holder for <keys> elements containing data keys of *cosine* interpolation type.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
-----------	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<sampling>

### Child Elements

<keys>	0 or 1
--------	--------

### Remarks

Cosine interpolation key has Only one value.

*time* - integer number, represents a frame number in animation sequence.

### Example

```
<cosine id="stealth_pos_track_keys">  
  <keys count="3">0 10 20 </keys>  
</cosine>
```

## **created**

---

### **Description**

Defines descriptive information about date and time file is created.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<description>

### **Child Elements**

None.

### **Remarks**

### **Example**

```
<description>
  <version>0.9 Alpha</version>
  <author></author>
  <authoring_tool>Morphing Sphere generator
sample.</authoring_tool>
  <source></source>
  <created>Thu Jan 24 12:31:50 2008
</created>
  <modified>Thu Jan 24 12:31:50 2008
</modified>
</description>
```

## **data**

---

### **Description**

Declares collection of data array elements.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<scene>

### **Child Elements**

<bytearray>	0 or more
<intarray>	0 or more
<realarray>	0 or more
<stringarray>	0 or more

### **Remarks**

### **Example**

```
<data>  
  <intarray id="stealth_polygons" count="1626"  
context="index" period="3"> 1 2 4 7 3 ...  
  </intarray>  
</data>
```

## **description**

---

### **Description**

Declares descriptive information block holder.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<CAST3D>

### **Child Elements**

<version>	0 or 1
<author>	0 or 1
<authoring_tool>	0 or 1
<source>	0 or 1
<created>	0 or 1
<modified>	0 or 1
<copyright>	0 or 1
<comments>	0 or 1

### **Remarks**

### **Example**

```
<description>
  <version>1.9</version>
  <author>Peter the Great</author>
  <source></source>
  <created>Thu Jan 24 12:31:50 2008</created>
  <modified>Thu Jan 24 12:31:50 2008</modified>
</description>
```

## fovtrack

---

### Description

Declares information about Camera Field of View angle (degree) value change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*.

### Example

```
<tracks>
  <fovtrack id="Camera01_fov_track" start="0" end="0"
  enabled="true" timeline="CLAMP" offset="0">
    <bind bind_id="Camera01_fov_track_keys"
  context="spline" path="sampling"></bind>
    <bind bind_id="Camera01_fov_track_data"
  context="trackdata" path="data"></bind>
  </fovtrack>
</tracks>
```

## frames

---

### Description

Declares collection of <keyframe> elements.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<scene>

### Child Elements

<keyframe>	0 or more
------------	-----------

### Remarks

### Example

```
<frames>
  <keyframe id="kf" frames="101" start="0" end="100">
    <bind bind_id="sphere_node" context="node3d"
path="nodes"></bind>
  </keyframe>
</frames>
```

## **geoms**

---

### **Description**

Declares collection of <geometry> elements.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<scene>

### **Child Elements**

<geometry>	0 or more
------------	-----------

### **Remarks**

### **Example**

```
<geoms>
  <geometry id="sphere_mesh" type="triad">
    <bind bind_id="sphere_coords" context="coords"
path="data"></bind>
    <bind bind_id="sphere_polygons" context="polygons"
path="data"></bind>
  </geometry>
</geoms>
```

## geometry

---

### Description

Defines information about a geometrical mesh.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>type</b>	required	String value indicating type of mesh. Possible values: <i>NODE, LINE, TRIAD, QUAD, NPOLY</i> .

### Related Elements

Occurrence	0 or 1
Parent elements	<geoms>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

To be valid geometrical mesh, element <geometry> should have reference to at least one vertex coordinates data array and one polygon connectivity array.

Possible context values for <bind> element: *coords, polygons, vertex\_normals*.

### Example

```
<geometry id="WSPHERE_mesh" type="triad">  
  <bind bind_id="WSPHERE_coords" context="coords"  
  path="data"></bind>  
  <bind bind_id="WSPHERE_polygons" context="polygons"  
  path="data"></bind>  
</geometry>
```

## hermite

---

### Description

Defines holder for <keys> elements containing data keys of *hermite* interpolation type.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
-----------	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<sampling>

### Child Elements

<keys>	0 or 1
--------	--------

### Remarks

Hermite interpolation key has 3 values.

*time* - integer number, represents a frame number in animation sequence.

*bias* - real value bias.

*tension* - real value tension.

### Example

```
<hermite id="stealth_pos_track_keys">  
  <keys count="3">0 0 0 10 0 0 20 0 0 </keys>  
</hermite>
```

## intarray

---

### Description

Declares storage for array of integer values.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>count</b>	required	Number of values in array.
<b>context</b>	required	String describing context of data. Possible values.
<b>period</b>	required	Integer number of values representing a single information unit.

### Related Elements

Occurrence	0 or more
Parent elements	<data>

### Child Elements

None

### Remarks

### Example

```
<data>
  <intarray id="stealth_polygons" count="1626"
context="index" period="3"> 1 2 4 7 3 ...
  </intarray>
</data>
```

## keyframe

---

### Description

Declares collection of references to top level <node> elements of 3D scene.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>frames</b>	required	Positive integer number indicates total number of frames

### Related Elements

Occurrence	0 or 1
Parent elements	<frames>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *node3d*, *cameranode3d*

### Example

```
<frames>
  <keyframe id="kf" frames="101" start="0" end="100">
    <bind bind_id="Camera01_node"
context="cameranode3d" path="nodes"></bind>
    <bind bind_id="sphere_node" context="node3d"
path="nodes"></bind>
  </keyframe>
</frames>
```

## keys

---

### Description

Defines data container for interpolation keys of specific type, depending under which parent element it appears.

### Attributes

<b>count</b>	required	Number of keys in array.
--------------	----------	--------------------------

### Related Elements

Occurrence	0 or 1
Parent elements	<bezier>, <linear>, <cosine>, <hermite>, <tcb>

### Child Elements

None

### Remarks

Number of key of array should match to number of values in <track> data array.

### Example

```
<linear id="stealth_pos_track_keys">  
  <keys count="3">0 10 20 </keys>  
</linear>
```

## lighting

---

### Description

Describes information about global light of 3D scene.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>direction</b>	required	3 space-separated real values. Define location in 3D space world coordinates.
<b>intensity</b>	optional	Value in range 0... 1

### Related Elements

Occurrence	0 or 1
Parent elements	<scene>

### Child Elements

<rgba>	0 or 1
--------	--------

### Remarks

### Example

```
<lighting id="Light01" direction="-24499.6 30384 43362.3">  
  <rgba r="0.0392157" g="0.0392157" b="0.0392157"  
  a="7.17465e-043"></rgba>  
</lighting>
```

## linear

---

### Description

Defines holder for <keys> elements containing data keys of *linear* interpolation type.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
-----------	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<sampling>

### Child Elements

<keys>	0 or 1
--------	--------

### Remarks

Linear interpolation key has single value.

*time* - integer number, represents a frame number in animation sequence.

### Example

```
<linear id="stealth_pos_track_keys">  
  <keys count="3">0 10 20 </keys>  
</linear>
```

## material

---

### Description

Defines data information about a geometrical mesh material.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>type</b>	required	String value indicating type of material. Possible values: <i>color</i> , <i>texture</i> .
<b>sides</b>	optional	String value indicating if material is single or double sided. Possible values: <i>single</i> (default), <i>double</i>

### Related Elements

Occurrence	0 or 1
Parent elements	<materials>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *texture*, *color*, *materialdata*

### Example

```
<materials>
  <material id="Material #1" sides="single"
type="texture">
  <bind bind_id="Material #1_matdata"
context="materialdata" path="assets"></bind>
</material>
</materials>
```

## materials

---

### Description

Declares collection of <material> elements.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<scene>

### Child Elements

<material>	0 or more
------------	-----------

### Remarks

### Example

```
<materials>
  <material id="material" sides="single" type="texture">
    <bind bind_id="material_matdata"
context="materialdata" path="assets"></bind>
  </material>
</materials>
```

## materialtrack

---

### Description

Declares information about material value change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*, *target*. Context *target* refers to geometrical mesh material definition.

### Example

```
<tracks>
  <materialtrack id="WSPHERE_mat_track" start="0"
end="70" enabled="true" timeline="CLAMP" offset="0">
  <bind bind_id="WSPHERE_mat_track_keys"
context="spline" path="sampling"></bind>
  <bind bind_id="WSPHERE_mat_track_data"
context="trackdata" path="data"></bind>
  <bind bind_id="SPHERE_WHITE_matdata" path="objects"
context="target"></bind>
  </materialtrack>
</tracks>
```

## materialbinding

---

### Description

Defines information about a geometrical mesh material binding

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>type</b>	required	String value indicating type of material binding. Possible values: <i>binding_face</i> , <i>binding_vertex</i> .

### Related Elements

Occurrence	0 or 1
Parent elements	<part>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *tex\_coords*, *material*

### Example

```
<part id="stealth_part">
  <bind bind_id="stealth_mesh" context="geometry"
  path="geoms"></bind>
  <materialbinding id="Material #1_matbind"
  type="binding_face">
    <bind bind_id="Material #1" context="material"
  path="materials"></bind>
    <bind bind_id="stealth_texcoord"
  context="tex_coords" path="data"></bind>
  </materialbinding>
</part>
```

## **matrix**

---

### **Description**

Defines container for 3x4 matrix data.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<node>, <bone>

### **Child Elements**

### **Remarks**

### **Example**

```
<matrix>1 0 0 0 0 1 0 0 0 0 1 0 </matrix>
```

## **modified**

---

### **Description**

Defines descriptive information about date and time file is modified.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<description>

### **Child Elements**

None.

### **Remarks**

### **Example**

```
<description>
  <version>0.9 Alpha</version>
  <author></author>
  <authoring_tool>Morphing Sphere generator
sample.</authoring_tool>
  <source></source>
  <created>Thu Jan 24 12:31:50 2008
</created>
  <modified>Thu Jan 24 12:31:50 2008
</modified>
</description>
```

## morphtrack

---

### Description

Describes data change history of geometrical meshes. History changes could be related to mesh vertex positions, normals or/and texture coordinates.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.
<b>method</b>	optional	String value indicates algorithm for blending values. Possible values: <i>PROPOTIONAL</i> (default), <i>RELATIVE</i>

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
<targetgroup>	0 or more

### Remarks

If **method** *PROPOTIONAL* is used, calculation between frames will use formulae:  
 $v = \text{base} * (1.0 - \text{weight1} - \text{weight2} \dots) + \text{weight1} * \text{Target1} + \text{weight2} * \text{Target2} \dots$

For *RELATIVE* **method** the following calculation is used:

$v = \text{base} + \text{weight1} * \text{Target1} + \text{weight2} * \text{Target2} \dots$

Possible context values for <bind> element: *spline*, *trackdata*.

### Example

```
<tracks>
  <morphtrack id="sphere_node_morph_track" start="0"
end="100" enabled="true" timeline="CLAMP" offset="0"
method="proportional">
  <bind bind_id="sphere_node_morph_track_keys"
context="spline" path="sampling"></bind>
```

```
    <targetgroup>
      <target weight="1">
        <bind bind_id="sphere_deformed__coords"
context="positions" path="data"></bind>
      </target>
    </targetgroup>
    <targetgroup>
      <target weight="1">
        <bind bind_id="sphere_coords"
context="positions" path="data"></bind>
      </target>
    </targetgroup>
  </morphtrack>
</tracks>
```

## movietrack

---

### Description

Declares information about movie material state change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*, *target*. Context *target* refers to geometrical mesh material definition.

### Example

## node

---

### Description

Declares instance of 3D object and its motion history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>parent</b>	required	Text string containing identifier of a parent node.

### Related Elements

Occurrence	0 or more
Parent elements	<frames>

### Child Elements

<bind>	0 or more
<matrix>	0 or 1
<pivot>	0 or 1
<rotate>	0 or more
<translate>	0 or more

### Remarks

Possible context values for <bind> element: *target*, *track*. Context *target* refers to geometrical mesh definition.

If attribute **parent** is blank, the node is considered to be a top level node and should appear in <keyframe> reference list. In case it does not, the instance of the node will never be instantiated.

### Example

```
</nodes>
  <node id="WSPHERE_node" parent="FRAME_node">
    <bind bind_id="WSPHERE_part" context="target"
path="objects"></bind>
    <bind bind_id="WSPHERE_pos_track" context="track"
path="tracks"></bind>
    <bind bind_id="WSPHERE_rot_track" context="track"
path="tracks"></bind>
  </node>
</nodes>
```

## nodes

---

### Description

Declares collection of <node> elements.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<scene>

### Child Elements

<node>	0 or more
<cameranode>	0 or more

### Remarks

### Example

#### <nodes>

```
<node id="BSHERE_node" parent="FRAME_node">
  <bind bind_id="BSHERE_part" context="target"
path="objects"></bind>
  <bind bind_id="BSHERE_pos_track" context="track"
path="tracks"></bind>
  <bind bind_id="BSHERE_rot_track" context="track"
path="tracks"></bind>
  <bind bind_id="BSPHERE_vis_track" context="track"
path="tracks"></bind>
</node>
<cameranode id="Camera01_node" parent="">
  <bind bind_id="Camera01_camera" context="target"
path="objects"></bind>
  <bind bind_id="Camera01_pos_track" context="track"
path="tracks"></bind>
  <bind bind_id="Camera01_fov_track" context="track"
path="tracks"></bind>
  <bind bind_id="Camera01_roll_track" context="track"
path="tracks"></bind>
</cameranode>
```

#### </nodes>

## objects

---

### Description

Declares collection of elements representing the instances of 3D objects and camera.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<scene>

### Child Elements

<part>	0 or more
<camera>	0 or more
<skin>	0 or more

### Remarks

### Example

```
<objects>
  <part id="sphere_part">
    <bind bind_id="sphere_mesh" context="geometry"
path="geoms"></bind>
    <materialbinding id="material_matbind">
      <bind bind_id="material" context="material"
path="materials"></bind>
      <bind bind_id="sphere_uvcoords"
context="tex_coords" path="data"></bind>
    </materialbinding>
  </part>
</objects>
```

## part

---

### Description

Defines information about of 3D object.

### Attributes

id	required	Text string containing unique across whole file identifier of the element.
----	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<objects>

### Child Elements

<bind>	0 or more
<materialbinding>	1 or more

### Remarks

Possible context values for <bind> element: *geometry*.

### Example

```
<objects>
  <part id="tris.md2_part">
    <bind bind_id="tris.md2_mesh" context="geometry"
path="geoms"></bind>
    <materialbinding id="cd2000.pcx_matbind">
      <bind bind_id="cd2000.pcx" context="material"
path="materials"></bind>
      <bind bind_id="tris.md2_texcoord"
context="tex_coords" path="data"></bind>
    </materialbinding>
  </part>
  <camera id="Camera01_camera" position="29.7946
-58.6083 -66.5591" target="10 -10.4818 -38.0663" up="0 1 0"
near="0" far="1000" roll="0" fov="48">
  </camera>
</objects >
```

## **pivot**

---

### **Description**

Defines point of rotation in local coordinate system for a node.

### **Attributes**

<b>x</b>	required	Real value for X local coordinate.
<b>y</b>	required	Real value for Y local coordinate.
<b>z</b>	required	Real value for Z local coordinate.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<node>

### **Child Elements**

### **Remarks**

### **Example**

```
node id="FRAME_node" parent="">
  <bind bind_id="FRAME_part" context="target"
path="objects"></bind>
  <bind bind_id="FRAME_pos_track" context="track"
path="tracks"></bind>
  <bind bind_id="FRAME_rot_track" context="track"
path="tracks"></bind>
  <bind bind_id="FRAME_scl_track" context="track"
path="tracks"></bind>
  <pivot x="9.87954" y="-10" z="-40"></pivot>
/node>
```

## positiontrack

---

Declares information about spatial position (vector) value change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*.

**offset** attribute is usually used together with **timeline** value set to *REPEAT* to start motion from point other than first in animation sequence. For example, if track represents a walking transformations for a character, sometimes, you may start not at first frame, but at specific one, let's say, when 'right' foot goes up.

### Example

```
<tracks>
  <positiontrack id="Camera01_pos_track" start="0"
end="120" enabled="true" timeline="CLAMP" _offset="0">
  <bind bind_id="Camera01_pos_track_keys"
context="spline" path="sampling"></bind>
  <bind bind_id="Camera01_pos_track_data"
context="trackdata" path="data"></bind>
  </positiontrack>
</tracks>
```

## realarray

---

### Description

Declares storage for array of real number values.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>count</b>	required	Number of values in array.
<b>context</b>	required	String describing context of data. Possible values.
<b>period</b>	required	Integer number of values representing a single information unit.

### Related Elements

Occurrence	0 or more
Parent elements	<data>

### Child Elements

None

### Remarks

### Example

```
<data>  
  <realarray id="stealth_pos_track_data" count="3"  
context="vector" period="3">  
  -1.37291 2.2583 -91.8719  
  </realarray>  
</data>
```

## rgba

---

### Description

Defines color component values.

### Attributes

<b>r</b>	required	Real value for Red color component in range 0..1
<b>g</b>	required	Real value for Green color component in range 0..1
<b>b</b>	required	Real value for Blue color component in range 0..1
<b>a</b>	required	Real value for Alpha (transparency) component in range 0..1

### Related Elements

Occurrence	0 or more
Parent elements	<color> <lighting>

### Child Elements

None.

### Remarks

### Example

```
<materials>
  <color id="SPHERE_matdata">
    <ambient>
      <rgba r="0.231373" g="0.231373" b="1"
a="1"></rgba>
    </ambient>
    <diffuse>
      <rgba r="0.231373" g="0.231373" b="1"
a="1"></rgba>
    </diffuse>
    <specular>
      <rgba r="1" g="1" b="1" a="1"></rgba>
    </specular>
  </color>
</materials>
```

## rolltrack

---

### Description

Declares information about Camera roll angle (degree) value change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*.

### Example

```
<tracks>
  <rolltrack id="Camera01_roll_track" start="0" end="0"
enabled="true" timeline="CLAMP" _offset="0">
  <bind bind_id="Camera01_roll_track_keys"
context="spline" path="sampling"></bind>
  <bind bind_id="Camera01_roll_track_data"
context="trackdata" path="data"></bind>
</rolltrack>
</tracks>
```

## rotate

---

### Description

Defines rotation of a node about <pivot> point with axis(x y z) and angle (radians) values.

### Attributes

None.

### Related Elements

Occurrence	0 or more
Parent elements	<node>

### Child Elements

### Remarks

### Example

```
<node id="stealth_node" parent="">
  <bind bind_id="stealth_part" context="target"
path="objects"></bind>
  <bind bind_id="stealth_pos_track" context="track"
path="tracks"></bind>
  <bind bind_id="stealth_rot_track" context="track"
path="tracks"></bind>
  <bind bind_id="stealth_scl_track" context="track"
path="tracks"></bind>
  <bind bind_id="stealth_sound_track" context="track"
path="tracks"></bind>
  <rotate>0 0 -1 1.4 </rotate>
</node>
```

## rotationtrack

---

Declares information about spatial rotation, axis angle (in radians) pair, value change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*.

**offset** attribute is usually used together with **timeline** value set to *REPEAT* to start motion from point other than first in animation sequence. For example, if track represents a walking transformations for a character, sometimes, you may start not at first frame, but at specific one, let's say, when 'right' foot goes up.

### Example

```
<tracks>
  <rotation id="stealth_rot_track" start="0" end="120"
enabled="true" timeline="CLAMP" _offset="0">
  <bind bind_id="kc10_rot_track_keys"
context="spline" path="sampling"></bind>
  <bind bind_id="kc10_rot_track_data"
context="trackdata" path="data"></bind>
</rotation>
</tracks>
```

## sampling

---

### Description

Declares collection of elements for interpolation control.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<scene>

### Child Elements

<tcb>	0 or more
<linear>	0 or more
<bezier>	0 or more
<cosine>	0 or more
<hermite>	0 or more

### Remarks

### Example

```
<sampling>
  <tcb id="BSHERE_pos_track_keys">
    <keys count="1">0 0 0 0 0 0 </keys>
  </tcb>
</sampling>
```

## scaletrack

---

Declares information about spatial scale, three real numbers, value change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*.

### Example

```
<tracks>
  <scale id="stealth_scl_track" start="0" end="0"
enabled="true" timeline="CLAMP" _offset="0">
  <bind bind_id="kc10_scl_track_keys"
context="spline" path="sampling"></bind>
  <bind bind_id="kc10_scl_track_data"
context="trackdata" path="data"></bind>
  </scale>
</tracks>
```

## scene

---

### Description

Declares collection of all mandatory and optional elements representing instance of a 3D Scene.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
-----------	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<Cast3D>

### Child Elements

<assets>	0 or 1
<data>	0 or 1
<materials>	0 or 1
<geoms>	0 or 1
<objects>	0 or 1
<sampling>	0 or 1
<tracks>	0 or 1
<nodes>	0 or 1
<frames>	0 or 1

### Remarks

### Example

## skin

---

### Description

Defines information about of 3D skin object. Skin vertex coordinate transformations depend on influencing bones, defined as child <bone> elements.

### Attributes

id	required	Text string containing unique across whole file identifier of the element.
----	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<objects>

### Child Elements

<bind>	0 or more
<materialbinding>	1 or more
<bone>	0 or more

### Remarks

Possible context values for <bind> element: *geometry*.

### Example

```
<objects>
  <skin id="tris.md2_part">
    <bind bind_id="tris.md2_mesh" context="geometry"
path="geoms"></bind>
    <materialbinding id="cd2000.pcx_matbind">
      <bind bind_id="cd2000.pcx" context="material"
path="materials"></bind>
      <bind bind_id="tris.md2_texcoord"
context="tex_coords" path="data"></bind>
    </materialbinding>
    <bone weight="1">
      <bind bind_id="hand_right" context="target"
path="objects"></bind>
      <bind bind_id="coords_list1"
context="vertex_index" path="data"></bind>
    </bone>
  </skin>
</objects >
```

## soundtrack

---

### Description

Declares information about sound state, volume, and balance change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*.

### Example

```
<soundtrack id="stealth_sound_track" start="0" end="120" enabled="true"
timeline="CLAMP" offset="0">
  <bind bind_id="kc10_sound_track_keys" context="spline" path="sampling"></bind>
  <bind bind_id="kc10_sound_track_data" context="trackdata" path="data"> </bind>
  <bind bind_id="kc10_sound_track_vol_keys" context="spline_sound_volume"
path="sampling"> </bind>
  <bind bind_id="kc10_sound_volume_data" context="trackdata" path="data"> </bind>
  <bind bind_id="kc10_sound_track_keys" context="spline_sound_balance"
path="sampling"> </bind>
  <bind bind_id="kc10_sound_balance_data" context="trackdata" path="data"> </bind>
  <bind bind_id="kc10_sound_source" context="trackdata" path="assets"> </bind>
</soundtrack>
```

## source

---

### Description

Defines descriptive information about the source of data in file, usually file name.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<description>

### Child Elements

None.

### Remarks

### Example

```
<description>
  <version>0.9 Alpha</version>
  <author>Peter the Great</author>
  <created>Thu Jan 24 12:31:50 2008
</created>
  <modified>Thu Jan 24 12:31:50 2008
</modified>
<source>MyPrettyModel.3ds</source>
</description>
```

## stringarray

---

### Description

Declares storage for array of string values.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>count</b>	required	Number of values in array.
<b>context</b>	required	String describing context of data. Possible values.
<b>period</b>	required	Integer number of values representing a single information unit.

### Related Elements

Occurrence	0 or more
Parent elements	<data>

### Child Elements

None

### Remarks

### Example

```
<data>  
  <stringarray id="stealth_names" count="3"  
context="id" period="1"> data1 data2 data3 </stringarray>  
</data>
```

## target

---

### Description

Defines data of weights and references to 3D object elements participating in coordinate blending for a <morphtrack>.

### Attributes

<b>weight</b>	required	Real value in range 0..1.
---------------	----------	---------------------------

### Related Elements

Occurrence	1 or more
Parent elements	<targetgroup>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Total sum of weight values of participating targets in <targetgroup> should be equal to 1.0.

Possible context values for <bind> element: *positions, normals, texcoords*.

### Example

```
<targetgroup>
  <target weight="1">
    <bind bind_id="sphere_deformed_coords"
context="positions" path="data"> </bind>
  </target>
</targetgroup>
```

## targetgroup

---

### Description

Declares collection of <targets> elements containing references to 3D object elements participating in coordinate blending for a <morphtrack>.

### Attributes

None.

### Related Elements

Occurrence	0 or more
Parent elements	<morphtrack>

### Child Elements

<target>	0 or more
----------	-----------

### Remarks

Total sum of weight values of participating targets in <targetgroup> should be equal to 1.0.

### Example

```
<targetgroup>
  <target weight="1">
    <bind bind_id="sphere_deformed_coords"
context="positions" path="data"> </bind>
  </target>
</targetgroup>
```

## tcb

---

### Description

Defines holder for <keys> elements containing data keys of *tcb* interpolation type.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
-----------	----------	--

### Related Elements

Occurrence	0 or more
Parent elements	<sampling>

### Child Elements

<keys>	0 or 1
--------	--------

### Remarks

TCB interpolation key has 6 values.

- time* - integer number, represents a frame number in animation sequence.
- bias* - real value bias.
- tension* - real value tension.
- continuity* - real value continuity.
- easeTo* - real value for incoming easing.
- easeFrom* - real value for outgoing easing.

### Example

```
<tcb id="stealth_pos_track_keys">  
  <keys count="2">0 0 0 0 0 0 10 0 0 1 0 0 1</keys>  
</tcb>
```

## tracks

---

### Description

Declares collection of <track> elements for data state change control.

### Attributes

None.

### Related Elements

Occurrence	0 or 1
Parent elements	<scene>

### Child Elements

<positiontrack>	0 or more
<rotationtrack>	0 or more
<scaletrack>	0 or more
<visibilitytrack>	0 or more
<fovtrack>	0 or more
<rolltrack>	0 or more
<materialtrack>	0 or more
<videotrack>	0 or more
<movietrack>	0 or more
<soundtrack>	0 or more
<morphtrack>	0 or more

### Remarks

### Example

```
<tracks>
  <rotationtrack id="BSHERE_rot_track" start="0"
end="0" enabled="true" timeline="CLAMP" _offset="0">
  <bind bind_id="BSHERE_rot_track_keys"
context="spline" path="sampling"></bind>
  <bind bind_id="BSHERE_rot_track_data"
context="trackdata" path="data"></bind>
  </rotationtrack>
</tracks>
```

## translate

---

### Description

Defines translation vector (x y z) of a node in local coordinate system.

### Attributes

None.

### Related Elements

Occurrence	0 or more
Parent elements	<node>

### Child Elements

### Remarks

### Example

```
<node id="stealth_node" parent="">
  <bind bind_id="stealth_part" context="target"
path="objects"></bind>
  <bind bind_id="stealth_pos_track" context="track"
path="tracks"></bind>
  <bind bind_id="stealth_rot_track" context="track"
path="tracks"></bind>
  <bind bind_id="stealth_scl_track" context="track"
path="tracks"></bind>
  <bind bind_id="stealth_sound_track" context="track"
path="tracks"></bind>
  <translate>100 0 0 </translate>
</node>
```

## **version**

---

### **Description**

Defines descriptive information about the version of date in file.

### **Attributes**

None.

### **Related Elements**

Occurrence	0 or 1
Parent elements	<description>

### **Child Elements**

None.

### **Remarks**

### **Example**

```
<description>
  <version>4.9</version>
  <author>Peter the Great</author>
  <created>Thu Jan 24 12:31:50 2008
</created>
  <modified>Thu Jan 24 12:31:50 2008
</modified>
<source>MyPrettyModel.3ds</source>
</description>
```

## videotrack

---

### Description

Declares information about video material state, volume, and balance change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*, *target*. Context *target* refers to geometrical mesh material definition.

### Example

```
<videorack id="stealth_video_track" start="0" end="120" enabled="true"
timeline="CLAMP" offset="0">
  <bind bind_id="kc10video_track_keys" context="spline" path="sampling"></bind>
  <bind bind_id="kc10_video_track_data" context="trackdata" path="data"> </bind>
  <bind bind_id="kc10_video_track_vol_keys" context="spline_video_volume"
path="sampling"> </bind>
  <bind bind_id="kc10_video_volume_data" context="trackdata" path="data"> </bind>
  <bind bind_id="kc10_video_track_keys" context="spline_video_balance"
path="sampling"> </bind>
  <bind bind_id="kc10_video_balance_data" context="trackdata" path="data"> </bind>
  <bind bind_id="kc10_video_source" context="trackdata" path="assets"> </bind>
</videotrack>
```

## visibilitytrack

---

### Description

Declares information about 3D scene object visibility state value change history.

### Attributes

<b>id</b>	required	Text string containing unique across whole file identifier of the element.
<b>start</b>	required	Positive integer number indicates starting frame.
<b>end</b>	required	Positive integer number indicates last frame.
<b>timeline</b>	optional	String text for controlling history repetition. Possible values: <i>CLAMP</i> (default), <i>REPEAT</i> , <i>ONCE</i>
<b>enabled</b>	optional	String value indicated status of track. Possible values: true(default), false
<b>offset</b>	optional	Integer number indicates offset of starting frame of the history sequence. Can be negative.

### Related Elements

Occurrence	0 or more
Parent elements	<tracks>

### Child Elements

<bind>	0 or more
--------	-----------

### Remarks

Possible context values for <bind> element: *spline*, *trackdata*.

### Example

```
<tracks>
  <visibility id="WSPHERE_vis_track" start="0" end="25"
  enabled="true" timeline="CLAMP" _offset="0">
    <bind bind_id="WSPHERE_vis_track_keys"
  context="spline" path="sampling"></bind>
    <bind bind_id="WSPHERE_vis_track_data"
  context="trackdata" path="data"></bind>
  </visibility>
</tracks>
```

