COLLADA and glTF

**COLLADA**

Two way 3D asset **INTERCHANGE**
ISO Standard Lossless Archival
Flexible specialization and toolchains

- Maya
- Max
- Motion Builder
- Unity
- Sketchup
- Blender

... ...

**COLLADA enables the flow of assets through sophisticated toolchains**

collada2gltf

gltF delivers assets to run-time applications

**GLTF**

Efficient runtime 3D asset **TRANSMISSION**
Compact File Size
Easy to unpack and use on all platforms

- Vulkan
- DirectX 12
- WebGL

COLLADA and glTF diagram:

© Copyright Khronos Group 2017 - Page 2
COLLADA Status - Stable

• 1.4.1 was released SIGGRAPH 2006 - 11 years ago (1.0 was 2004)
  - Most implementations are 1.4.1 - stable
  - 1.5 release 2008
    - ISO/PAS 17506:2012 certified, used mainly for CAx and complex kinematics

• COLLADA derived formats
  - OpenRAVE robot interchange format
    http://openrave.org/docs/0.8.2/collada_robot_extensions/
  - AutomationML car industry provides interchange format
    https://www.automationml.org/o.red.c/home.html

• 1.4.1 extensions
  - Definitions
    https://www.khronos.org/collada/wiki/Category:COLLADA_extensions
  - Implementations, maintenance, bug fixes
    https://github.com/KhronosGroup/OpenCOLLADA
More Details

https://github.com/KhronosGroup/OpenCOLLADA
OpenCOLLADA library (SAX) for macOS, Windows, Linux
ColladaMax, ColladaMaya
Blender, Collada2Gltf ...
uses OpenCOLLADA

https://github.com/fl4re/COLLADAMobu
MotionBuilder using old FCollada library
Useful in game production, updated last april

Maya, Max also have native implementation with FBX library

Unity
Native editor import via FBX library
Editor exporter in store
  https://www.assetstore.unity3d.com/en/#!/content/40946
run-time importer in store
Import/Export libraries

OpenCollada
Assimp (http://assimp.sourceforge.net)
FBX (https://www.autodesk.com/products/fbx/overview)
AssetKit (https://github.com/recp/assetkit)

Status: In Progress:
3D importer/exporter library based on COLLADA 1.5 spec written in C99, it will full support COLLADA 1.4, 1.5+ and glTF,

And many others
Motion Builder Exporter

- Useful in production
  - Create skeleton / skin in Maya
  - Exports one .dae per skin. Export skeleton data with all models
    - Skeleton data small, used as a ‘key’ to the model. Checked by engine importer
  - Export various animations for skeleton, with Motion Builder
  - Run-time loads several daes, and take what it needs to allow multiple skins, multiple animations
  - Taking advantage of COLLADA’s URI-based external reference mechanism
DAEValidator

• New Test App for OpenCOLLADA
  - https://github.com/KhronosGroup/OpenCOLLADA/tree/master/DAEValidator
  - Verify your .dae documents
  - Supports 1.4, 1.5, and PhysX extensions
  - Runs unit tests for OpenCOLLADA

Options:
  - Validate against COLLADA schema or custom schema extensions
  - Check URI verifies that external documents exist and # fragments resolve to elements
  - Check Unique ID verifies ID attribute constraints
  - Check Unique SID verifies Scoped ID attribute constraints
New COLLADA Extensions

- Animation Extensions
- Physics Extensions

- Following COLLADA Extension process
  - HOW-TO (https://www.khronos.org/collada/wiki/How_to_create_a_COLLADA_Extension)
  - Design extension schema
  - Advertise extension at Khronos (https://www.khronos.org/collada/wiki/Portal:Extensions_directory)
  - Publishing extension schema to khronos.org

- Implementing in OpenCOLLADA
- Adding test cases in OpenCOLLADA DAEValidator
COLLADAMaya Extensions

• Animation events

Example

```
<animation_clip id="clip2" start="0" end="4.76666667">
    <instance_animation url="#clip2_c_torso_a_ue"/>
    <instance_animation url="#clip2_c_torso_b_ue"/>
    <instance_animation url="#clip2_c_torso_c_ue"/>
    <extra>
        <technique profile="OpenCOLLADAMaya">
            <event>
                <timestamps id="clip2-marker-input-array" count="4">0 1 2.26 3.56</timestamps>
                <markers id="clip2-marker-name-array" count="4">Foot_L Foot_R Foot_L Hand_L</markers>
            </event>
        </technique>
    </extra>
</animation_clip>
```
COLLADAMaya Extensions

- NVIDIA PhysX
  - https://www.khronos.org/blog/opencollada-maya-exporter-now-with-nvidia-physx-support
  - Adds most of the NVIDIA PhysX engine parameters
  - Created XML Schema for extension validation
  - Implemented in OpenCOLLADA

Extended COLLADA elements:

- `<physics_material>` Friction and restitution combine modes have been added to physics material
- `<rigid_body>` Actor flags, rigid body flags, linear and angular damping and many other parameters have been added
- `<rigid_constraint>` All parameters to fully describe a PxD6Joint in PhysX SDK have been added
- `<shape>` Extension adds filters data, contact/rest offsets, PxShape flags...
OpenCOLLADA Activity

- Released SIGGRAPH 2008. quite active till 2010 (Intel). Active again since 2015 (mostly Starbreeze but more and more external contributions)
- ~75 merged PRs since last SIGGRAPH
Fl4reBot and Jenkins

SUCCESS: exercise-opencollada-pull-request build #110

- Maya-2015, 2017-mac-pull-request build #398 with result SUCCESS. Artifacts: Maya 2015 Maya 2016 Maya 2017
- openCOLLADA-mac-pull-request build #408 with result SUCCESS. Artifacts: OpenCOLLADA Mac
- openCOLLADA-pc-pull-request build #403 with result SUCCESS. Artifacts: OpenCOLLADA Win
- openCOLLADA-ubuntu-pull-request build #297 with result SUCCESS. Artifacts: OpenCOLLADA Ubuntu

Pull Requests:

- PR #534: Consistent use of std::abs OpenCOLLADA

RemiArnaud commented on Jun 13

thank you for the contribution

RemiArnaud merged commit 3ae25759 into KhranosGroup:master on Jun 13

1 check passed

elfprince13 deleted the elfprince13:absfixes branch on Jun 13
Automated Tests

https://github.com/fl4re/openCOLLADAtests

openCOLLADAtests
Validation tests for OpenCOLLADA plugins.
Python test framework which allows you to validate OpenCOLLADA plugins for Maya, 3DSMax, MotionBuilder...

Requirements
Python 2.7 Applications to test (Maya, 3DSMax...) COLLADA plugin built in Release DAEValidator built in Release

Setup
By default, test framework supposes OpenCOLLADA and openCOLLADAtests projects are located in the same directory andthat applications (Maya, 3DSMax...) are installed to their default location (usually in C:\Program Files\Autodesk on Windows).

If default paths are not used you can tell where things are located by setting environment variables:

OPENCOLLADA_PATH path to OpenCOLLADA project folder
MAYA_PATH VVVV, X84 path to Maya installation where VVV isMaya version (2015, 2017...) 
ADSK_3DSMAX_v64, VVV path 3DSMax installation where VVV is 3DSMax version (2017...)

COLLADA plugins must be built in Release prior to running tests. They are automatically installed before running tests. You don't have to install them manually.

DAEValidator tool must be built in Release prior to running tests.

Running tests
To run tests, go to openCOLLADAtests folder and run the following command:

python launch.py

Continue:
New - Binary Packages in GitHub Release Tab

- **https://opencollada.fl4re.com** is no more! Archived binaries are now at **https://www.dropbox.com/sh/dzjyp1x8x5odt4d/AADX0hSFq34NyS5Ab5ssHDoCa?dl=0**
Thanks!

Questions?

remi.arnaud@starbreeze.com
mark.barnes@starbreeze.com
BOF BLITZ AFTER-PARTY

Come Back at 5:45 for the After-Party

SPONSORED BY:

WWW.KHRONOS.ORG