

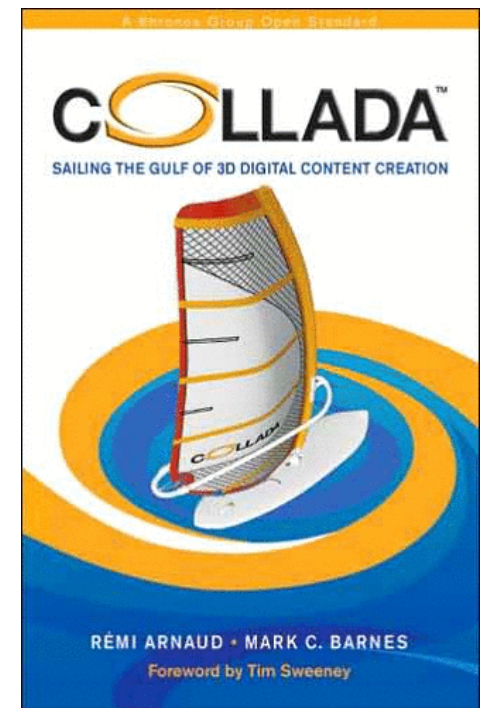


# **A XML standard for Digital Asset Exchange**

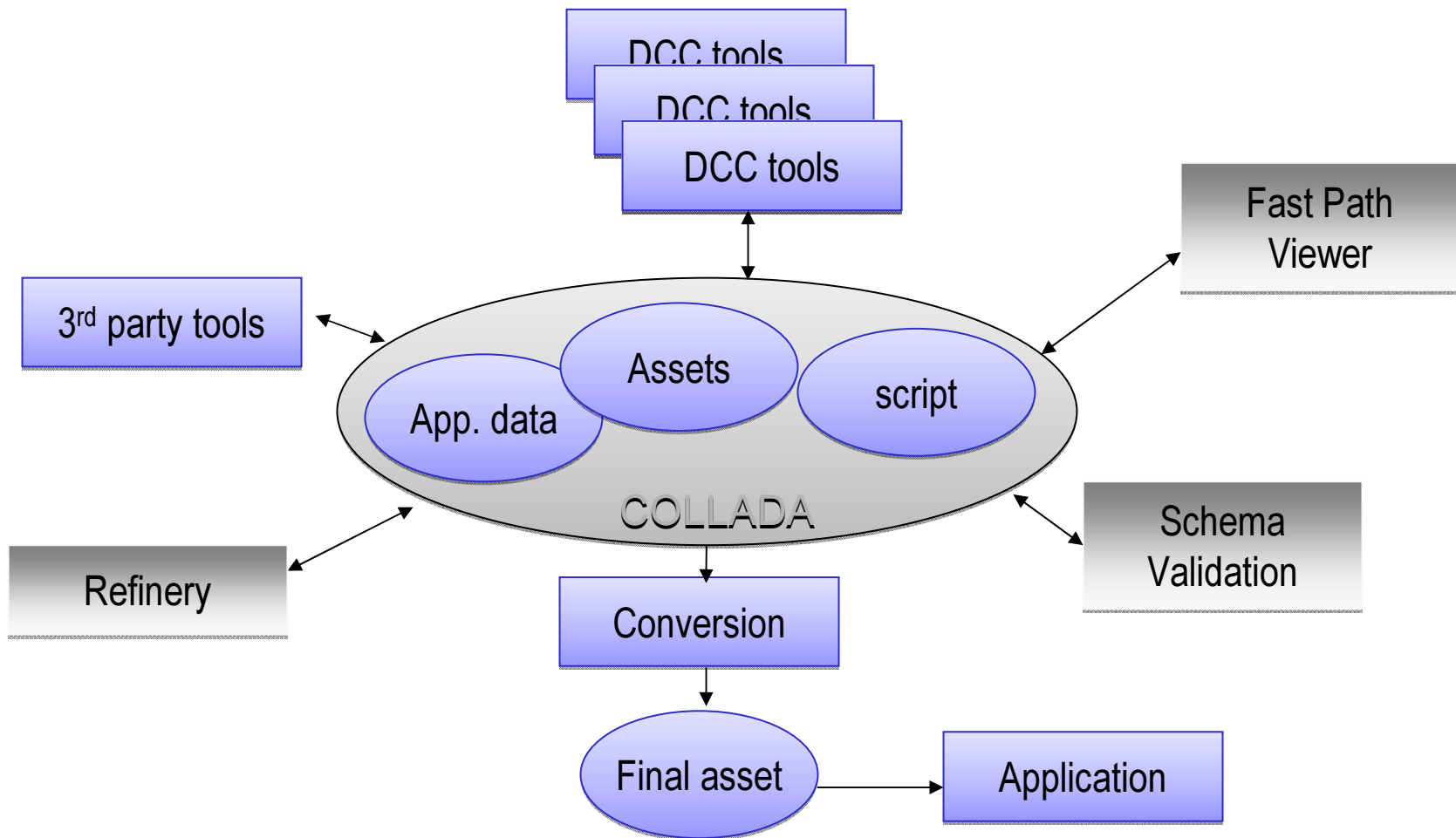
**Dr. Rémi Arnaud**  
**Intel – Advanced Visual Computing**

# Objectives

- Raise the quality and feature set of content
- Liberate content from proprietary formats and API
- Bring more tools to developers/artists
- Drastically improve productivity
- Lower the barrier to entry for tool & middleware companies
- Bring 'advanced' features into the main stream
- Enable user content flow
- Remove the wall between 3D industries
  - game, CAD, movie...



# COLLADA Model

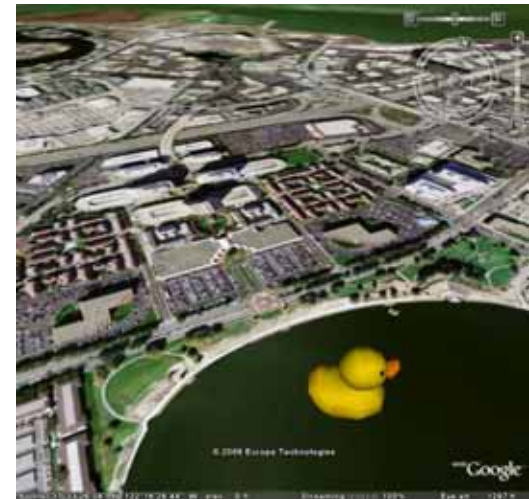




- [www.khronos.org](http://www.khronos.org)
- Founded in January 2000 by a number of leading media-centric companies, including: 3Dlabs, ATI, Discreet, Evans & Sutherland, Intel, NVIDIA, SGI and Sun Microsystems. (currently more than 100)
- Dedicated to the creation of royalty-free open standard APIs to enable the playback of rich media on a wide variety of platforms and devices.
- Home of 11 WG, including: OpenGL, OpenGL ES, OpenVG, OpenKODE, OpenSL, COLLADA
- New WG introduced at GDC: glFX, Compositing

# Status

- **1.4.1 released August 2006**
  - Patch update from 1.4.0 (January)
  - Latest release notes update August 2007
  - Very stable specification !
- **Thousands of active users**
  - 20-40% game developers using COLLADA today
    - all platforms
  - >20,000 1.4.1 specification downloaded
  - ~5000 active users
- **More DCC tools have COLLADA support**
  - 15 booths at SigGrap'07 in the COLLADA crawl
  - >50 products with COLLADA support (collada.org)
    - Double every year
  - And more in the works
- **Official conformance test in development**
  - Early access available to Khronos members
  - Coherency test publicly available
- **1.5.0 planned for 1Q 08**



PS3 ducky on earth  
Image courtesy of Google Inc  
(earth.google.com)

# COLLADA – Adoption'06

- 3dsMax (ColladaMax)
- AGEIA physics
- Agent FX
- Blender
- Bullet physics
- C4 engine
- DAZ 3D
- Fusion
- Feeling Viewer
- FXComposer 2.0
- Google Earth
- Houdini
- Irrlicht
- Kynogon AI
- Maya (ColladaMaya)
- Multiverse
- Ogre3D
- OpenSceneGraph
- OpenSG
- Penumbra
- SketchUp
- RealViz
- Unreal Engine
- Virtools
- Warehouse 3D
- XSI (FTK)

# COLLADA – Adoption'07

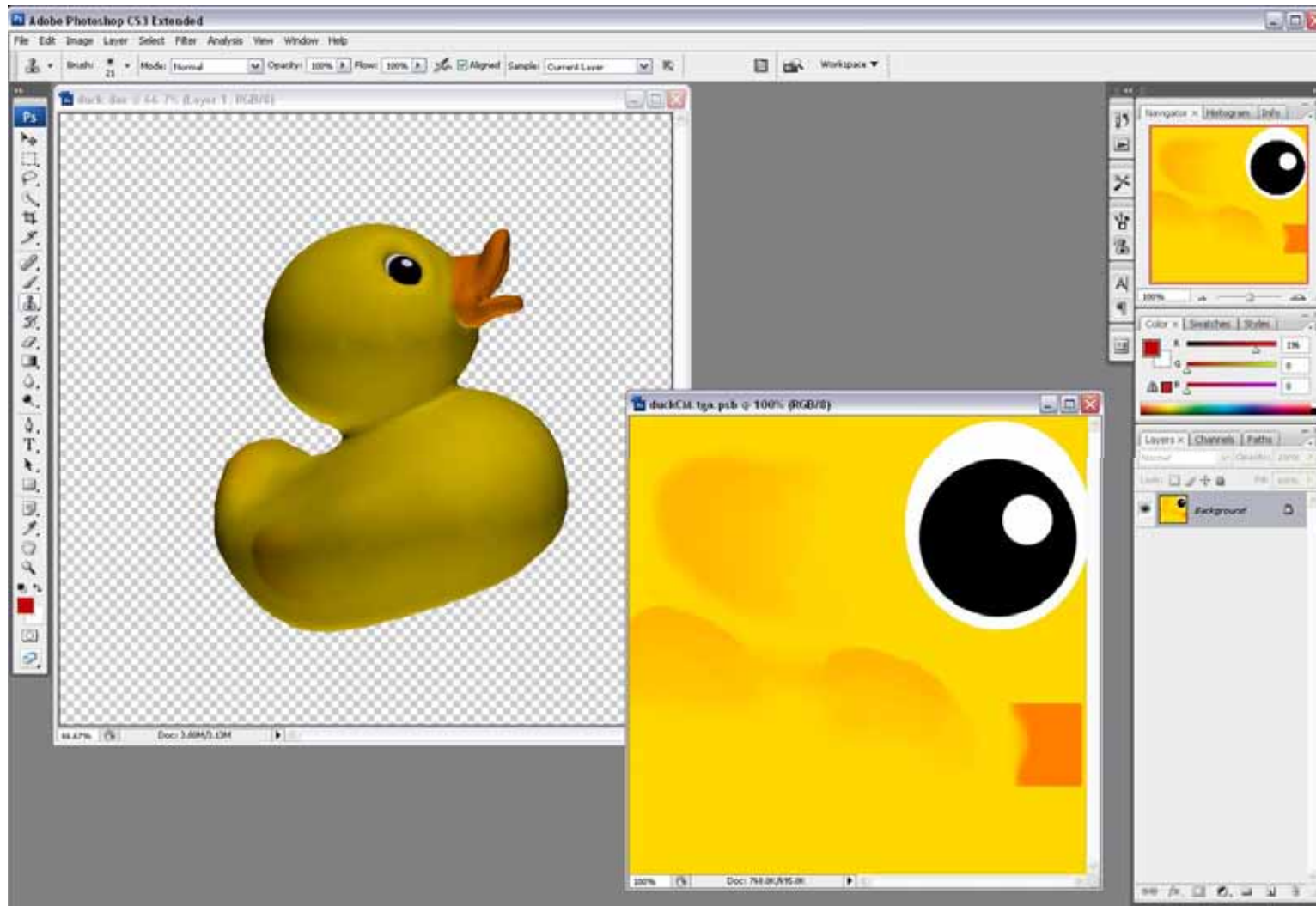
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- ShiVa
- TrueSpace
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- Unwrap 3D
- Virtools
- Warehouse 3D
- XSI (Crosswalk)
- XSI Modtool
- ...

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# Photoshop: 3D in 2D layers



## COLLADA – Flash (papervision3d.com)



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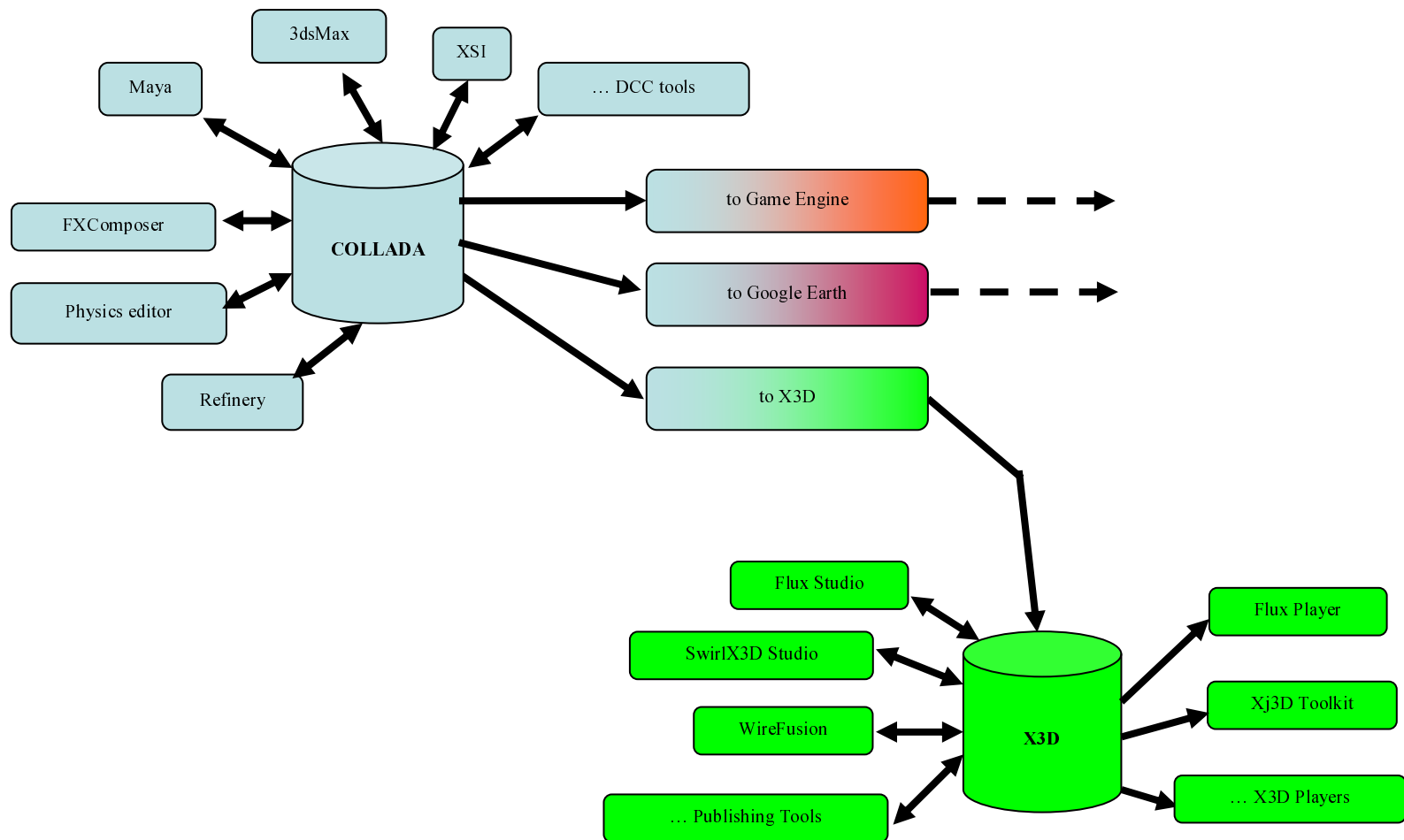
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# COLLADA (Khronos) and X3D (Web3D)

- See white paper (Arnaud/Parisi 2007)



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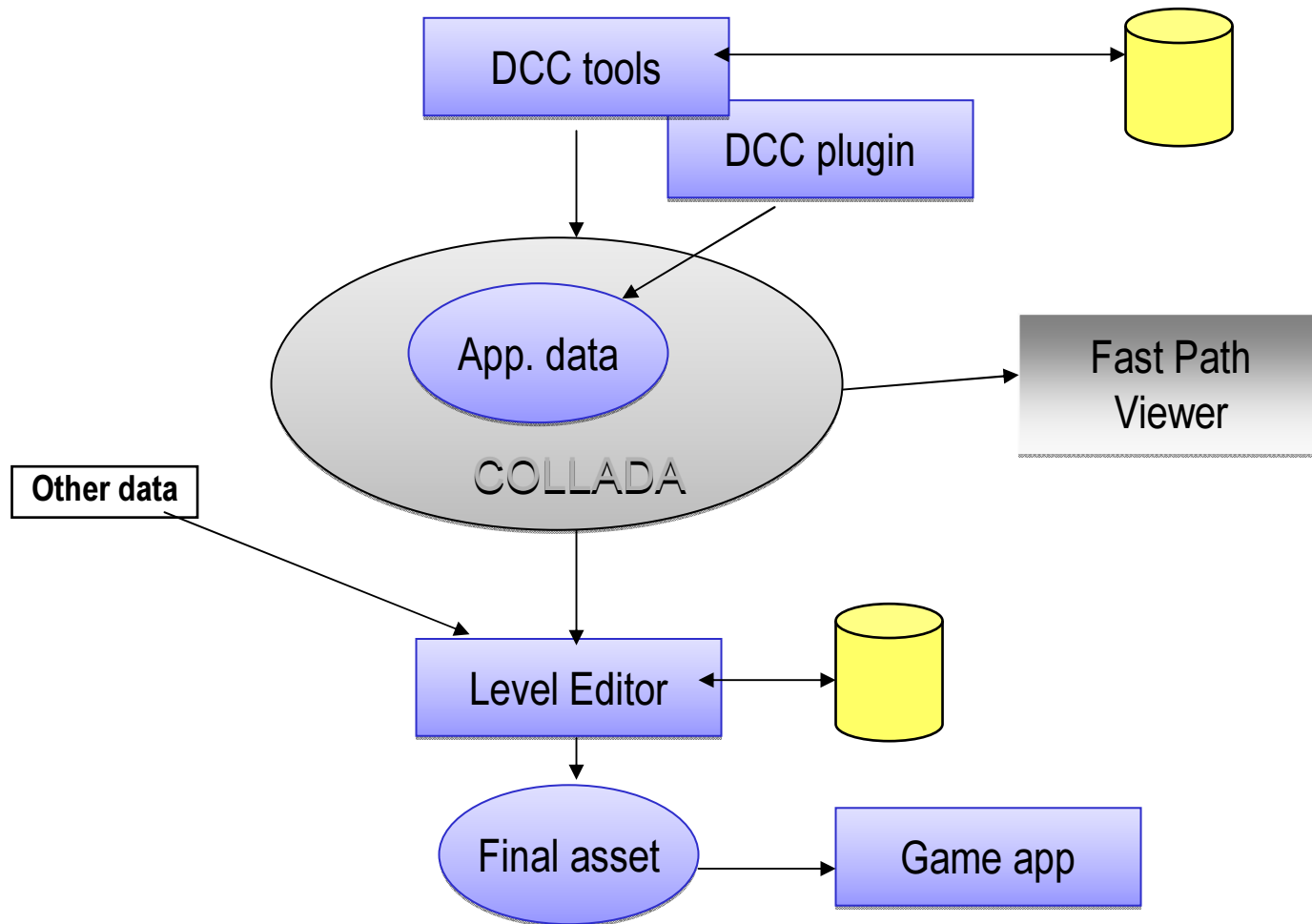
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## User content – Berlin in Google Earth

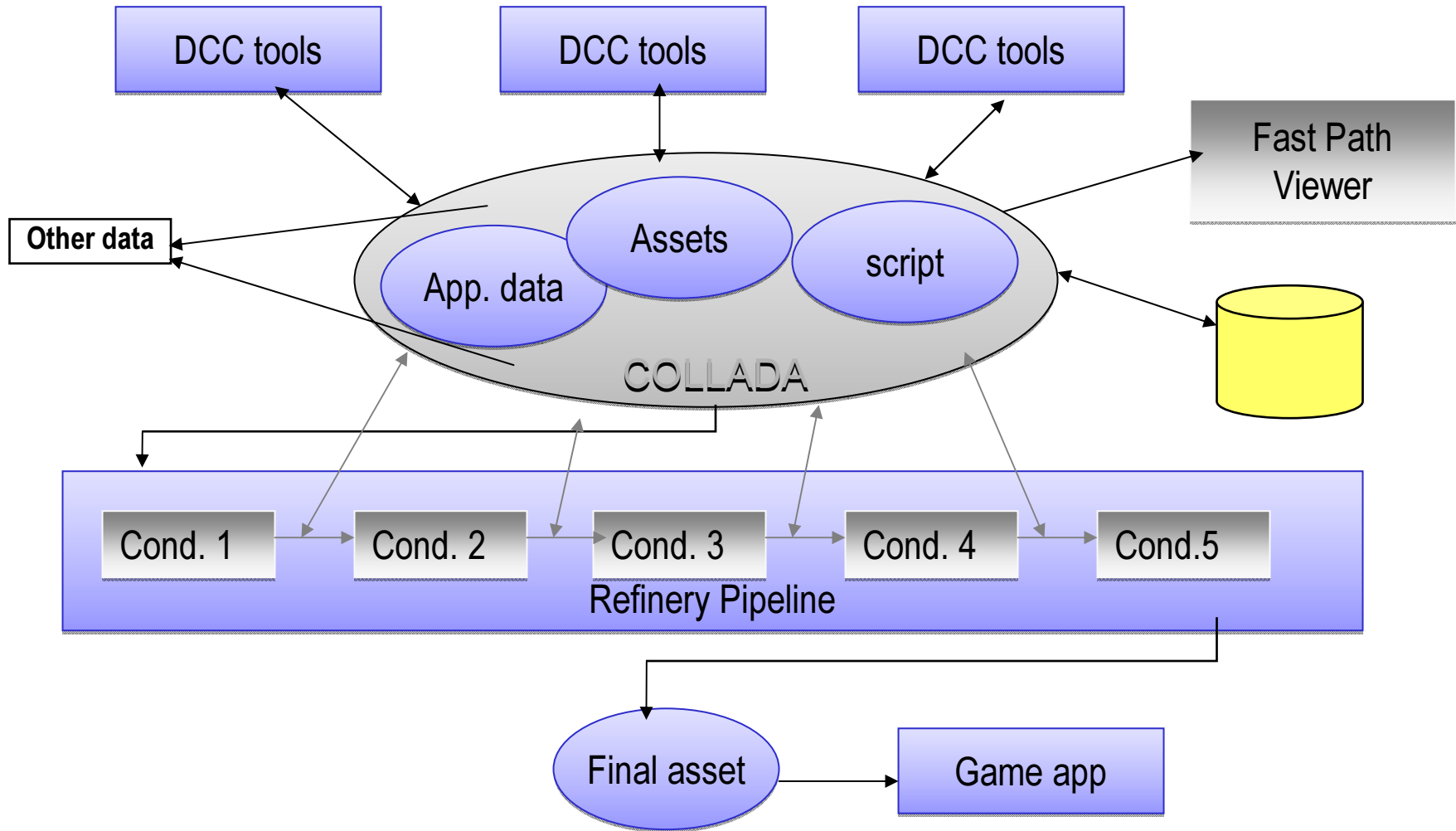




# Simplified COLLADA pipeline



# Preferred COLLADA pipeline



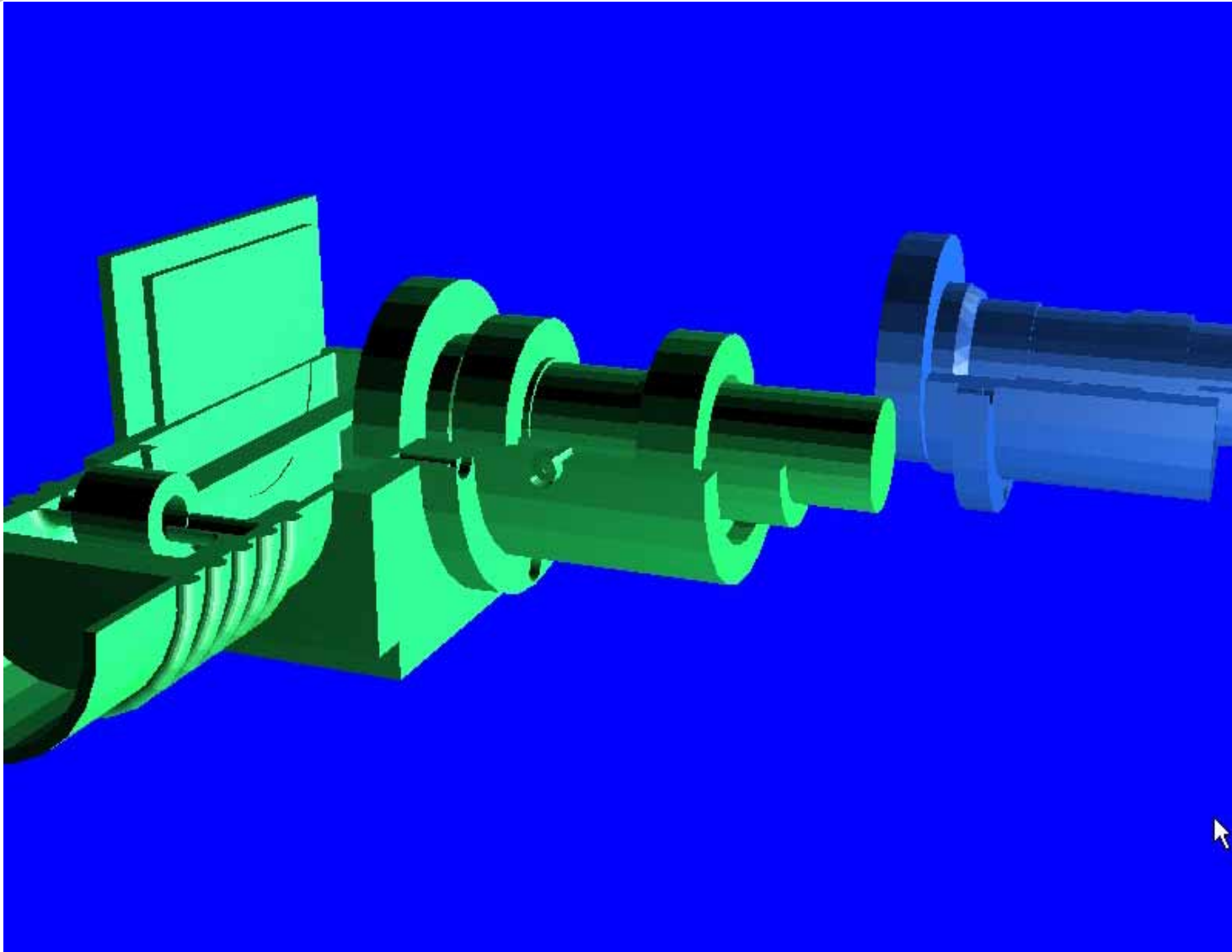
## COLLADA – main APIs and sample code

- **COLLADA DOM – read, write, access data**
  - Open source, MIT license, source-forge distribution
  - In place data access – avoid costly data duplication
  - Front-end generated automatically from Schema (C++)
  - Back-end as plug-in – libxml backend, database backend
- **FCOLLADA – read, write at higher level**
  - Open source, MIT license, source-forge distribution
  - Used in ColladaMaya, ColladaMax, Feeling Viewer...
- **COLLADA Refinery – processing content framework**
  - Open source, MIT license, source-forge distribution
  - User interface to create the conditioning pipeline
  - C++ conditioners can be combined
  - Batch mode for execution in the build process
- **Coherency test**
  - XML validation + content coherency checker
  - An open source Refinery conditioner
- **COLLADA RT**
  - Open source, MIT license, source-forge distribution
  - COLLADA RT – example Run Time / viewer (PC (openGL), PS3 (PSGL)...)
  - COLLADA CFX – FX loader for Cg shader (companion to RT)

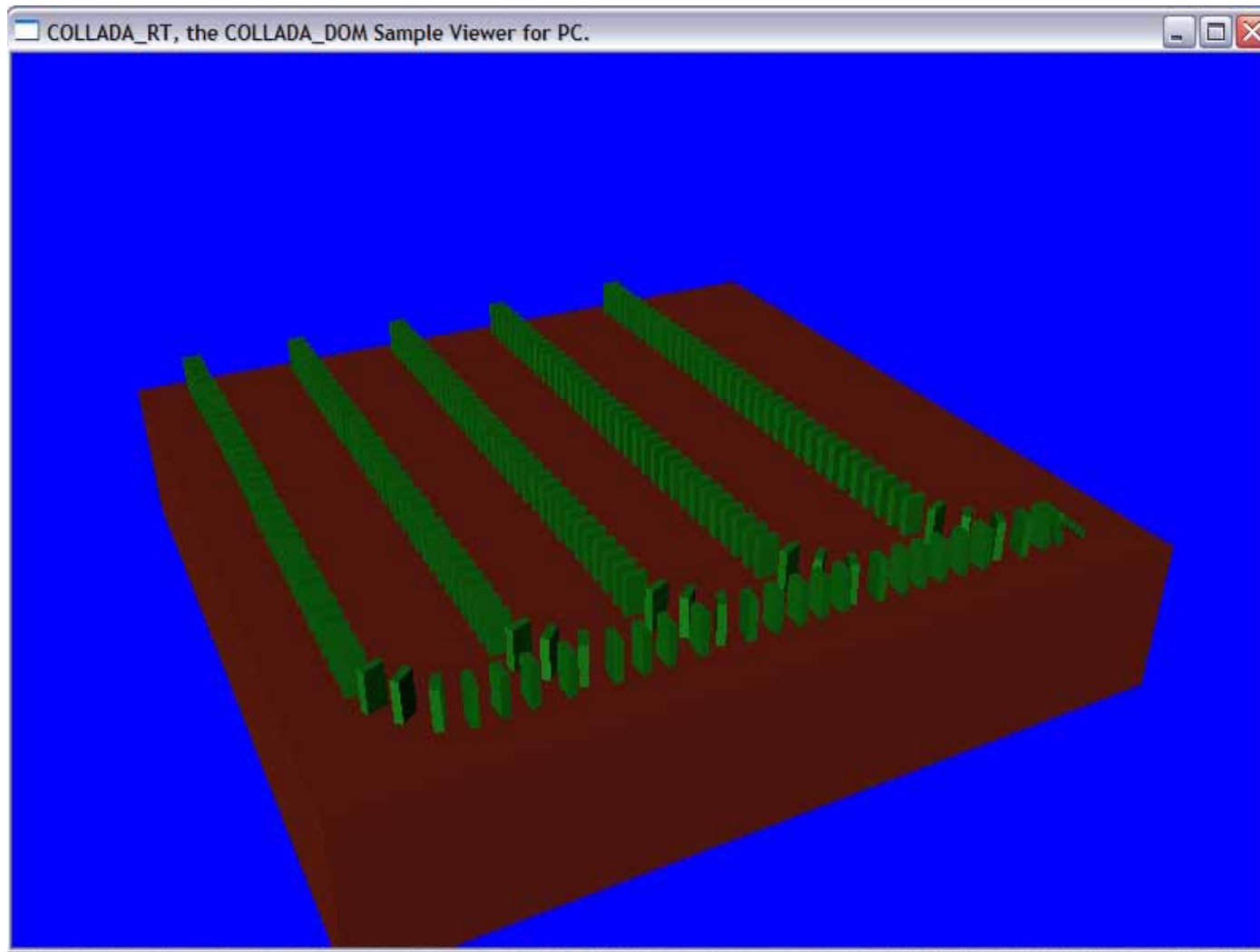
# 1.4.x Features

- **Mesh Geometry**
- **Transform hierarchy (rotation, translation, shear, scale, matrix)**
- **Materials**
- **Textures**
- **Shader programs (Cg, GLSL, GLES)**
- **Shader effects (FX)**
- **Lights**
- **Cameras**
- **Skinning / bones**
- **Animation**
- **Physics (rigid bodies, constraints, rag dolls, collision volumes)**
- **Instancing**
- **Techniques**
- **Multi-representations**
- **Assets**
- **User data**

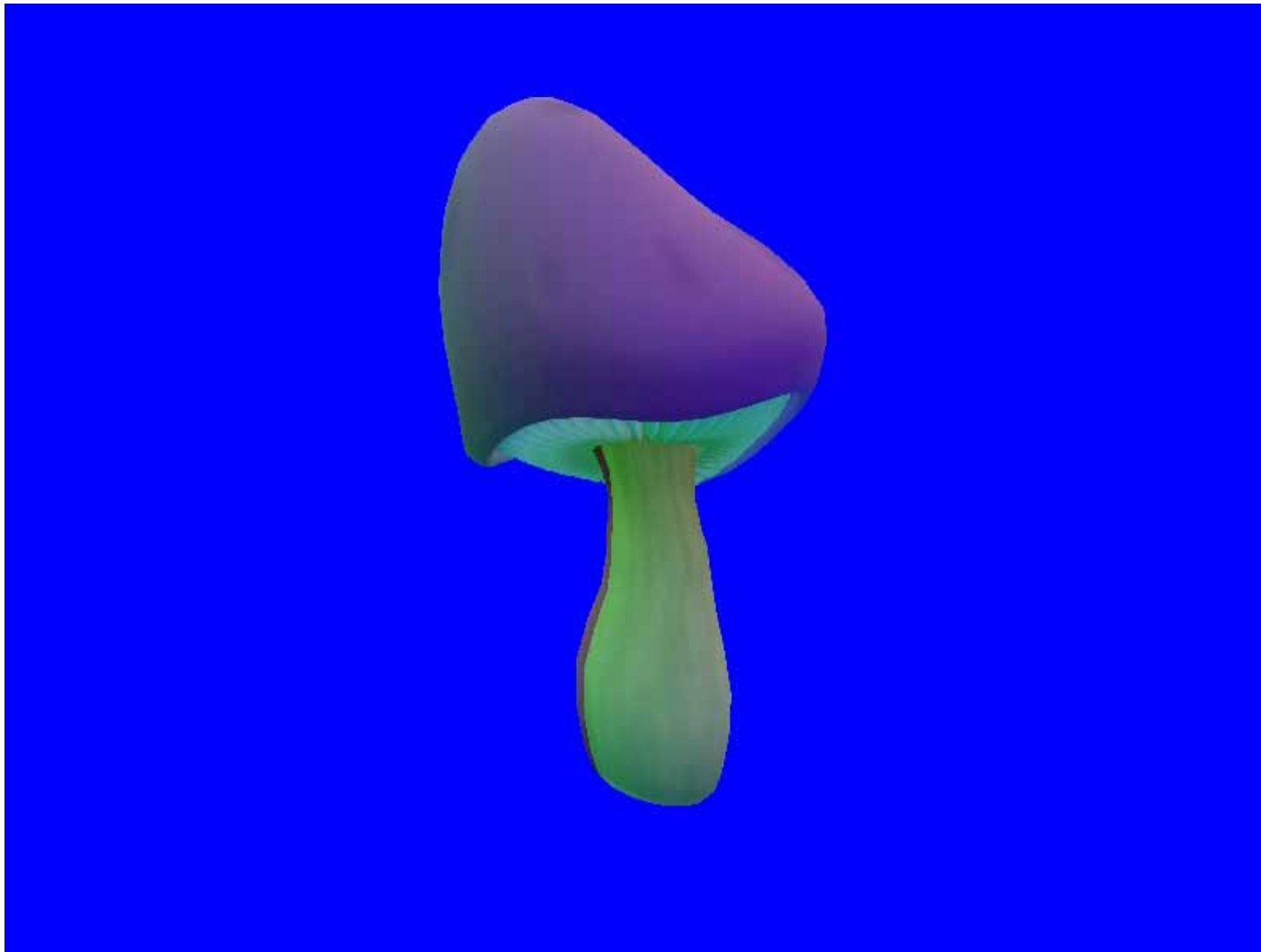
# Keyframe Animation



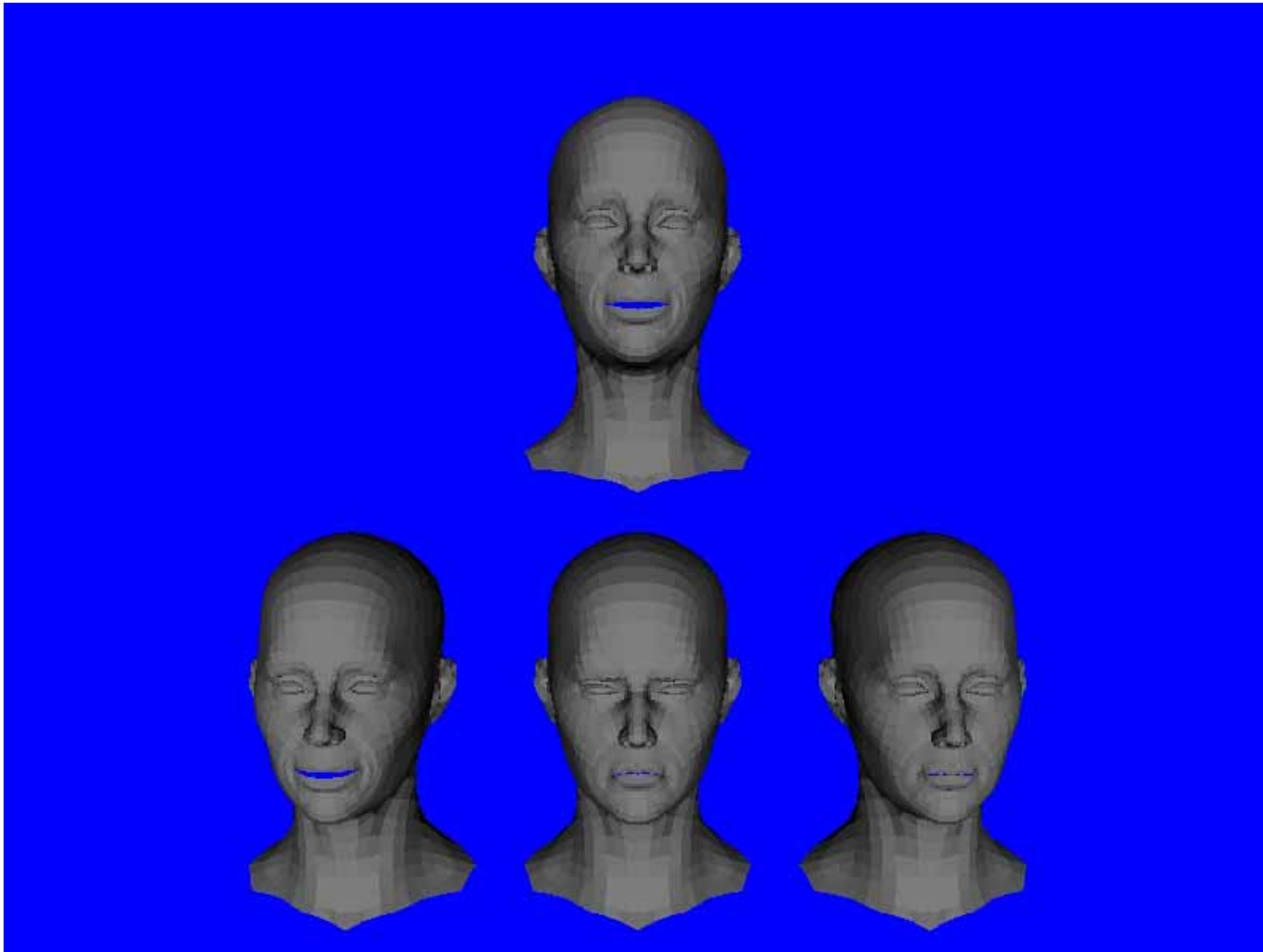
# Rigid body physics



# FX : Vertex shader

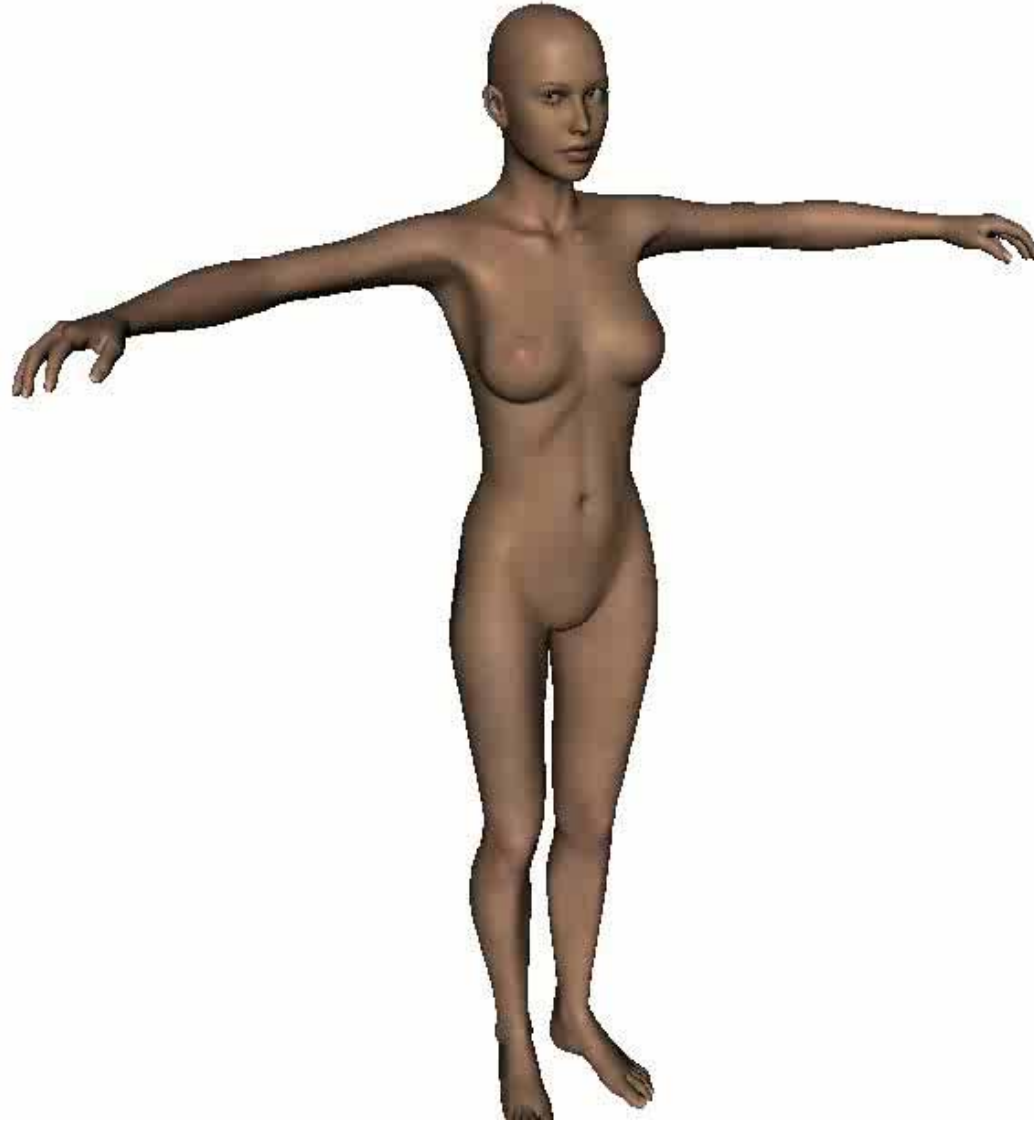


# Morphing





# Skinning



# Skinned cloth



# Cloth simulation (extra)



Thank you.

