GameDevelopers
Conference

MARCH 20-24
SAN JOSE, CALIFORNIA

WHAT'S NEXT
GDC:06

www.gdconf.com

GAME DEVELOPERS CHOICE AWARDS   INDEPENDENT GAMES FESTIVAL

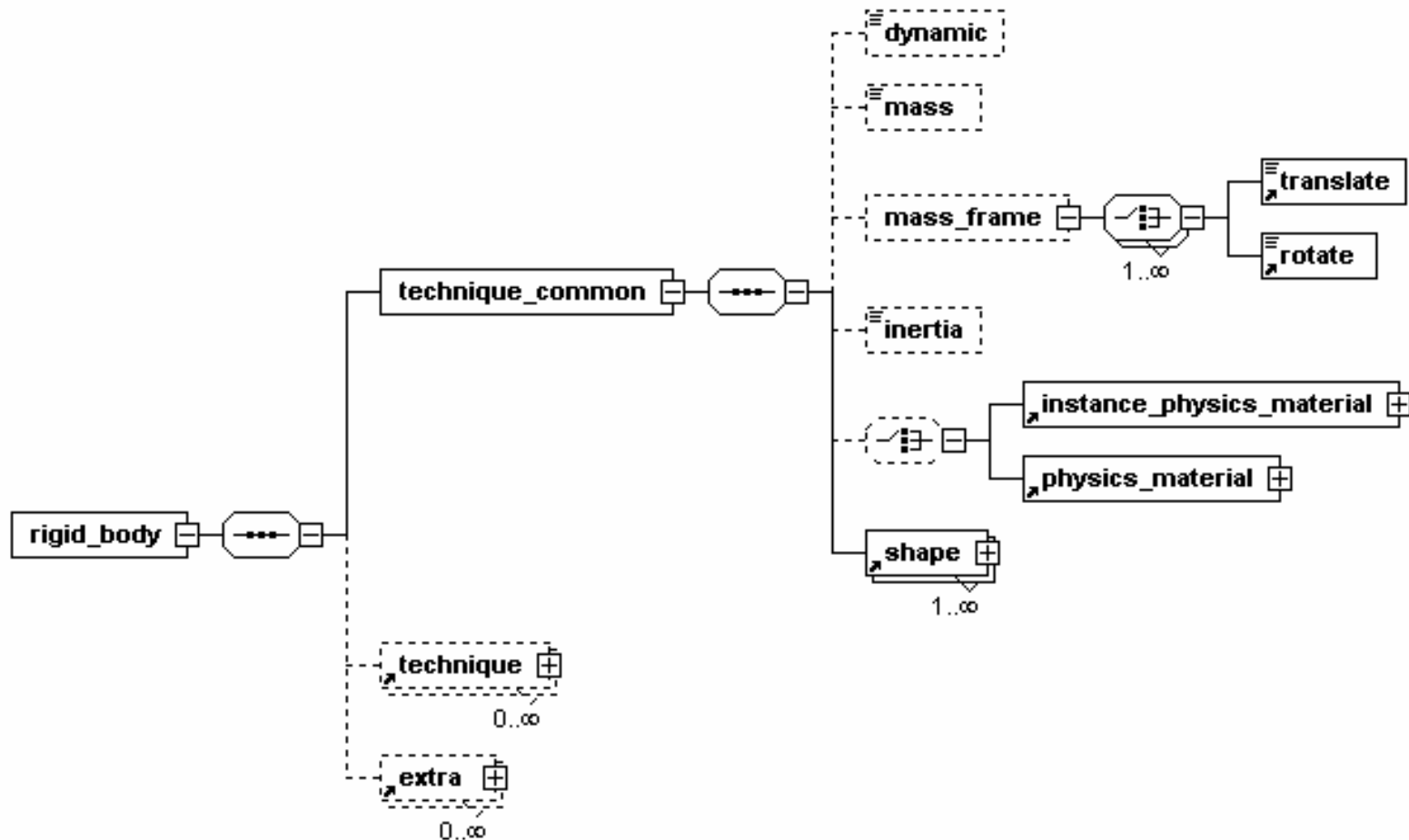GDC MOBILE   SERIOUS GAMES SUMMIT   GAME CONNECTION

CMP

COLLADA for PLAYSTATION®3

- Every SDK needs a file format for geometry
  - For examples and tools
  - For development

- No file format covered all the Next-Gen features
  - Multiple texture sets and values per vertex
  - Polygons, triangles, tri strips and fans
  - Animation, skinning, blending, morphing
  - Shaders, effects
  - Physics

- COLLADA was designed to solve this
  - Not just for PS3, but also for the whole industry

GameDevelopers
Conference

Public Domain vs. PS3 SDK

- COLLADA is built from standard XML
  - Specification and XML Schema available on the Khronos web site
  - Open Source COLLADA DOM library
  - Plug-ins for many products available on collada.org
    - 3dsMax, Maya, XSI, Blender, Agent FX, FCOLLADA
- Registered PS3 developers have extra tools
  - PSGL
    - OpenGL | ES for PS3
  - Cg 1.5 API – public beta release scheduled 04/06
    - PSGL's Cg API Extension for PS3
  - COLLADA_RT – public release scheduled 05/06
    - COLLADA Scene Importer/Renderer for PS3 / PC
  - COLLADA_FX Loader - public release scheduled 05/06
    - *Effects* Loader for PS3/PC
  - FX Composer 2.0 - will be publicly released within '06
    - *COLLADA Effects* Authoring Tool on PC

GameDevelopers
Conference

COLLADA is XML

```
                                                          ┌┄┄┄┄┄┄┄┄┄┐
                                                          ┆ dynamic ┆
                                                          └┄┄┄┄┄┄┄┄┄┘

                                                          ┌┄┄┄┄┄┄┄┄┄┐
                                                          ┆ mass    ┆
                                                          └┄┄┄┄┄┄┄┄┄┘
                                                                              ┌───────────┐
                                                          ┌┄┄┄┄┄┄┄┄┄┄┄┄┄┐     │ translate │
                                                          ┆ mass_frame  ┆─────┤           │
                                                          └┄┄┄┄┄┄┄┄┄┄┄┄┄┘     │ rotate    │
                        ┌──────────────────┐                                  └───────────┘
                        │ technique_common │                 1..∞
                        └──────────────────┘              ┌┄┄┄┄┄┄┄┄┄┐
                                                          ┆ inertia ┆
                                                          └┄┄┄┄┄┄┄┄┄┘
                                                                              ┌───────────────────────────┐
                                                                              │ instance_physics_material │
                                                                              ├───────────────────────────┤
                                                                              │ physics_material          │
                                                                              └───────────────────────────┘
  ┌────────────┐
  │ rigid_body │                                          ┌───────┐
  └────────────┘                                          │ shape │
                                                          └───────┘
                                                            1..∞
                        ┌┄┄┄┄┄┄┄┄┄┄┄┐
                        ┆ technique ┆
                        └┄┄┄┄┄┄┄┄┄┄┄┘
                            0..∞
                        ┌┄┄┄┄┄┄┄┄┄┐
                        ┆ extra   ┆
                        └┄┄┄┄┄┄┄┄┄┘
                            0..∞
```

GameDevelopers
Conference

Schema and Specification

- The *XML Schema* document
  - Formally defines the format
  - Tools *automatically generated* from the schema
  - The s*chema* is the authoritative source

- The *Specification* document
  - Explains interpretation and design goals
  - Free from the Khronos website
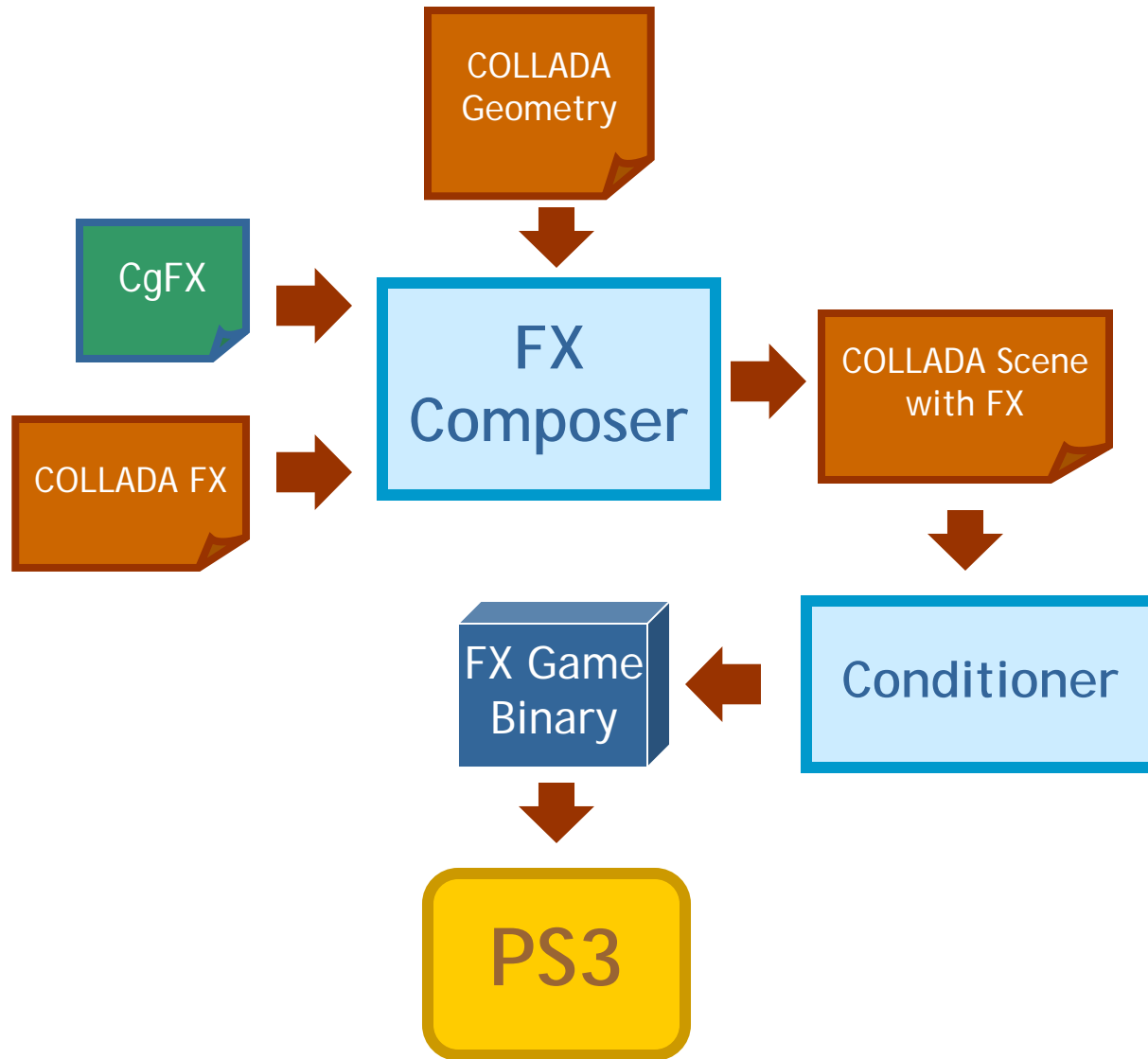 - English and Japanese versions

Importers and Exporters

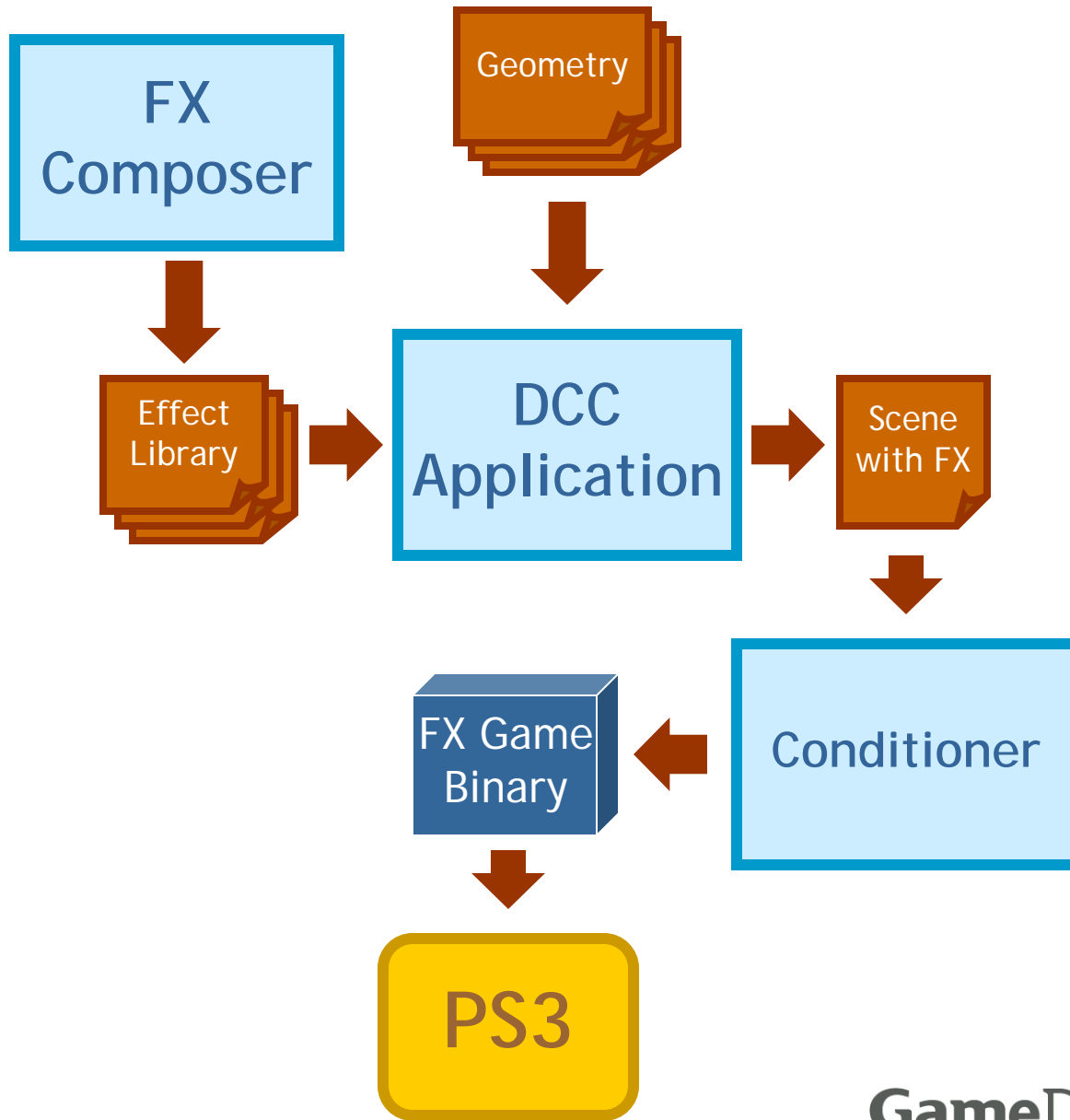|	Import	Export
MAYA	✓	✓
XSI	✓	✓
3DS Max	✓	✓

GameDevelopers
Conference

Developing COLLADA tools

- COLLADA DOM Library – by SCEA
  - DOM stands for *Document Object Model*
  - C++ Classes automatically generated from Schema
  - Read, modify and write COLLADA documents
  - Open Source, available on Sourceforge
- FCOLLADA library – by Feeling Software
  - Feeling COLLADA library, open source
  - Higher level API to ease importing COLLADA
  - Used for the 3dsMax and Maya plug-ins
  - Feeling Software available for contract work

DEMO

- Everything we are demonstrating will be available for you to use very shortly after GDC!

- No tricks, no pre-generated files!

- Emphasis here is on *toolchain* and *interchange*

COLLADA
Geometry

CgFX

COLLADA FX

FX
Composer

COLLADA Scene
with FX

Conditioner

FX Game
Binary

PS3

Content from DCC

- Materials are originally bound to polygon groups in DCC tool and exported as COLLADA documents.

- Scene Geometry is imported into FXComposer 2.0
  - Effects are imported or created
  - Assigned to Materials
  - Shader values tweaked
  - Texture assigned as parameters

- Result is a *single COLLADA document* that describes everything
  - Geometry, animations and scenegraph
  - Materials, effects and bindings

GameDevelopers
Conference

FX Composer 2.0

- Edit and debug *shaders*
- Package *shaders* into multipass *effects*
- Set default *material* parameters
- Assign *textures* parameters
- Export all as COLLADA
  - Option 1. Export the original COLLADA Scene data from DCC including FX.
  - Option 2. Export FX Library for import of FX into DCC.
    - Full Scene with FX exported from the DCC tool.

GameDevelopers
Conference

Package and Execute on PS3

- A *conditioner* converts the COLLADA FX part of the COLLADA document to our binary FX engine format.
  - Shader paths replaced by our PS3 shader paths.
  - Written as big-endian binary for the PS3
  - Geometry should be binary as well for an actual game.
    - COLLADA is meant for interchange not for final loading as game asset.
    - However, for this demo we are still loading native COLLADA for Geometry and Scene.
- Live, nude game development!

DEMO AGAIN

- Edits are faithfully *interchanged* and passed down the pipeline

XSI COLLADA Support

- XSI COLLADA FX Support
  - (COLLADA/COLLADA FX Demo Video)
  - XSI import of COLLADA Scene Geometry.
  - Creation/Import/Binding and Tweaking of COLLADA FX materials parameters.
  - Export of COLLADA scene with COLLADA FX
  - Import into FX Composer 2.0

Maya COLLADA Support

- Maya COLLADA FX Support
  - (COLLADA/COLLADA FX Demo Video)
  - Maya support for import of COLLADA Scene Geometry.
  - COLLADA FX Material Creation and Tweaking.
  - Export of COLLADA scene with FX

3dsMax COLLADA Support

- 3dsMax COLLADA FX Support
  - (COLLADA/COLLADA FX Demo Video)
  - Full HLSL as well as Cg profiles maintained.
  - Max support for import of COLLADA Scene Geometry.
  - COLLADA_FX materials creation/import/binding and tweaking.
  - Export of COLLADA scene with FX
  - Import into FXComposer 2.0

GameDevelopers
Conference

Demo of Mad Mod Mike

- Here is that character displayed with COLLADA_FX
  - Same COLLADA Data as used in Demo Videos
  - Some of the previous *Effects* have been assigned in FXC.
  - Notice some of the *effects* from the first demo.
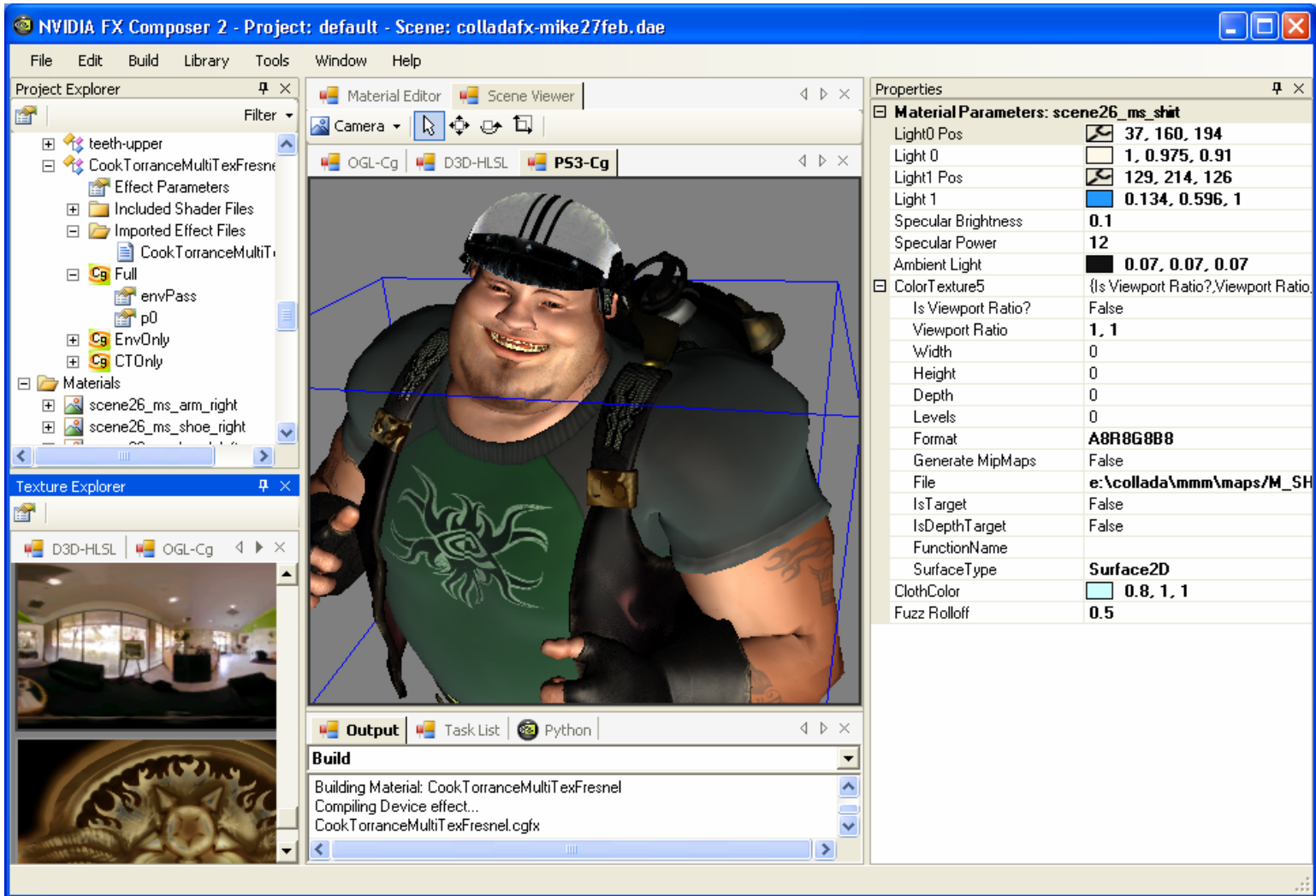
GameDevelopers
Conference

COLLADA for NextGen Models

- Many effects on a model
  - Normal maps, shadow maps, specular maps, skin, hair, reflections, etc.

- 100K+ poly models imported in seconds
  - XML is not slow, but COLLADA aimed at production not delivery

- Shader bindings included in the COLLADA document

COLLADA Physics on PS3

- COLLADA can describe settings for physics simulators
  - First interchange format for physics

- COLLADA PhX describes
  - Rigid bodies
  - Hierarchical, simplified collision bounds
  - Constrained jointed models
  - Multiple simulation scenes

GameDevelopers
Conference

COLLADA Physics on PS3

- Ageia for PS3
  - Full port of Ageia Physics API available for use on PS3.

- Feeling Software's Nima COLLADA PhX
  - Creation and Export of Rigid Bodies
  - Creation and Export of Constrained Jointed Nodes

- PS3 COLLADA Physics Demo
  - By Feeling Software
  - Using Ageia for PS3 API

SUMMARY

- COLLADA 1.4 is ready for production
  - Open Source licensed libraries
  - Free importers and exporters
  - 1000s of users already
  - Standard part of the PS3 toolchain

- Visit the COLLADA website

  http://www.khronos.org/collada/

GameDevelopers
Conference