RenderWare Graphics

Artist Guide

Glossary

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Glossary

This glossary contains RenderWare Graphics artist specific glossary information. The API Reference contains a more detailed glossary for all RenderWare Graphics terminology.

Alpha Blending

This is just computer speak for the mixing of two colors. There are many ways for the mixing to take place. Most modern computer graphics chips support these operations in hardware.

Alpha Channel

Colors are usually represented using three numbers (RGB), for the contribution of red, green, and blue. Often a fourth value is used to say how transparent a color is (RGBA). This transparency value is called "alpha". A color with 50% alpha would apply half of its own color, and half of the color behind it. When colors with red, green, blue and alpha are written into computer memory, the area that stores the alpha values is called the "alpha channel". There will also be separate red, green and blue channels. Paint packages such as Adobe PhotoShop and PaintShop Pro allow alpha channels to be created.

anm Format

This RenderWare Graphics file format contains only animation data for a model. Usually associated with a `.dff` file.

This file format is now considered legacy. The binary format of these files will continue to be supported, and RenderWare Graphics 3.5 and 3.6 will continue to read them. There is no need to re-export existing artwork to `.rws` file format. However, it is recommended that you export to `.rws` files as these file formats *may* be removed in future releases.

API

Application Programming Interface refers to a set of named operations that a computer program can perform. RenderWare Graphics offers over 2,000 operations to control 3D graphics. Collectively these are called the RenderWare Graphics API. The API manual is included in the SDK.

Assets

Models, textures, sounds and the other data that is put together to build a game's world are known as assets.

Asset Templates

RenderWare Graphics exporters use Asset Templates to set options for exporting an asset in a particular format. All templates are stored in `.rwt` files and can be edited using the template editor or a standard text editor.

Atomic

A renderable, possibly dynamic object. An atomic connects a geometry to a frame.

Bézier

Pierre Bézier pioneered this mathematically calculated curved line for use in Peugeot motor car production in the 1960s. To over-simplify, it is a curve calculated from four points. It starts at the first and ends at the second, being drawn towards the second and third as it progresses. Extending the calculations into 3D produces the Bézier Patch - a 3D curved surface. Bézier Patches are supported in the `RpPatch` plugin and the `RtBezPat` toolkit.

BSP Format

This is a RenderWare Graphics file format for exporting static game models from a modeling package.

This file format is now considered legacy. The binary format of these files will continue to be supported, and RenderWare Graphics 3.5 and 3.6 will continue to read them. There is no need to re-export existing artwork to `.rws` file format. However, it is recommended that you export to `.rws` files as these file formats *may* be removed in future releases.

Clump Viewer

Used to load and explore clumps in `.dff` file format. See the Clump View and World View Viewer document for more information. Note that only `.dff` files containing 3d assets may be viewed with Clump viewer.

DDS Format

Texture format for D3D8, GameCube and Xbox.

Degenerate Triangles

Degenerate triangles are the triangles inserted between the end of one tri-strip and the beginning of the next. RenderWare Graphics calculates the number of triangles and the number of triangles actually processed by the hardware.

To improve tri-stripping performance and reduce the number of degenerate triangles.

Degenerate triangles can be displayed using RenderWare Visualizer.

Delta Morph

Delta Morphing is one stage more complicated than morphing. It animates between more than one morph target. For instance three morph targets might define the vertices of a tall thin box, a short flat box, and a frustum of a pyramid. Delta morphing adds different proportions of the value of each corresponding vertex, to produce a range of shapes between these morph targets. These shapes can be used to render a six-sided object that transforms itself between the shapes of the morph targets. Delta morphing is implemented in the `RpDMorph` plugin.

DFF Format

This is a RenderWare Graphics file format for exporting animated game models from a modeling package. Note that `.dff` files may contain either 2D or 3D assets, depending on the tool that was used to create them.

This file format is now considered legacy. The binary format of these files will continue to be supported, and RenderWare Graphics 3.5 and 3.6 will continue to read them. There is no need to re-export existing artwork to `.rws` file format. However, it is recommended that you export to `.rws` files as these file formats *may* be removed in future releases.

Direct X

Media technology from Microsoft.

DMA Format

This is the RenderWare Graphics animation data file format for DMorph. It stores deltas, also called delta morph targets, which are applied to the geometry. They can overlap and morph any combination which gives great flexibility specially when more then one morph target is used in the Morpher modifier.

This file format is now considered legacy. The binary format of these files will continue to be supported, and RenderWare Graphics 3.5 and 3.6 will continue to read them. There is no need to re-export existing artwork to `.rws` file format. However, it is recommended that you export to `.rws` files as these file formats *may* be removed in future releases.

Exporter

Graphics tools like 3ds max and Maya produce models in their own file format. RenderWare Graphics uses exporters to translate their data directly into its own format.

Game Engine

"Engine" is an over-used word meaning a part of a bigger piece of software. A "game engine" is a piece of software that typically handles the graphics for a game.

Gameplay

The substance that makes a game worth playing. Involves illusive things like "why are you fighting those monsters", "how did you get onto the planet in the first place", "boy those monsters are difficult to kill". Gameplay might also involve how easy it is to move around the world, whether the buttons are responsive or not. Think of gameplay as the equivalent to a good storyline in a movie.

Hierarchical Animation

This is animation that understands about joints. Typically a character is broken up into arms, legs, head, torso, etc., and the animation moves the pieces around. If the lower arm is rotated about the elbow joint, the animation "knows" that the hand and fingers must move too. Hierarchical animation is supported in the `RpHAnim` plugin and `RtAnim` toolkit.

Hints

Hints are a special type of primitive that affect the sectorization of the scene on export but do not get exported as geometry to the final model.

Just a few hints placed strategically in the scene can significantly improve the sectorization, and they provide a way to affect the partitioning more controllably than before.

The hints are used in conjunction with the automatic partitioning of a scene.

Hints can be defined within 3ds max and Maya using the RenderWare Graphics extensions. Refer to the Artist Guides for more information.

HW T&L

Hardware transform and light is circuitry in modern graphics cards which perform key parts of the 3D calculations.

IDE

Integrated Development Environment. A software package that is used to develop computer software, like a word processor for programs.

Keyframe

A keyframe is a fixed point in time and 3D space where a particular event (movement or rotation) takes place.

Traditional animation studios realized they could increase the productivity of their master artists by having them draw only the important keyframes. Assistants would then "fill in" the frames in between.

With RenderWare Graphics, you create the keyframes that record the beginning and the end of each animated transform. RenderWare Graphics calculates the interpolated values between each key to produce the completed animation.

Lightmap

A lightmap is a texture, used to store precalculated diffuse lighting information. This is applied to scene geometry at run-time (as a second rendering pass), giving the impression of detailed and high-quality lighting.

Middleware

Software that makes it easier for game developers to use new games consoles.

MIPMAP

In 3D computer graphics it is common to map a bitmap to a surface to give texture or detail. As the surface gets further away the quality of the reduced image deteriorates and the time it takes to process it is not reduced in proportion to its size. It helps to provide alternative versions of such bitmaps to different scales for different distances: not bitmaps but one mipmap.

Morph Target Animation

3D computer models are made of many points in space, covering the surface of an object. A morph target is a set of these points that define the start or end state of an animated object. Morph targets define states of the same object, using points that correspond in both targets. The morph targets might be a can and the same can crushed, or a face, and the same face smiling. Thus morphing is the process of transforming smoothly between the two morph targets. Delta morphing transforms between more than two morph targets. Morphing is supported in the `RpMorph` plugin.

MTD Format

RenderWare Graphics file format containing material effect dictionary data.

MTE Format

RenderWare Graphics file format containing multi-texture effect data. The data contained within the effects will be specific to a particular platform.

Normal Maps

A normal map is similar to the other texture map but instead of containing color values (as RGB) it contains normal values (as xyz). Normal maps have better lighting calculations and better results than bump map models. Normal maps can render real bump maps using DOTPRODUCT3.

Normal maps are only supported on Xbox.

Normals

Normals are vectors that usually define the outward pointing perpendicular to a surface. They may be associated with vertices or polygon faces.

Open GL

A 3D *API* developed by Silicon Graphics Inc.

Partitions

Partitions are a result of exporting a world; they define the Sectors in the world. However, in this tutorial, we refer to partitions as their visualization using the partition object.

Hints can be defined within 3ds max and Maya using the RenderWare Graphics extensions. Refer to the Artist Guides for more information.

Patch

A patch object is a type of deformable object useful for creating gently curved surfaces, and provides very detailed control for manipulating complex geometry. It describes a 3D surface with four corners, bounded by four edges that are all Bézier curves. Patches are supported in `RpPatch`.

Patch Mesh

A group of patches, mostly touching at their edges. Each describes a simple curved surface, but together they describe more complicated shapes.

Pixel Shader

Some computer hardware contains a unit that allows very precise control over how final colors are computed. This unit can be programmed by the game developer, and the special program that is written to control it is known as a pixel shader

Platform

RenderWare Graphics supports these platforms:

- GameCube

- PC
- PlayStation 2
- Xbox

Plug-in architecture

An architecture that has been designed to allow users to bolt in extra components to add new features.

Pre-instancing

The process of preparing a platform specific representation of a renderable object so that the platform independent representation isn't required when rendering.

Pre-light

An object's color is affected by the level of light and shade, and the color of the light falling on it. The color of the object before all these effects is its pre-light color.

Pre-lighting

The use of vertex pre-light colors, where the color is computed by a modeling tool performing illumination calculations at vertices.

Project Templates

RenderWare Graphics exporters use Project Templates contain all the export settings, specified for an entire project. These project settings are shared between all assets belonging to that project. All templates are stored in `.rwt` files and can be edited using the template editor or a standard text editor.

PVS

Potentially Visible Sets is the part of RenderWare Graphics that decides what sectors of a world can potentially be seen from the sector where the camera is located. RenderWare Graphics uses this information to draw only the things that can be potentially seen, which speeds up rendering. The plugin RpPVS handles potentially visible sets.

Real-time graphics

Graphics which are drawn to the screen immediately. By contrast, the special effects that you see in movies take many minutes per frame to draw and so need to be pre-rendered.

RF3 Format

The RenderWare Graphics .rf3 file format is an XML based editable file, which contains all the raw exported data. Unlike the .rws files, which are RenderWare optimized binary files, .rf3 files contain no rendering optimizations, and are simply a snapshot of the raw 3D data.

Using the rf3cc compiler tool, users can compile these .rf3 file into optimized platform specific RenderWare binary files, (.rws, .rp2, .rg1, .rx1 etc.).

By using .rf3 files, users can fully customize and control their art tool path. This can be achieved by exporting all their artwork as .rf3 files and recompiling them each time their export templates are modified. They can use Makefiles for checking for dependencies between template files and .rf3 files. This also eliminates the task of going back to the modeler package and re-exporting the data, each time an export option requires modification.

.rf3 files can be manually edited and modified, viewed by any XML viewing tool, and also rendered by RenderWare Visualizer.

RG1 Format

RenderWare Graphics file format containing GameCube pre-instanced data.

RP2 Format

RenderWare Graphics file format containing PlayStation 2 pre-instanced data.

RWS Format

This is the RenderWare Graphics file format for exporting any type of RenderWare data. It can contain the contents of multiple .dff, .bsp files etc. and embeds textures. RenderWare Visualizer can be used to view .rws files.

RWT Format

This is the RenderWare Graphics file format for exporter templates. There are two types of templates:

- asset templates - animation, world and spline exporter settings
- project templates - platform specific export settings and output file format settings.

The default output file format is RWS.

The exporter templates are explained in more detail in the exporter documentation.

RX1 Format

RenderWare Graphics file format containing Xbox pre-instanced data.

SDK

Software Development Kit. Usually made up of an API, examples, demos, and documentation.

Skin

A geometry that is animated using a hierarchy of bones. Skinning is implemented in the `RpSkin` plugin.

SPL Format

RenderWare Graphics spline file format.

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Texture Coordinates

The coordinates that determine which texel in each texture is assigned to each vertex in an object. Also referred to as UV coordinates.

TCB

Tension, continuity and bias are spline controls on function curves. Typically used for ease-ins/outs, abrupt motion changes, and to control how the animation is distributed around the key.

Tri-fan

Triangles arranged in a fan-like structure from a common vertex.

Tri-list

An arrangement of triangles in which every triangle has three vertices.

Tri-strip

A sequential arrangement of triangles defined by a sequence of vertices, so that the addition of a single vertex to the end of the list defines a new triangle. Tri-strips are efficient to transmit to the graphics processor.

UVs

The coordinates that determine which texel in each texture is assigned to each vertex in an object. Also referred to as Texture Coordinates.

Visualizer

RenderWare Visualizer can view `.bsp`, `.dff`, `.anm`, `.spl`, and `.rws` file formats. The `.rws` format saves all export formats in one file, to display the whole of a scene at once. RenderWare Visualizer is documented in RenderWareVisualizer.pdf.

World Viewer

Used to load and explore `BSP` worlds. See the *Clump View and World View Viewer* document for more information.