RenderWare

Visualizer

3.7

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Contents

Introduction

What is RenderWare Visualizer?

RenderWare Visualizer is a tool for viewing artwork in real time directly on the console of your choice.

You can easily view your artwork in RenderWare Visualizer on several different types of target hardware. RenderWare Visualizer also displays platform-specific performance metrics that you can use to tune your artwork to get the most out of each platform.

Visualizer can be opened either:

•   From the RenderWare menu in 3ds max or Maya to view the current piece of artwork.

•   Using a standalone launcher which can be used to view a specific piece of artwork which has previously exported.

File formats

Visualizer can be used to view `.rws` files, which may contain static and animated graphics. These files also bundle in the textures used.

Visualizer may also be used to export and view `.rf3` files. The exporter can create these text-based scene and animation files, which can later be converted to a platform specific form given an appropriate template file. See the exporter documentation for more details of the `.rf3` format.

Note: `.rws` and `.rf3` files are the exporter's primary format. Visualizer can also display `.bsp`, `.dff`, `.dma` and `.anm` files, but these are now considered legacy formats.

Legacy files

If files are in the legacy `.anm`, `.bsp`, `.dff`, or `.dma` format they are converted to temporary `.rws` files when they are loaded into Visualizer. The file format conversion takes place at view time.

Textures required by `.bsp` and `.dff` files are embedded within the `.rws` files if the textures are in a directory with the same name as the RenderWare Graphics file format or in a directory called `textures`. The embedded textures are automatically converted to platform independent textures on conversion to `.rws`.

RWS and RF3

RWS

An `.rws` file stores all export formats. This means that it can store worlds, animation, splines and clumps at the same time, which means that you're able to view your entire scene in one instance.

RF3

`.rf3` files are XML-based RenderWare scene files. Given an appropriate template file, Visualizer can export `.rf3` files and view the resulting `.rws` file.

Legacy Formats

ANM

An `.anm` file stores only animation data and requires a `.dff` file of the same name to contain the geometry. To set up an `.anm` export format select an object or joint within the hierarchy you wish to export before running the exporter.

`.anm` is now considered a legacy format; `.rws` files can contain animations.

BSP

A `.bsp` file contains worlds that do not contain any hierarchy or animation information and are typically used for static level geometry in a game. They are automatically split into sections (BSP world sectors) that RenderWare Graphics uses to speed up the rendering process.

`.bsp` is now considered a legacy format; `.rws` files can contain worlds.

DFF

A `.dff` file contains a single hierarchy as a RenderWare Graphics container object, called `RpClump` (see the Fundamental Types and Dynamic Models chapters of the User Guide for more details on `RpClump`). Depending on the options you select in the DFF Exporter, the `RpClump` file saved will contain the object hierarchy, hierarchical animation, skinned animation, and morph target animation.

`.dff` is now considered a legacy format; `.rws` files can contain clumps.

DMA

A `.dma` file stores only DMorph animation data and requires a `.dff` file containing one or more atomics set up for DMorph rendering. `.dma` files can only be exported at the same time as a `.dff` export.

`.dma` is now considered a legacy format; `.rws` files can contain DMorph animations.

Note: BSP world sectors should be viewed in Visualizer.

Generating artwork

RenderWare Graphics `.rws` and `.rf3` files can come from any source but are usually generated using one of the RenderWare Graphics export plugins for 3ds max and Maya. The RenderWare Graphics viewers form an integral part of the tool chain needed to get great looking artwork into RenderWare Graphics. The artist will usually run through a cycle of:

- Creating assets in an art package.

- Viewing the assets in RenderWare Visualizer by clicking **view** or choosing the **view** menu option from the exporter plugins.

- Tweaking as necessary in the art package and viewing again.

Note: The exporters are also capable of exporting the legacy `.bsp`, `.dff`, `.anm`, and `.dma` formats.

Platforms

RenderWare Visualizer is capable of viewing artwork on PCs (D3D8, D3D9 and OpenGL), PlayStation 2, Xbox and GameCube. RenderWare Visualizer views artwork on your PC and your target platform. This enables you to change the menu options on your PC and view the changes on your target platform.

Other documentation

RenderWare Graphics contains extensive documentation, including tutorials, examples, and various guides on using RenderWare with 3ds max and Maya.

- 3ds max Reference Guide
- 3ds max Tutorials
- Maya Reference Guide
- Maya Tutorials
- Technical Artist Guide
- Optimize Static Geometry White Paper

Known issues

There are currently no known issues.

Hardware requirements

PC requirements

RenderWare Visualizer requires the host and target PC to be running Windows 2000 or Windows XP with DirectX8, DirectX9 or OpenGL. Windows 95/98/ME are not supported.

PlayStation 2 hardware requirements

Configuration of Visualizer for the Playstation 2 is determined by the following:

- Type of development platform
- Type of network adapter
- Method of network address assignment

PlayStation 2 development platform

For PlayStation 2 development, use either a:

- PlayStation 2 Debugging Station

or a:

- PlayStation 2 Development Tool (T10000)

Debugging Station	Development Tool

Note: If you plan to use a Debugging Station, you must have access to a CD burner to be able to burn the ISO images provided with Visualizer. You will be prompted to burn the images during the connection wizard setup.

PlayStation 2 network adapter

To connect your PlayStation 2 to the network, use a Sony Network Adapter for Playstation 2, for broadband access.

PlayStation 2 network address

Connection can be made in one of two ways:

- Using a DHCP server to automatically obtain an IP address.
- Using an IP address assigned to you by your network administrator. In this case you will need to have a memory card to store the address.

Xbox hardware requirements

To use Visualizer to view artwork on an Xbox, use an:

• Xbox Development Kit

or an:

• Xbox Debug Kit

GameCube hardware requirements

To use Visualizer to view artwork on a GameCube, use a:

- GameCube DDH development kit

or a:

- GameCube GDEV development kit

GameCube network adapter

To connect your GameCube to the network, a GameCube BroadBand Adapter must be installed in the development kit

GameCube network address

Visualizer attempts to obtain an IP address from a DHCP server on your network, but an address may also be specified directly. Create a file called `rwsipcfg.txt` containing the desired IP address. Place it in the directory where Visualizer will be executed from. This is `<DVDDRIVE>\Visualizer` for a DDH, and `<RenderWare Graphics Installation>\Viewers\Visual\GCN` for a GDEV.

Specifying the IP address directly can result in faster startup and reconnection times, which can be very handy if you're using the instance tool.

GDEV notes

The Visualizer binary is kept in the `bin` subdirectory as required by the GDEV kit. On this platform, the containing directory gets locked during execution of the binary.

Resources are transferred to Visualizer via the network link. The GDEV still needs an environment variable set up with a temporary path exactly as required for regular development, for example:

```
setodenv dvdroot c:\temp\gdev
```

3ds max and Maya RenderWare menus

You can access the RenderWare Visualizer with 3ds max or Maya via the **RenderWare** menu:
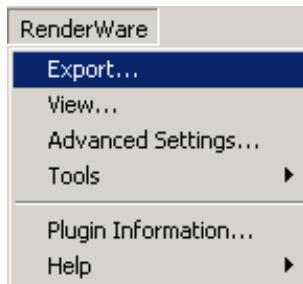
The **RenderWare** menu enables you to:

Export your artwork

The **Export** menu option lets you export your artwork to RenderWare `.rws` and `.rf3` files.

View your artwork

The **View** menu option lets you view your artwork in Visualizer.

Set some of the Advanced settings

The **Advanced settings** menu option can be used to edit the existing connection and view individual assets.

Setting up RenderWare Visualizer

When you run Visualizer from 3ds max or Maya for the first time, a connection wizard will run. Initially, you are given the option of choosing which graphics system to use for local visualization:
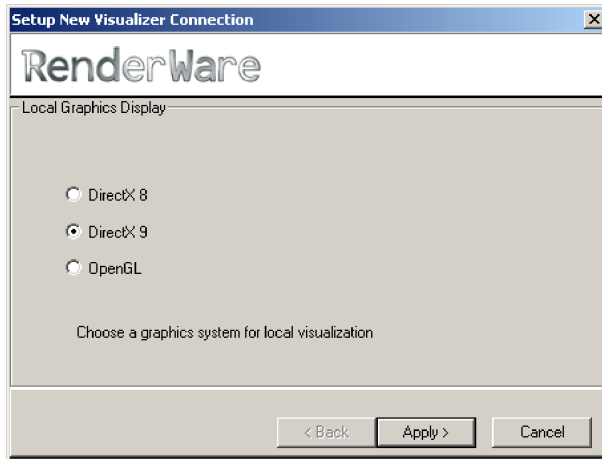
Subsequently, you may setup a connection to a console:
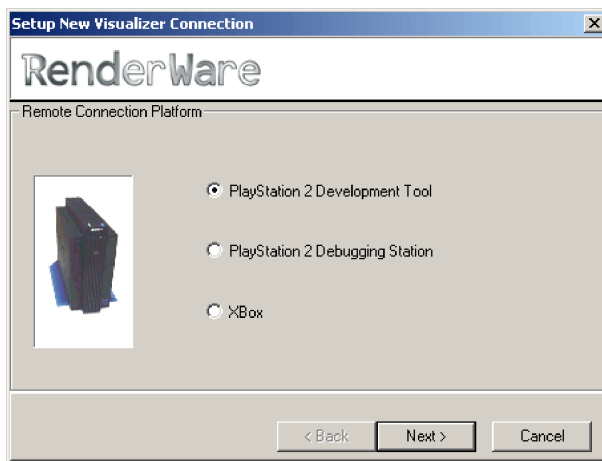
The wizard will guide you through the steps necessary to initialize a connection.

Talk to your system administrator during this phase of configuration. The Visualizer host that runs on the console is able to automatically obtain IP addresses if a DHCP server is present. Failing that, your administrator can provide you with a fixed IP address that can be used by the Visualizer host.
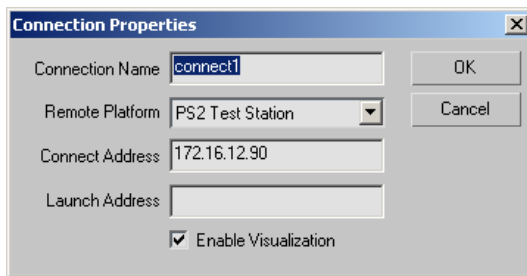
Configuring connections

Once you have established a connection, you can add another connection, or configure or delete an existing one, by selecting **Advanced settings** from the **RenderWare** menu. The following window will appear:
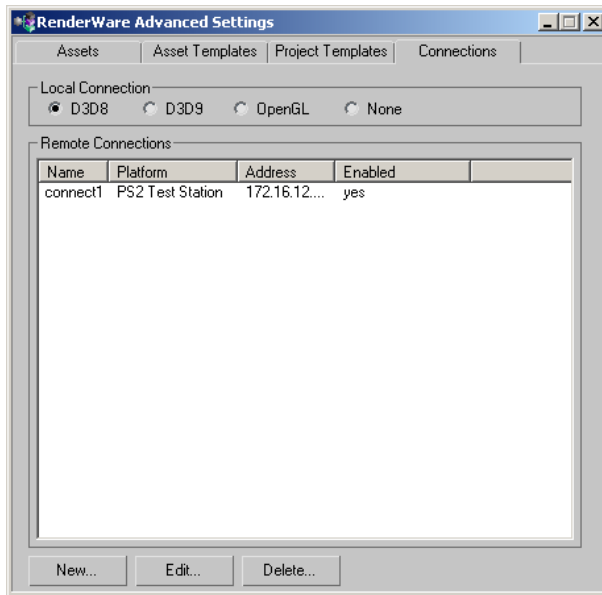
To add another connection, click **New...**. The connection wizard will start up again to help you make a new connection.

To configure a connection, select the connection in the list and click **Edit...**. The following window will appear:

Your administrator can provide you with the information you need to be able to configure your connections. See also the section on using the Launcher (p.39).

Note: Be wary of switching between different kinds of network hardware on your console while using the same address. This can result in hard-to-diagnose communications problems between the PC Visualizer control program and the console Visualizer host. For example, switching from a USB/Ethernet adapter to a broadband adapter on your PlayStation 2, but retaining the same network address, may cause problems. Usually, these problems may be fixed by disabling and re-enabling the network adapter from your network settings on your PC.

Using RenderWare Visualizer

This section is a guide to the Visualizer viewer and control panel.

The RenderWare Visualizer can be accessed from 3ds max, Maya and the stand-alone launcher. When the viewer starts, it uses the information that the connection wizard has saved into the registry about the local and remote controls and runs the viewer on all of them. This loads the Visualizer viewer and the control panel on your workstation and sends your artwork to any targets that you have enabled.

The control panel contains the menus and control interface toolbar for the viewer, while the viewer itself is a separate preview window that will display your selected artwork.

The RenderWare Visualizer loads `.rws` or `.rf3` files into the Viewer.

Note: Only one world can be viewed at a time, even though the exporters can create `.rws` files with more than one world in them. If you attempt to view such a file, only the first world will display in Visualizer.

When you view your artwork Visualizer translates any hierachies into RenderWare animated hierarchies or static worlds. In general, a hierarchy stores all the information about a model, such as a teapot or a person. A RenderWare animated hierachy holds a hierachy of transforms and dynamic objects. If your hierachy or model contains any dynamic or animated objects, Visualizer will create an animated hierachy on view. Dynamic objects are objects that have any of the following assets:

- Mesh with skin or morphing
- Light
- Camera

If the hierachy contains none of the above attributes, and contains no animation, it will be exported for viewing as part of the static world.

The Visualizer viewer

The viewer displays the assets and performance information about the assets:
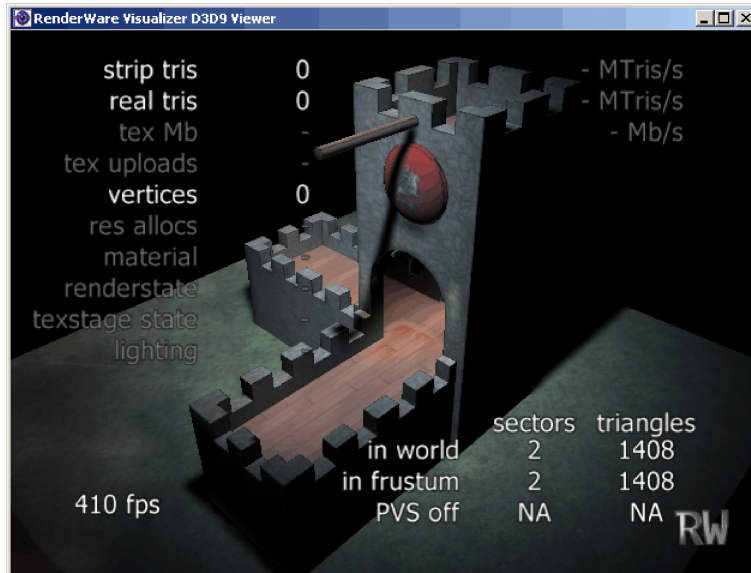
The Visualizer control panel

The RenderWare Visualizer control panel provides a number of controls so you can thoroughly review your content on your chosen target platforms. These controls toggle key display information (triangles, wireframe, world sectors, hierarchies, normals, culling, mesh, statistics), manipulate lighting (ambient, main) and camera selection (free, near and far clip). You may also override any cameras present in the scene, and use the PC mouse or the appropriate console controller to fully preview your artwork.

The control panel has an **Always on top** option you can use to make sure it doesn't disappear behind the viewer.
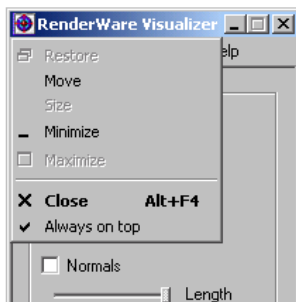
Control panel render options
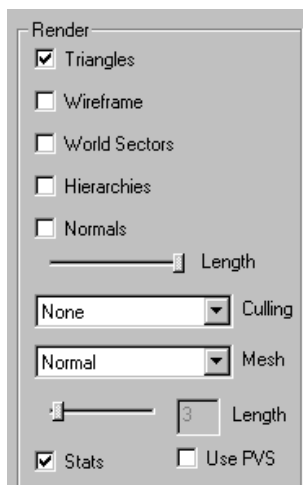
Rendering the world can be controlled from the control panel. It can be rendered in solid or wireframe, with vertex normals, with world sector bounding boxes, or in any combination of the above.

Triangles

This toggles the rendering of world triangles (solid mode).

Wireframe

This toggles the wireframe rendering of world triangles. These are rendered in cyan.

World sectors

This toggles the rendering of the world sector bounding boxes. These are rendered in yellow.

Hierarchies

This toggles the rendering of hierarchies. These are rendered in red.

Normals

This toggles the rendering of vertex normals. These are rendered in green. The length of the normals can be scaled so that you can display them in the clearest possible way.

Note: Wireframe and vertex normals only work on static geometry.

Culling

This drop-down control allows you to set whether *front*, *back* or *no faces* are culled out when RenderWare Graphics renders the scene. For most artwork you should use the default value of *back*. If you're using a specialized tri-stripper which ignores winding order you'll need to set the face culling to *none*.

Note: Some PlayStation 2 pipelines do not support backface culling and will ignore this setting.

Mesh

The mesh drop-down control offers you different options for displaying the meshes in your scene. You can select *normal* which is the default setting, or you can select *Tristrips*, *Tristrips No Degenerates* or *Meshes* which are described below. They let you render your scene using a different color for each mesh. You should find there is a separate mesh for each material. Since the frequency of mesh changes affects the efficiency of tri-stripping and therefore your runtime performance, it is important to be aware of the meshes in your scenes and attempt to minimize the number that are generated.

Tristrips

The number of tri-strips in your scene greatly affects the performance at run-time. The visualization tools built into the viewers enable you to assess the quality of the tri-stripping in your artwork and identity areas where improvement is possible. Each tri-strip is rendered in a different color. Further guidance on improving the tri-stripping in your scenes can be found in the RenderWare Graphics Artist Guides for 3ds max and Maya.
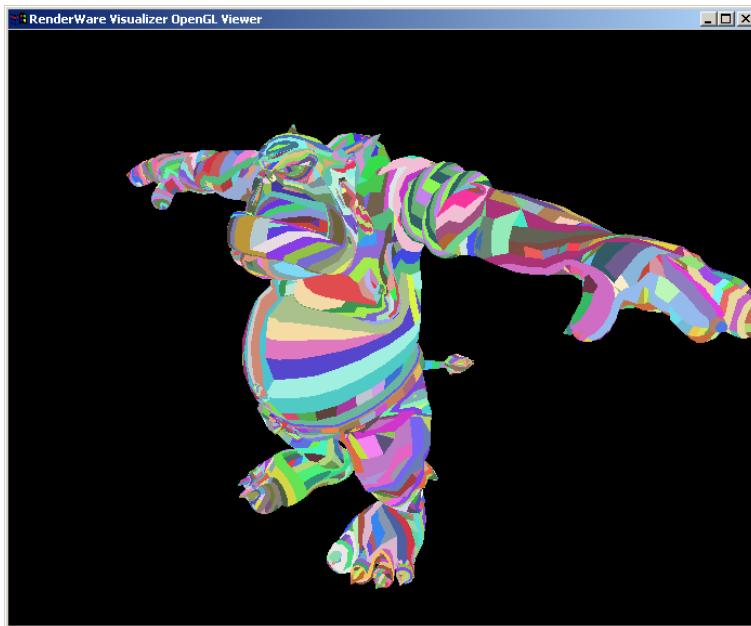
Tristrips No Degenerates

Setting the tri-strip lengths will render your scene in a mode that allows you to visualize the lengths of tri-strips. Tri-strips of length less than or equal to the tri-strip length setting will appear in different shades of red; the shortest will appear bright red and the longest dark red. Tri-strips longer than the tri-strip length setting will appear in black.
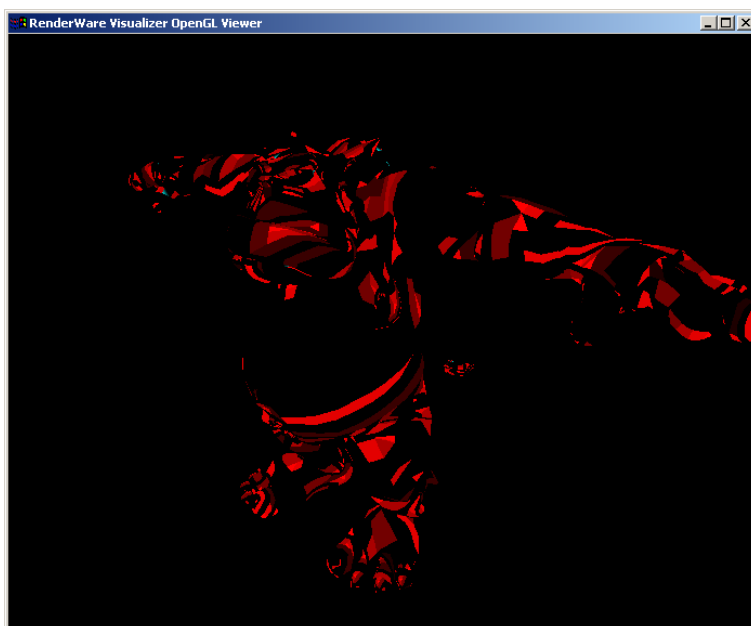
Meshes

Triangles are rendered with a different color for each different material that is assigned to them.
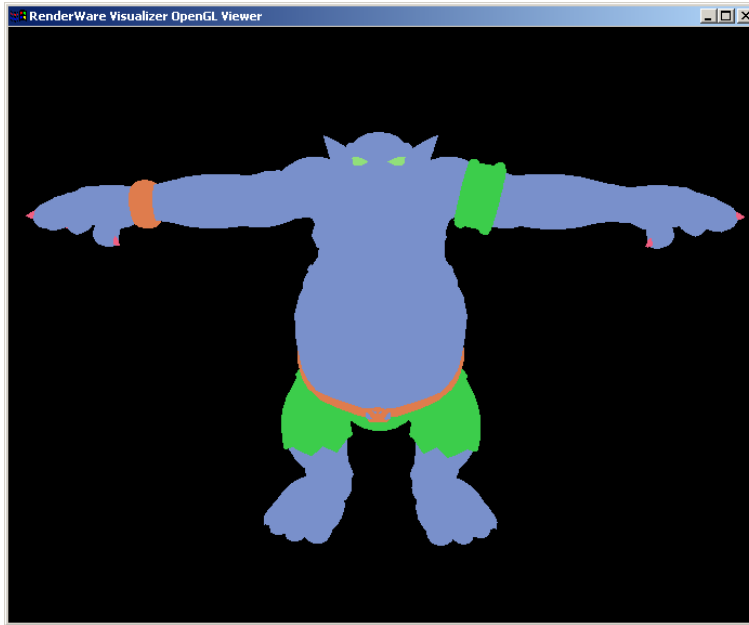
Use PVS

Potentially Visible Sets (PVS) 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. This information is used to draw only the things that can be potentially seen, which speeds up rendering.

Use PVS is used to enable or disable the use of PVS during rendering (only relevant if the scene contains PVS data). This allows you to compare the performance with and without PVS rendering.

Statistics

Various performance related statistics are displayed by ticking the *Stats* box. Cross-platform and platform-specific statistics are available. Studying these will help you improve the performance of a problematic piece of artwork, or identify under utilized areas of the hardware that you could be using for additional detail.
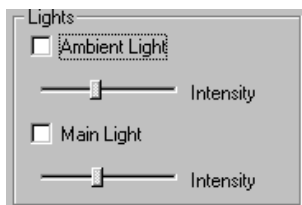
Control panel light options

The ambient light and main light controls allow you to turn on and off the two lights in the scene. The related intensity controls give you fine control over the brightness of the lights. Main lights are directional, point or spot lights. Ambient lights are the general lighting levels of the scene.

Visualizer attempts to locate appropriate ambient and main lights from within the scene itself. If it finds them, the intensity and on-off controls will use these lights. Only the first ambient and first main light in the scene will be controlled.

If lights are not found in the scene, the control panel will add an ambient or main light if required. Both lights are white in color.

Control panel camera options

The camera controls give you control over the camera parameters used in the viewers. These values, along with the camera position, should default to values that give you a good view of the entire world or clump:
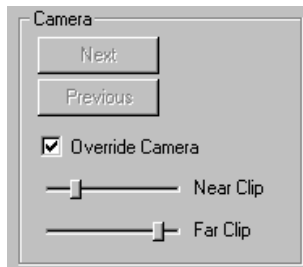
Next and Previous

Buttons to move you between cameras in your artwork.

Override Camera

Allows you to move around your artwork.

Near and Far Clip

Adjust the near and far clip planes.

Depending on the scene, you may find that adjusting the near clip plane can reduce Z bleeding between polygons

Control panel control sensitivity options

Use the control sensitivity options to customize the mouse and keyboard speed:
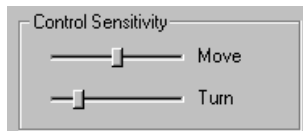
Move

Lets you control the cursor key speed when moving around the viewer using the keyboard.

Turn

Lets you control the turning speed of the mouse when turning in the viewer.

Control panel animation speed options

Use the animation speed control to adjust the speed of any animations that are playing in the viewer:

Speed

Set the slider to the middle to view animations in real time; move the slider bar to the right to increase the speed of animation and move the bar to the left to slow it down. If you move the bar fully to the left the animation will stop. The bar "sticks" at the middle, which is exactly real-time speed. At this speed, there is no speed up or slow down of the animation.

Navigation controls

The navigation controls are intuitive. The keyboard and mouse shortcuts to move around the viewer are:
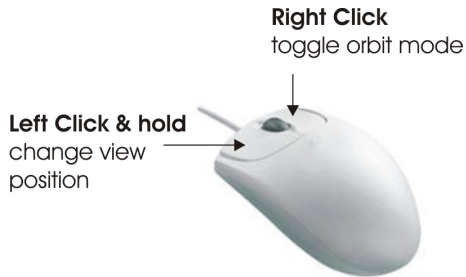
Left click & drag
> Mouse Look - position static, but changing view orientation.

Right click
> Activates and deactivates orbit mode. To activate orbit mode, press and hold the right mouse button, and move the mouse or use the keyboard to navigate. Release the right mouse button to deactivate orbit mode.

← or D
> Strafe left

→ or A
> Strafe right

↑ or W
> Forward

↓ or S
> Backward

Esc
> Exit application if in the viewer window

Orbiting around a selected point

The yellow cross in the middle of the viewer is the point to orbit around:
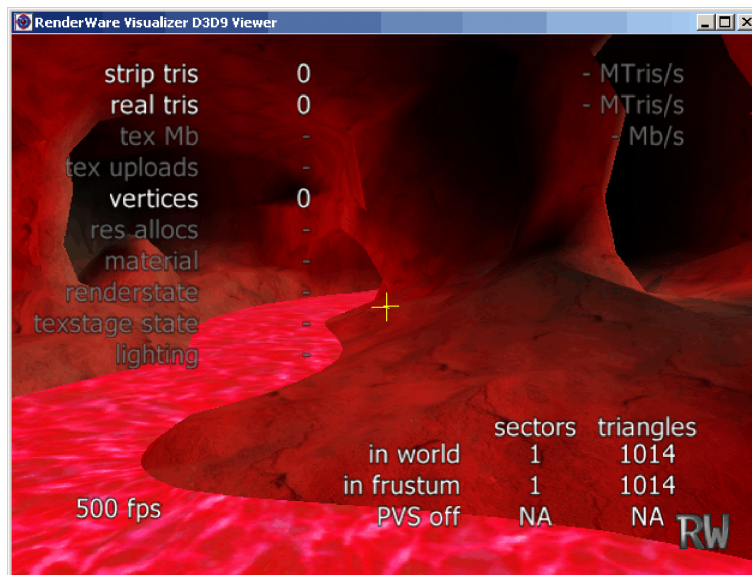
PlayStation 2 controls

Left Shoulder 1 Strafe left   **Right Shoulder 1** Strafe right

Right Shoulder 2 Toggle orbit mode

Triangle Move forward

Circle Strafe right

Square Strafe left

Cross Move backward

Left analog stick
Change view direction

Right analog stick
Move forward
and backward
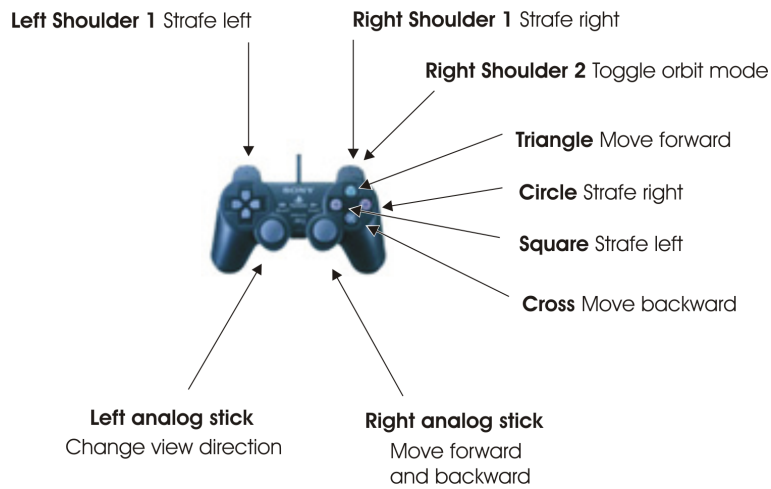
Left analog stick
Change view direction

Right analog stick or Triangle and Cross
Move forward and backward

Left shoulder 1 or Square
Strafe left

Right shoulder 1 or Circle
Strafe right

Right shoulder
Activates and deactivates orbit mode. To activate orbit mode, press and hold R2. Move the left analog stick to rotate and the right analog stick to zoom. Release R2 to deactivate orbit mode.

Xbox controls

Right Trigger Toggle orbit mode

X Strafe left

Y Move forward

B Strafe right

A Move backward

Left analog stick
Change view direction

Right analog stick
Move forward
and backward

Left analog stick
Change view direction

Right analog stick or A or B
Move forward and backward

X
Strafe left

B
Strafe right

Y
Move forward

A
Move backward

Right Trigger
Activates and deactivates orbit mode. To activate orbit mode, press and hold the right trigger. Move the left analog stick to rotate and the right analog stick to zoom. Release the right trigger to deactivate orbit mode.

GameCube controls

Left analog stick
Change view direction

Right analog stick
Move forward
and backward

A Toggle orbit mode

Left analog stick
  Change view direction

Right analog stick
  Move forward and backward

A

  Activates and deactivates orbit mode. To activate orbit mode, press and
  hold A. Move the left analog stick to rotate and the right analog stick to
  zoom. Release A to deactivate orbit mode.

Statistics

The display of statistics can be enabled from the Visualizer Control Panel (p.21).

Cross platform statistics

In bottom left corner:

- Number of frames per second being rendered. This is updated every second.

In bottom right corner:

- Total number of sectors and triangles in world.

- Total number of sectors and triangles currently inside the camera's frustum.

- Total number of sectors and triangles potentially visible, according to the RenderWare Graphics PVS system if the world has PVS data and **Use PVS** is enabled. If there is occlusion within the scene and world sectorization is done well, these numbers should be significantly smaller than the numbers inside the frustum.

Note: Enabling world sector rendering and checking the world sector culling statistics above should give you a good idea of how good your world sectorization (if any!) is, and whether changing it can improve frustum culling or PVS to gain a performance boost.

PlayStation 2 specific statistics

The names of the active rendering pipelines are cycled across the top of the screen. Visualizer will attempt to select the fastest pipeline available to render your scene. Changing scene properties, such as reducing the number of lights, can enable Visualizer to use a faster pipeline for better performance. For example, the G3x family of pipelines is faster than the G3 family of pipelines because they are specially coded to work with fewer lights and perform only triangle frustum culling rather than true clipping.

Strip tris

Number of triangles submitted, including degenerates, on average, per frame. The rendering rate in millions of triangles per second is displayed to the right of this figure.

Real tris

Number of triangles submitted, not including degenerates, on average, per frame. The rendering rate in millions of triangles per second is displayed to the right of this figure.

tex Mb

Number of megabytes of texture uploaded, on average, per frame. Upload rate in megabytes per second is displayed to the right of this figure.

tex uploads

Number of textures uploaded, on average, per frame.

vertices

Number of vertices submitted, on average, per frame.

resource allocs

Number of resource allocations, on average, per frame.

VU1

Percentage of the time VU1 was busy, as determined by approximate sampling. This should indicate to you how much geometry processing capacity you are using. Enabling a faster/simpler pipeline, using better tri-stripping, or just using less vertices can help reduce this figure.

DMA1

Percentage of the time DMA1 was busy, as determined by approximate sampling. RenderWare Graphics uses DMA1 for upload of renderstate and geometry. DMA1 can sometimes also be used for texture upload when necessary.

DMA2

Percentage of the time DMA2 was busy, as determined by approximate sampling. RenderWare Graphics uses DMA2 for texture upload. Reducing the size or number of textures or texture changes in a scene can help reduce this figure.

CPU

Percentage of the time the CPU was busy, as determined by approximate sampling. (Note that Visualizer itself takes about 6% of this on average, to collect and display metrics and do network communication, your game will have different overheads.) Large numbers of world sectors, particle

systems, complex hierarchy and morph animation can use up available CPU time. Adjusting the complexities of these quantities can reduce CPU usage.

Note: If you load a scene running at less than 60 FPS, comparing VU1, DMA1, DMA2 and CPU usage should give you an idea of where the bottleneck lies and what you can change about the art or rendering options to fix it.

Note: When running at less than 60 FPS, the busy percentage of the frame-rate-dropping culprit may actually drop to less than 100%. Try moving the camera or changing rendering options to cross the threshold of rendering at 60 FPS to get a true idea of where the bottleneck lies.

Xbox specific statistics

Coverage

Percentage of the screen filled by pixels that passed the z-test, that is the pixels that were drawn requiring all the work to shade them. The rate in millions of pixels drawn per second is displayed to the right of this. The coverage gives you some idea of how much overdraw you have in the scene. If it's greater than 200%, using PVS may reduce your fill rate needs.

Vertices

Total number of vertices or vertex indices submitted to the hardware, on average, per frame.

Submits

Total number of drawing calls submitted to the hardware, on average, each frame. In general, you get better performance by submitting larger batches of vertices in a few draw calls than submitting many small batches of vertices in many draw calls, so ideally this number should be small. However, material changes (such as texture and color), and geometry changes (such as to a different world sector or atomic) each require a submit. So you can get better performance by using fewer (but perhaps bigger) textures on an object, or creating fewer, but bigger world sectors.

Texture sets

Total number of times a texture had to be bound to the hardware, each frame. Often a significant contributor to number of submits, above. If you have many small textures in a scene, replacing them with one large texture will reduce this cost.

Stream sets

Total number of times a vertex buffer had to be bound to the hardware. Often a significant contributor to number of submits, above. If you have many atomics or world sectors in a scene, grouping them together as bigger atomics or world sectors will reduce this cost.

GPU geometry

Percentage of the time the geometry stage of the GPU was busy, on average as determined by approximate sampling. The number of vertices submitted, how good your tri-stripping is and how expensive the vertex shaders used are all contribute to this figure. Any stalls waiting for the rasterizer are also included in this number.

GPU rasterizer

Percentage of the time the rasterizer stage of the GPU was busy, on average as determined by approximate sampling. This includes texture fetching, pixel shading, alpha blending and z buffer operations. Compressing your textures better, reducing their size and reducing overdraw in the scene can help reduce this figure.

CPU

Amount of time the CPU was busy, judging by the time "left over" after drawing the scene waiting for the page flip. Large numbers of world sectors, particle systems, complex hierarchy and morph animation can use up available CPU. Adjusting the complexities of these quantities can reduce CPU usage.

Note: These counters are based on hardware counters described in more detail in the white paper "Xbox Graphics Performance Tuning Strategies" at **https://xds.xbox.com** (xds.xbox.com).

GameCube Specific Statistics

Coverage

Percentage of the screen filled by pixels that passed the z-test, i.e. the pixels that were drawn requiring all the work to shade them. The rate in millions of pixels drawn per second is displayed to the right of this. The coverage gives you some idea of how much overdraw you have in the scene. If it's greater than 200%, you can probably benefit by using PVS to reduce your fillrate needs.

Vertices

Total number of vertices or vertex indices submitted to the hardware, on average, per frame. The rate in millions of vertices processed per second is displayed to the right of this.

Texels

Total number of texels processed. The rate in millions of texels processed per second is displayed to the right of this.

Strips tris

Total number of triangles processed, including degenerates. The rate in millions of triangles processed per second is displayed to the right of this.

Clipped vertices

Total number of vertices that were clipped, on average per frame.

GP tex

Percentage of the total time to draw the scene that the texture unit was busy.

GP clip

Percentage of the total time to draw the scene that was spent clipping.

GP transforming

Percentage of the total time to draw the scene that was spent transforming geometry.

GP light

Percentage of the total time to draw the scene that was spent lighting geometry.

Note: Clipping, especially against the near clip plane, is expensive on GameCube and should be avoided by altering artwork and camera settings wherever possible. Changing world sectorization can help cull away sectors rather than clip them.

Note: The GameCube hardware counters only allow you to measure a small subset of them at any one time. So the results you see are a mixture of results from different frames, sampled in a round robin scheme. Therefore, holding the camera still for a few seconds before reading them will give more consistent figures.

Direct3D specific statistics

Strip tris

> Number of triangles submitted, including degenerates, on average, per frame. The rendering rate in millions of triangles per second is displayed to the right of this figure.

Real tris

> Number of triangles submitted, not including degenerates, on average, per frame. The rendering rate in millions of triangles per second is displayed to the right of this figure.

tex Mb

> Number of megabytes of texture uploaded, on average, per frame. Upload rate in megabytes per second is displayed to the right of this figure.

tex uploads

> Number of textures uploaded, on average, per frame.

vertices

> Number of vertices submitted, on average, per frame.

resource allocs

> Number of resource allocations, on average, per frame.

material

> Number of material changes, on average, per frame.

renderstate

> Number of render state changes, on average, per frame.

texstage state

> Number of texture stage state changes, on average, per frame.

lighting

> Number of lighting state changes, on average, per frame.

Note: State changes of each kind can be costly on D3D8 and D3D9. Advice for reducing these similar to that in the Xbox section applies to PC based hardware T&L video cards.

OpenGL specific statistics

Strip tris

Number of triangles submitted, including degenerates, on average, per frame. The rendering rate in millions of triangles per second is displayed to the right of this figure.

Real tris

Number of triangles submitted, not including degenerates, on average, per frame. The rendering rate in millions of triangles per second is displayed to the right of this figure.

vertices

Number of vertices submitted, on average, per frame.

resource allocs

Number of resource allocations on average, per frame.

Using the launcher

The launcher loads exported resources saved as `.rws` files and sends them to viewers for viewing on different platforms. Given an appropriate template file, the launcher can export `.rf3` files and view the resulting `.rws` file.

Note: The launcher can also load the legacy formats `.dff` and `.bsp`. The launcher will attempt to locate textures or animations that are used by these files.

The launcher also allows you to set up and edit connections to those platforms via the embedded connection editor.

To open the launcher select **Start ▶ Programs ▶ RenderWare ▶ Graphics ▶ Visualizer** or click .
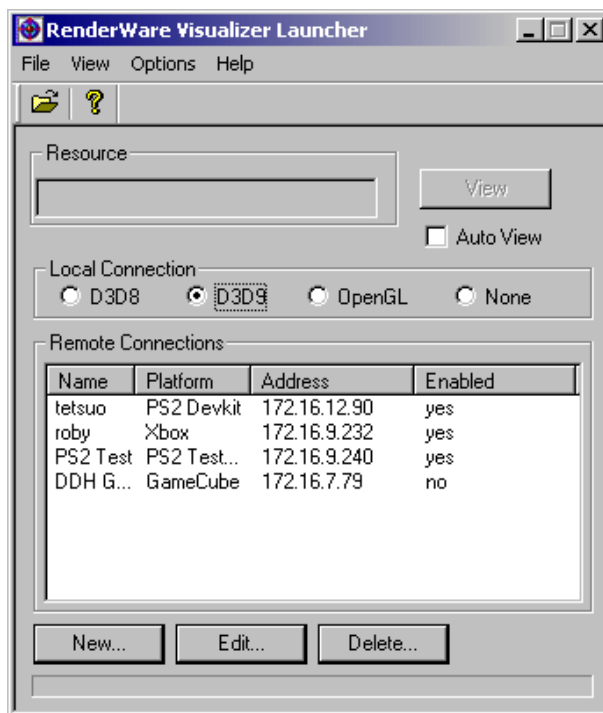
Menus

The menus at the top of the launcher provide a convenient way to access some common options:
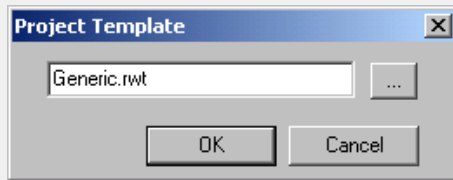
File

Allows a specific file to be opened.

Provides a list of recently opened files.

View

Can show or hide the application toolbar.

Options

Displays up a dialog box that allows an `.rwt` template to be selected.

These files may be found in the `export/bin/template` directory in your RenderWare distribution. They are used by the Launcher (and the 3ds max and Maya exporters) to customize the export of `.rf3` files to `.rws` files.

For more information refer to the Technical Artist Guide.

Help

Can bring up the **About** dialog box that lists the program's basic information.

Resource

Resource
The `.rws` or `.rf3` file to view in RenderWare Visualizer.

View
Views the file specified.

Auto View
Automatically views a file when it is opened in the launcher.

Connections

The connection editor is divided into **Local Connection** and **Remote Connections** so that you can easily view files on different platforms. Local connection can be used to view D3D8, D3D9 and OpenGL on your PC whereas remote connections can be used to view files on GameCube, PlayStation 2 Test Station, PlayStation 2 DevKit, Xbox, or a remote PC on D3D8, D3D9 or OpenGL. Any number of remote targets can be configured, and even launched simultaneously.
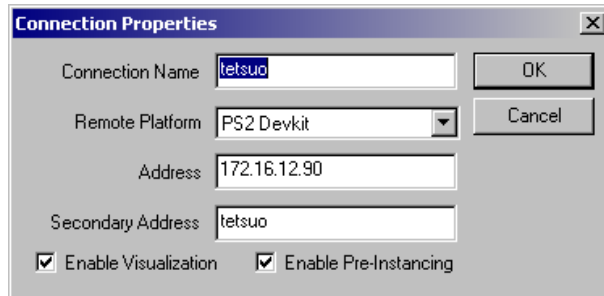
Buttons

New...
Creates a new connection. The connection Wizard is launched and the following window will appear:
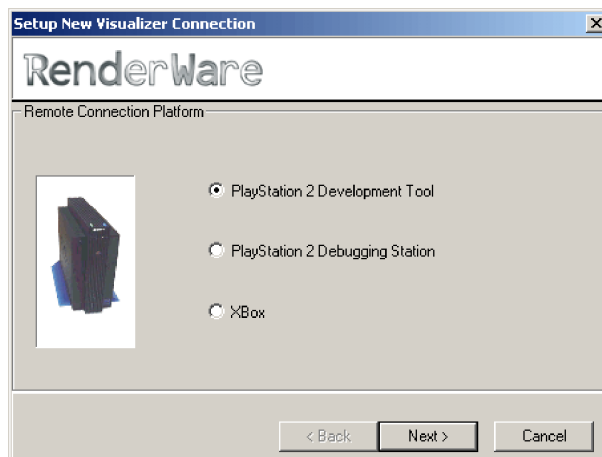
For a more detailed explanation about setting up connection properties refer to the section.

Edit...

Edits the selected connection. A connection is selected by clicking on the Connection Name. The following window will appear:

Connection Name

The name of the connection to be made.

Remote Platform

The remote target platform.

Address

The address for the target platform.

Secondary Address

The secondary address for the target platform.

Enable Visualization

Used to state which platform viewers will display the RenderWare Export Nodes when the View button is pressed. When you click on a View button in the launcher, `viewer.exe` is run, the registry is accessed and connections are made to the enabled target platforms. The `.rws`, `.bsp` or `.dff` file is then displayed in RenderWare Visualizer.

Enable Pre-Instancing

Controls whether this connection will be used to generate platform specific data when an `.rws` file is exported with the `Pre-Instance` option enabled. If assets are not being exported to `.rws` files or the `Pre-Instance` option is not enabled in the exporters then this setting has no effect. See the Maya Reference Guide, 3ds max Reference Guide or Technical Artist Guide documents for more information on how pre-instancing works.

Delete...

Deletes the selected connection. A connection is selected by clicking on the connection name.

Hints and troubleshooting

This topic assumes that you have already been able to launch the program and connect to Visualizer on a target machine. If you have not been able to do this, you should use the connection wizard to establish your connection. See the Setting up RenderWare Visualizer (p.17) section for information.

Make sure that both the control panel (p.21) and the viewer (p.20) are visible on your PC screen. The viewer should also be visible on your chosen target platform.

Starting out

It's a good idea to begin with a simple scene, rather than more complex artwork. Start with a simple piece of artwork with no lights or animation. Then, when you have this displaying correctly, you can move on to more complicated pieces of artwork.

RenderWare is optimized for games platforms. Some features which are available in 3ds max and Maya are not optimal in the context of a games platform and are unsupported in Visualizer.

Basic problems

- You have successfully installed RenderWare Visualizer but you have a completely blank screen (p.43) and cannot see your artwork.

- If your artwork looks very different from what you were expecting, the problem is probably to do with the lighting (p.44) of the scene.

- Other changes to the way your artwork is displayed might be due to the restrictions (p.45) of RenderWare Visualizer.

- Other common problems (p.46) hints and tips.

- Error messages (p.47) and warnings which may be displayed.

Blank screen

If you have successfully installed RenderWare Visualizer but you have a completely blank screen and cannot see your artwork, try using Wireframe Mode, Bounding Boxes or Meshes. This will help determine if your artwork is in view. Then try the following:

1. Check the settings of the clip planes. You may be able to view the artwork in 3ds max or Maya, but if the near clip plane is set too far away or the far clip plane is set too close, then you will see nothing in Visualizer. Adjust the settings in the camera section of the Visualizer control panel.
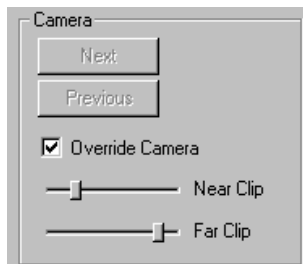
2. Check that there are lights in the scene. An unlighted object on a black background will be invisible. Adjust the settings in the lighting section of the Visualizer control panel.
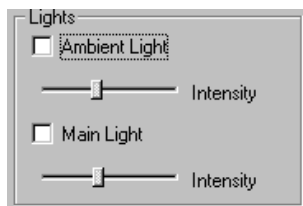
3. Check that the **Alpha Channel** setting of the image does not set it to be completely transparent.

Lighting problems

If your artwork looks very different from what you were expecting, the problem is probably to do with the lighting of the scene. Bear in mind the following:

- If the scene doesn't contain an ambient light, Visualizer will place one in the scene. This will be white in color.

- If the scene doesn't contain a main light, Visualizer will place one in the scene. This will also be white in color. Main lights are directional, point or spot lights.

- The first ambient and the first directional light in a scene can be adjusted in the lighting section of the Visualizer control panel. Only the first lights in the scene will be controlled in the control panel. If the most important lights in your scene are not the first lights, then you may have unexpected results.

- Disabling the ambient or directional light check boxes on the Visualizer control panel restores the lights to their state in the 3ds max or Maya scene.

- If you are using black prelights with no other lighting, you won't see anything. If you are using white prelights, you will probably get harsh, ugly (or even completely white) results.

- Alpha prelights are not available in Visualizer on D3D9 or OpenGL.

- Consoles have trouble with a large number of lights in a scene. The number of dynamic lights needs to be kept small per sector. Lots of lights can result in no lights being used on some platforms.

Restrictions

RenderWare is optimized for games platforms. Some features which are available in 3ds max or Maya are not optimal in the context of a games platform and are unsupported in Visualizer.

The restrictions shown below might affect the artwork as it is rendered in Visualizer. See also the list of error messages (p.47) which may be displayed.

Hierarchy

- Geometry skins should be skinned to just one hierarchy.

- Some platforms impose a limit on the number of bones that are permissible in a single object (48 on Xbox, 64 on PlayStation 2). An object that requires more bones, than the bone limit, can be supported using RenderWare's skin-splitting technology. This splits the geometry such that each mesh will use, at most, the Bone Limit number of bones matrices. The source geometric data is not modified. Instead, the underlying meshes are rearranged such that each mesh requires, at most, the specified bone limit.

- If the mesh is to be exported as a skin, the skin modifier must be at the top of the modifier stack.

- There is no support for animated scale.

Materials

- Only Shell, Multi/sub-object, Standard and `RwMaterial` material types are supported.

Morph

- Only a single morph modifier per hierarchy is supported.

Common problems

The material of one of my objects is not coming out correctly. Why?

Only Shell, Multi/sub-object, Standard and `RwMaterial` material types are supported.

I'm only seeing a black screen (p.43). Why?

The two main things to check when this is seen are:

1. **Camera clip planes.** Do the objects/world fit between the near and far clip planes of the camera? Try changing the clip planes and/or the camera to see if this will solve the problem.

2. **Lighting.** Is there any lighting in the scene? Try the Visualizer ambient and directional lights.

I still can't see my model. Where is it?

Turn on "World Sectors", this should show you a box of the world. The world bounding box always surrounds all the objects of the world and the origin. So if there is an object far away, or the object you are interested in is far from the origin, then you might not see it when starting Visualizer. You will probably find your object in one of the corners of the bounding box.

The Visualizer directional light doesn't seem to be affecting the scene. Why?

If the world is small the light might not fit into it and thus will have no effect. Create a big box around your scene.

I can't see any of my lightmaps in the viewer. Why?

When generating lightmaps using the **Render To Texture** dialog in 3ds max or Maya (**Rendering** menu ► **Render To Texture** ► **Render to Texture** dialog), you must use the **Create New Baked** option in the **Baked Material** rollout. You will also need to select **DirextX_9_Shader:lightmap** as the baked material type and link the **LightingMap** element to the **Lightmap** target map slot.

Other tips

- Keep the number of nodes in the hierarchy down, especially when using hierarchy for skinning.

- Only the standard nodes are supported. At best you will get a transform exported in a hierarchy from a unsupported node.

- It's a good idea to begin with a simple scene, rather than with more complex artwork. Start with a simple piece of artwork with no lights or animation. Then when you have this displaying correctly you can move on to more complicated things.

Error messages

The RenderWare art tools perform a number of checks on your artwork to ensure it will work accurately and optimally on the platform you are viewing on. If the viewer generates any of the following messages, we recommend you examine your artwork using the hints below.

Texture file "TextureName" not found
> A texture file which is specified in your artwork has not been found. Visualizer requires all the specified textures to be at the specified paths. In your art creation package, texture paths are specified in the **Materials Editor** (**Rendering ▶ Material Editor ▶ Bitmap Parameters ▶ Bitmaps**).

High level of duplicated vertices, set verbosity to high for more details
> RenderWare vertices can have up to eight UV sets, with one UV per set, only one normal and one prelight color. Note that, in your art creation package, UV sets are called mapping coordinates. Because your art creation package allows you to have more than one normal, one prelight color and one UV per UV set, Visualizer splits the vertices and this can result in poor tri-stripping. Tri-stripping is very important as it is an efficient way of storing geometry. The longer the strip, the better the result. Poor tri-stripping leads to poor performance. Try to keep to one normal, one prelight color, and only one UV for each UV set in your artwork.

Failed test: Check dual pass UV set. The material "MaterialName" may appear incorrect: The dual pass texture should use UV set 2
> The UV set (or map channel) used in the dual pass of a material is fixed as the second UV set. If you have several dual pass materials, they all must use the same UV set for the first pass, and the same UV set for the second pass. This error is displayed when different UV sets are used for the second pass.

Failed test: Check base UV set. The material "MaterialName" may appear incorrect: The base texture should use UV set 1
> The UV set, or map channel, used in the base pass of a material is fixed as the first UV set. If you have several dual pass materials, they must all use the same UV set for the second pass. This error is displayed when different UV sets are used for the first pass.

Failed test: Check texture size. The following textures may be too large: "TextureName1 TextureName2.."
> You have used textures in your artwork that contain too many pixels for the target platform you have selected. You will need to scale them down in order for them to work.

Failed test: Check texture dimensions. The following textures are not power of two: "TextureName1 TextureName2.."
> You have used a texture that may cause problems on the platform being exported to, which has caused this warning. If textures are loaded into RenderWare Graphics from image files (such as `.bmps` or `.pngs`) rather than a texture dictionary, the image data needs to be converted to a format that is compatible with RenderWare Graphics. This may involve resampling the image to a different width, height and/or depth which can slow load times. Some graphics hardware requires textures to have a width and a

height that is a 'power of two' (i.e. 1x1, 2x2, 4x4, 8x8, 16x16, 32x32, 64x64, 128x128, 256x256, 128x256 etc). If the source images are not a power of two in either dimension, RenderWare Graphics may resample them. It is perhaps more preferable to resample the images in a paint package since RenderWare Graphics executes a very simple resampling algorithm.

Failed test: Check mesh size. Maximum number of vertices exceeded

RenderWare geometry has a limit of 65536 vertices. The artwork geometry that you are trying to view has exceeded this limit. You will need to simplify your artwork.

Failed test: Check number of weights. The following nodes have vertices with more than specified number of weights: "MeshName1 MeshName2.."

RenderWare Graphics skinning supports up to four weights per vertex. The skins of the given geometries have exceeded this limit.

Failed test: Check unweighted verts. Skinned object has vertices with no weights. Assigning them to the root bone

In RenderWare Graphics skinned vertices must be assigned to at least one bone. The skins of the given geometries have vertices that are not assigned to any bones. Visualizer has assigned them to the root bone.

Failed test: Check unsupported material animations. The following materials have unsupported animation: "MaterialName1 MaterialName2.."

RenderWare Graphics supports UV animations through the texture, not the material animation. Your artwork contains material animation which needs to be removed.

Failed test: Check unsupported texture animations. The following textures have unsupported animation: "TextureName1 TextureName2.."

RenderWare supports the following texture animations:

- Angle W

- Offset U

- Offset V

- Tiling U

- Tiling V

This error indicates that another type of texture animation has been found. Other types of texture animation may have been picked up through the sampling, but might not be rendered correctly.

Failed test: Check 2-sided materials. Ignoring the 2-sided setting of the following materials: "MaterialName1 MaterialName2.."

Visualizer has two view options, "Game Optimized" and "Full Quality". On a Game Optimized view, dual sided materials are not supported. Your 3ds max artwork contains a dual sided material and you will need to change to a "Full Quality" Visualizer view in order to view it.

Failed test: Check unsupported light animations. The following lights have unsupported animation: "LightName1 LightName2.."

RenderWare supports the animation of the position or orientation of lights. It doesn't support other kinds of light animation. You have used an invalid method of light animation which will need to be removed from your artwork.

Failed test: Check unsupported camera animations. The following cameras have unsupported animation: "CameraName1 CameraName2.."

RenderWare supports the animation of the position or orientation of

cameras. It doesn't support other kinds of camera animation. You have used an invalid method of camera animation which will need to be removed from your artwork.

Failed test: Check unsupported visibility animation checker. The following nodes have unsupported visibility animation: "ObjectName1 ObjectName2.."

You have animated a visibility attribute on an object in your art creation package. RenderWare doesn't support visibility animation.

Failed test: Check alpha textures. Textures "TextureName1 TextureName2.." have multiple alpha texture setups

Alpha is a type of data which is used to specify the transparency or opacity of each pixel within a texture bitmap. The alpha texture that specifies the transparency or opacity is often called the mask texture because it is masked, or merged, with the base texture. To store textures with mask textures, RenderWare uses the base texture name. In this instance, a problem has arisen because you have used the same texture with multiple mask textures, or without a mask, in different places. You will need to modify your artwork to use different names for the textures in different places.

Failed test: Check number of lights. Maximum number of lights exceeded (8)

RenderWare Visualizer restricts the number of ambient lights and directional lights in a scene to eight. Specifying more than this has different effects depending on the platform. Some platforms will not render the scene, while other platforms will render using only the first eight lights (which might not be the most important lights in the scene). Always try to keep within eight lights per scene to give the effect you require.

Failed test: Check number of patch mesh control points. Patch mesh "MeshName" exceeds maximum number of control points (65536)

RenderWare Visualizer restricts the number of control points on a patch mesh to 65536. You have exceeded this number and will need to reduce the number of control points.

Failed test: Check number of patch generated vertices. Patch mesh "MeshName" exceeds vertex count (65536) above LOD "n"

RenderWare Visualizer restricts the number of patch generated vertices to 65536. At the level of detail (LOD) greater than that specified, the patch has exceeded this and will need to be simplified.

Failed test: Check UVAnim with MatFX. Material "MaterialName" has UV animation and bump mapping. UV animation ignored

RenderWare Visualizer does not allow you to use UV animation together with bump mapping or environment mapping, so make sure that these maps are disabled when applying UV animation. (You can still use the opacity map). If you do setup both bump or environment mapping and UV animation, the bump or environment effect will take precedence and UV animation will not render. In this case you have tried to use UV animation together with bump mapping and the UV animation has been ignored.

Failed test: Check UVAnim with MatFX. Material "MaterialName" has UV animation and environment mapping. UV animation ignored

RenderWare Visualizer does not allow you to use UV animation together with bump mapping or environment mapping, so make sure that these maps are disabled when applying UV animation. You can still use the opacity map. If you do setup both bump or environment mapping and UV animation, the

bump or environment effect will take precedence and UV animation will not render. In this case you have tried to use UV animation together with environment mapping and the UV animation has been ignored.

Failed test: Check UVAnim with MatFX. Material "MaterialName" has UV animation and bump and environment mapping. UV animation ignored

RenderWare Visualizer does not allow you to use UV animation together with bump mapping or environment mapping, so make sure that these maps are disabled when applying UV animation. You can still use the opacity map. If you do setup both bump or environment mapping and UV animation, the bump or environment effect will take precedence and UV animation will not render. In this case you have tried to use UV animation together with both bump mapping and environment mapping and the UV animation has been ignored.

TransformName: Unknown bone used by skin. Check if skin is influenced by multiple hierarchies

The most likely cause of this error is that the skin is skinned to multiple hierarchies. A skin can only be skinned to one hierarchy.

"MeshName": Mesh may have a topology changing modifier applied, cannot export skin

You have a modifier after the skin modifier that is changing the polygon count or order. The skin modifier should be at the top of the modifier stack.

"MeshName": Conflict between effects: Normal Map and Material FX

You are using a mixture of normal/environment mapping and standard bump/environment mapping on your asset. Use one or the other type of mapping on this asset.

"MeshName": Multiple DMorph modifiers detected, exporting first only

Visualizer only supports one morph modifier in a hierarchy.

"MeshName": Morph modifier(s): "Modifier1 Modifier2.." incompatible with modifiers(s): Modifier3 Modifier4.." Morph Ignored

The morph targets are not compatible because the mesh is being animated in some way (skinning, morphing, etc.).

"MeshName": Some textures were missing during texel UV limiting, limiting skipped: "TextureName1 TextureName2.."

The mesh material texture files, which are needed for processing the UVs to get the texel limits on PlayStation 2, have not been found.

"MeshName": UVs outside the range 0.0 - 1.0 were encountered during lightmap conversion. Lightmap data may contain errors

The UV set coordinates for the given lightmap are not within the required range, of 0.0 to 1.0, so they are not within the texture.

"MeshName": Some lightmap textures were missing during native lightmap conversion. Lightmap data may contain errors

The texture files, that are specified as lightmaps, cannot be found. Check that the files are present in the correct location.

"MeshName": Warning: First UV set will be overwritten with the diffuse map uvs

The first set of UVs must be the base (diffuse) map UVs being exported.

"MeshName": Second UV set will be overwritten with the lightmap uvs

The second set of UVs will be overridden by the RenderWare lightmapping UVs. RenderWare lightmapping only supports two UV sets.

"MeshName": Vertex duplication "n"% due to normals "n"% due to UVs "n"% due to prelight.

RenderWare vertices can have up to eight UV sets, with one UV per set, only one normal and one prelight color. Note that, in your art creation package, UV sets are called mapping coordinates. If a vertex exceeds these limits, the vertices will be split, which can result in poor tri-stripping. Try to keep to one normal, one prelight color, and only one UV for each UV set.

"MeshName": the following non-lightmap materials were detected in lightmap asset: "MaterialName1 MaterialName 2"

You have used different types of lightmap materials on the same asset. An asset can only have lightmap materials or non-lightmap materials; you can not mix lightmap materials.

"CameraName": Invalid clipping plane values

You have set the far clip plane of the camera to be less than the near clip plane. This is not supported.

Conflict between effects: Normal Map and Material FX in the same world sector

You are using a mixture of normal/environment mapping and standard bump/environment mapping on the materials in the same world sector. Use one or the other on all your static geometry (assets that are not animated in anyway or in a hierarchy with animation, skinning, cameras, lights or other animated assets).

Unable to traverse children of "TransformName" by name order. Please ensure child names are unique

There are duplicate names in the hierarchy. Each name should be unique, although the traversal order in the hierarchy can vary, resulting in different bone orders.

Cannot create hierarchy with more than 256 bones

We do not support more then 256 bones in a single animated hierarchy. You must reduce the bone count in the hierarchy.

Glossary

DHCP (Dynamic Host Configuration Protocol)
A protocol that allows individual computers on an IP network to automicatically obtain their configurations from a server.

Environment mapping
Environment mapping in RenderWare Graphics corresponds to reflection map in the material editor.

File names
RenderWare Visualizer is not case sensitive and it can handle files and directories with spaces.

IP address (also called an IP number)
A number (typically written as four numbers separated by periods, e.g. 107.4.1.3 or 84.2.1.111) that uniquely identifies a computer that is making use of the Internet.

LOD (level of detail)
RenderWare Graphics has the capability to switch models based on distance to the camera. All that is needed from the artist are separate models each exported individually with the required level of detail. The level of detail changes by zooming in and out of the viewer.

PVS (Potentially Visible Sets)
RenderWare Graphics uses PVS to decide what can be seen by the user. It checks visibility from each part of the model. The parts that are not visible are culled reducing processing time. PVS culls all unseen or occluded geometry. For example, a camera placed inside a modeled world may not be able to view all visible geometry. This geometry could be behind the camera or blocked by other geometry and is culled.

Textures
Assets look for textures in a sub-directory with the same name as the asset and embeds the textures within the `.rws`file.

Tri-strips (triangle strips)
Tri-strips are an efficient way of storing geometry. Tri-strips consist of adjacent triangles which share vertices. Artwork created using tri-strips can reduce the number of vertex repetitions by a factor of three. RenderWare Graphics calculates the number of triangles and the number of triangles actually processed by the hardware. The difference between these two statistics is the number of degenerate triangles inserted between the end of one tri-strip and the beginning of the next.

Window size
The window size and position saved in the registry.

UV or UVW
Most material maps are a 2D plane assigned to a 3D surface. Consequently, the coordinate system used to describe the placement and transformation of maps is different from the X, Y, and Z axis coordinates used in 3D space. Specifically, mapping coordinates use the letters U, V, and W; the three letters preceding X, Y, and Z in the alphabet. The U, V, and W coordinates parallel the relative directions of X, Y, and Z coordinates. If you look at a 2D

map image, U is the equivalent of X, and represents the horizontal direction of the map. V is the equivalent of Y, and represents the vertical direction of the map. W is the equivalent of Z and represents a direction perpendicular to the UV plane of the map.

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