Viewpoint

Viewpoint
Scene Builder
User Guide

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Viewpoint Scene Builder User Guide

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Chapter 1: Introduction

New Features in Viewpoint Scene Builder 3.0.11

This new release of Viewpoint Scene Builder includes great, new features:

- **Generate HTML files** Test and deploy VET content by quickly embedding it in an HTML file.

- **Read files from a URL** Open files remotely from a URL.

- **Supports .swf file loading** Load and view .swf files through Scene Builder.

- **For discreet 3ds max users, improved ASE authoring path** It's now easier than ever to author VET content.

- **Create a "No Geometry" hot spot** You can now add hot spots that are not confined to an object.

Resolved Issues

This new release resolved the following issues from the previous version of Scene Builder:

- For discreet 3ds max users, improved ASE authoring path includes:

  - Reads focal length of the camera correctly

  - Loads all ASE textures

  - Improved camera rotation animations match those observed in 3ds max

  - Loads textures in their actual size

  - Supports morph target animations

- Publishes backface culling correctly

- Publishes animation On=0/1 correctly

- Publishes collapsed for Flash animations

- Generates Pre- and Post- tags correctly

- Fixed known issues with Transformation (translation/rotation/scale) sliders

- Improved reloading of textures, lightmaps, and bumpmaps

- Ctrl-Alt-drag changes camera Z-scale correctly

- Tool tips are now available in the object window.

- Fixed known issues when deleting objects and animations

- Import two ASE objects sequentially

- Publish crease angles

- Now load alpha channels correctly

- Rendering property and Globals rendering mode now works correctly

- Publishes Specwrap correctly

- Loads the default file automatically

- Loads panoramas

- Enhanced Texture Lab functionality

- Load SWF files directly through texture loading dialog boxes

- Publishes the scene with the original resource names by default

- Saves animation play direction appropriately

- Now add more then 10 OBJs to your scene

- Improved primitives functionality so you can now change the diffuse color

- Geometry Precision values are rescaled to be measured in bits (instead of percent) of the bounding box

- Hierarchy window scrolling bar working appropriately for large scenes

- Removed Quick Time VR Import function because there is a new authoring path. Refer to Viewpoint Developer Central (http://developer.viewpoint.com/) for more information on the QuickTime VR importing path.

- Loads OBJ textures in their actual size

About This Guide

This guide describes how to use **Viewpoint Scene Builder™** to edit and assemble the components of a **Viewpoint Experience Technology™ (VET)** scene.

This guide includes these chapters:

- Chapter 1: Introduction Describes what you'll find in this guide.

- Chapter 2: Using Scene Builder Offers an overview of Scene Builder and a description of how to use Scene Builder's menus and options.

- Chapter 3: Getting Started Lists system requirements for Scene Builder, and includes procedures for basic steps, including starting and stopping Scene Builder, and opening scene files.

- Chapter 4: Importing 3D Models Describes how to import an .ase, .obj, or .mtx file from a 3D modeling application into your VET scene.

- Chapter 5: Managing Geometries Describes how to add primitive 3D shapes (cubes, spheres, etc.) to your VET scene and how to manage the texture and other characteristics of the objects in the scene. This chapter discusses object opacity, textures, lightmaps, bumpmaps, and hot spots.

- Chapter 6: Managing Animations Describes how to organize and test imported animations in your VET scene.

- Chapter 7: Managing Scene Hierarchies Describes how to use the Hierarchy menu to organize elements in your VET scene.

- Chapter 8: Setting Other Scene Globals Describes how to set scene height and width, define settings for the scene's camera, and set a background color, image, or panorama.

- Chapter 9: Publish Your Scene Files Describes how to save or publish your scene's .mtx and .mts files. This chapter also describes how to create a default file that you can use as a VET scene template.

- Appendix A: Help, Resources, and Feedback Lists other Viewpoint resources available to you.

- Appendix B: Scene Builder Menu Options Lists and defines each menu option in Scene Builder's Commands menu, including menu options for Procedural Lightmaps and Texture Lab.

- Appendix C: Resetting Elements of Your Scene Describes how to reset scene defaults, menu by menu, or for the entire VET scene.

- Appendix D: Keyboard Shortcuts Lists shortcuts you can use with Scene Builder.

- Glossary Defines terms used in this guide.

Related Documents

You'll find these related documents on the Viewpoint Developer Central website at http://developer.viewpoint.com/.

- For an introduction to VET and related concepts, read *Viewpoint Experience Technology: Getting Started*.

- For a description of advanced concepts and techniques, see other Viewpoint documentation, including these:

  - *Creating 3D Rich Media Web Applications*

- *Viewpoint Experience Technology: Technical Overview*
- *Viewpoint XML Reference Guide*

About Viewpoint Experience Technology

Viewpoint Experience Technology (VET) is Viewpoint Corporation's unique technology that streams rich media over the Internet via Viewpoint Media Player, a web browser plug-in.

VET allows you to combine all types of rich media—including 2D photos and drawings, 3D models, animation, ZoomView images, Macromedia® Flash™ movies, text, and audio—to create rich media content. Using a sophisticated set of compression techniques, Viewpoint tools create a visually crisp, smooth-streaming multimedia experience for the user.

Note: To publish VET content on a website, the site publisher must complete a Broadcast License Agreement and acquire the associated Broadcast License Key. Broadcast licenses are FREE for non-commercial use. For more information, please visit the Broadcast Key section of the Viewpoint Developer Central website (http://developer.viewpoint.com/).

What is Viewpoint Scene Builder?

Viewpoint Scene Builder allows you to compose and edit the contents of a VET scene. Scene Builder creates two VET scene files:

- A highly compressed file (.mts) containing 3D objects, lightmaps, texture maps, and panoramas.

- A companion XML (.mtx) file containing parameters describing the 3D objects, animations, and scene, as well as references to any external files. Once the final .mtx file has been generated, it can be embedded into a web (.html) page using Viewpoint Media Publisher.

Note: Even though a rich media component is in an .mts file, it is not necessary to use it in the resulting scene. The .mts file is your creative arsenal. The .mtx file orchestrates the elements within a scene.

To place a rich media component in a scene, Scene Builder publishes an .mtx file containing XML tags to acquire media atoms from its .mts file. Media atoms can also be stored in externally-referenced files, such as Flash .swf files, sound files, and JPEG image files.

Scene Builder employs a combination of wavelet technology and procedural materials, producing files that are dramatically smaller yet comparable in quality to 2D image formats. The resulting Viewpoint scene can be embedded in a web page via the Viewpoint Media Publisher application.

The Role of Scene Builder in Viewpoint Experience Technology

With Viewpoint Scene Builder you can put finishing touches on scenes you export from 3D modeling packages, and then create .mts and .mtx files ready to be embedded in a web page.

To begin, you can import .ase, .obj, or .mts (Viewpoint proprietary file format) 3D files into Scene Builder. Or, load an existing .mtx file.

Then you can use Scene Builder to manipulate the layout and relationship of objects within the 3D scene, as well as enhance the scene with effects and organize or edit animations.

With Scene Builder, you can enhance your VET scene by:

- Adding textures, lightmaps, hot spots, and background colors, images, or panoramas.

- Integrating other media types (including 2D images, Flash movies, audio, and text).

- Using Viewpoint's ZoomView technology, which allows you to convert a JPEG image into a zoomable image.
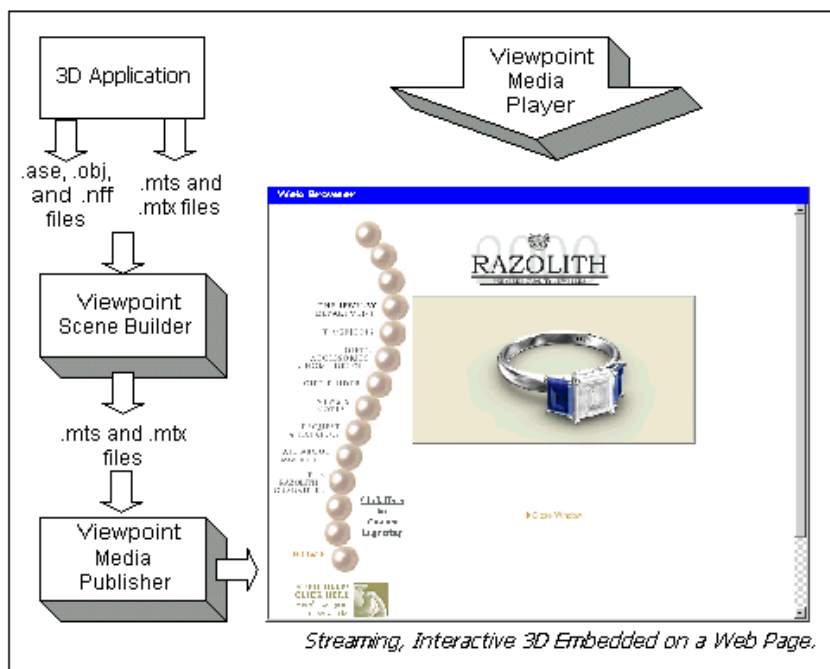
Scene Builder saves the .mtx and .mts files for your scene.

Viewpoint Media Publisher reads an .mtx file and generates a web page (.html file) using customizable templates.

Finally, visitors of your website can view your VET scene using **Viewpoint Media Player (VMP)**, a web plug-in.

Viewpoint Corporation offers tools and help to bring your 3D and rich media content to the web. To download Viewpoint tools for free and for more information, visit the Viewpoint Developer Central website at http://developer.viewpoint.com/.

> Note: Viewpoint Media Publisher functionality is now integrated with Scene Builder, enabling you to generate HTML files with your VET content.

Chapter 2: Using Scene Builder

Scene Builder Windows and Menus

Viewpoint Scene Builder includes four main parts, as illustrated below:

- **Scene window** Here you set the stage for your 3D scene. You can see and adjust the location and scale of your 3D models and their associated textures and other materials.

- **Scene commands menu** You can choose from nine menus listing various categories of options for creating and enhancing a VET scene. For a description of these menus and how to navigate them, see the "About Scene Commands Menus" section below.

- **Hierarchy menu** This menu is a directory of components in your scene and is divided into seven categories. For a description of these menus and how to navigate them, see the "About Hierarchy Menus" section below.

- **Object Information window** This window shows the XML code for the object or other scene element you select. Right-click an object in the Scene window to select it and view information about it (such as, name, position, size, number of points, and UV mapping coordinates) in this window.

> **Tip:** You can cut and paste coordinates from the Object Info window into your .mtx file for animations. Click the line you want (this automatically copies the line to the Clipboard), and then paste (Ctrl+V) the information into your .mtx file using a text editor or XML editor. Edit the .mtx file as needed.
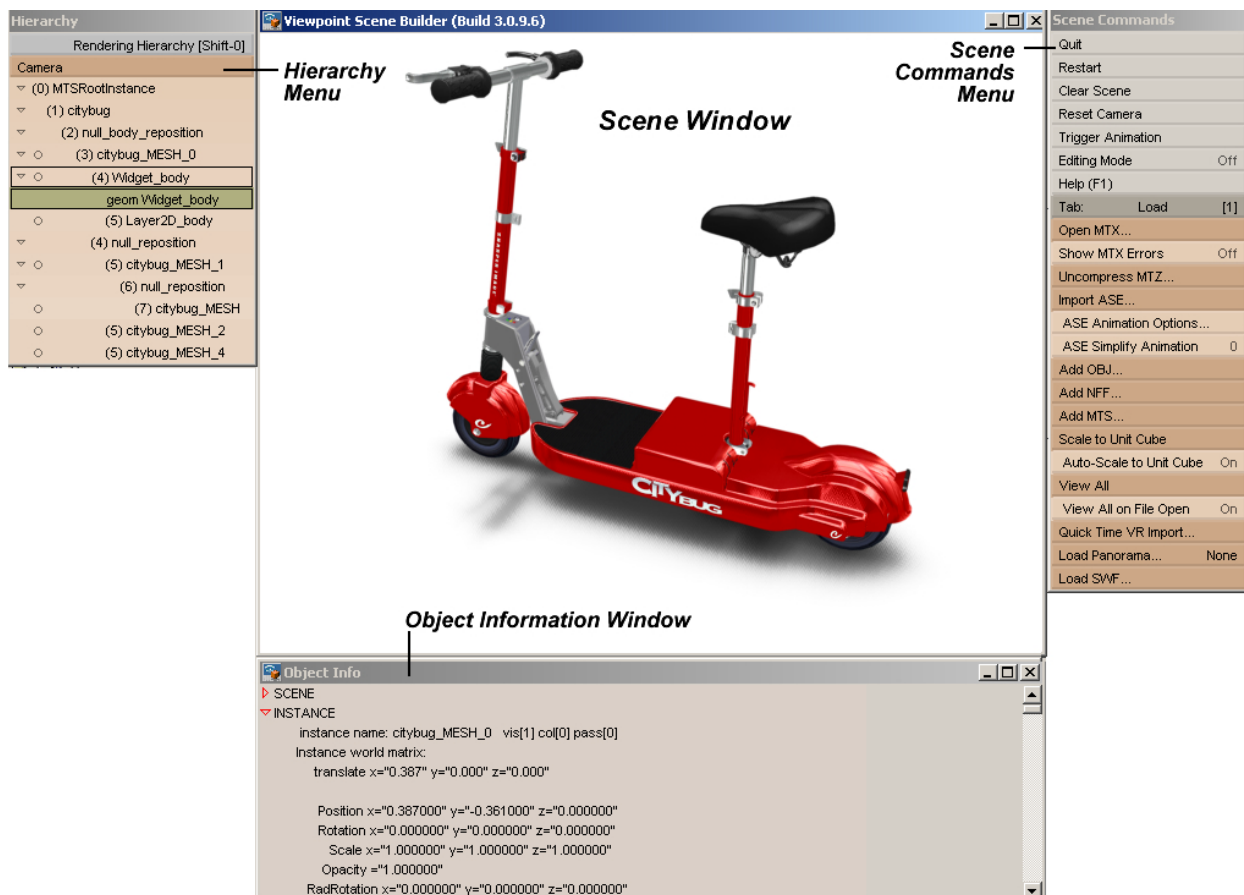
The Viewpoint Scene Builder interface includes a Scene window, Hierarchy menu, and Scene Commands menu, and Object Info window.

About Scene Commands Menus

The Scene Command menus on the right side of your screen provide options for creating and enhancing your VET scene. There are nine Scene Command menus:

Load (1)	This command menu allows you to load files. Here you can open an existing .mtx file or import a 3D file, QTVR movie, and choose settings for ASE-based animations.
Instances (2)	This command menu allows you to control and change polygons. You can flip normals, make geometries into double-sided polygons, and change crease angle and transparency, to name a few of the controls.
Animation (3)	This command menu allows you to edit animations in a scene. You can test and reset an animation or add a time element.
Transformation (4)	This command menu allows you to change the properties of geometries (rotation, scale, and translation).
Global Parameters (5)	This command menu gives you control over most of the scene parameter values. You can change shadow properties, choose render settings, and set camera parameters, as well as load global lightmaps and panoramas.
Materials (6)	This command menu allows you to control material properties and rendering mode by the geometry instance. You can apply lightmaps, bumpmaps, and textures, as well as create procedural lightmaps and optimize textures.
Hot Spots (7)	This command menu provides you with tools to create and modify hot spots. Hot spots (sometimes called "widgets") are 3D areas within a VET scene that users can click or mouse over to display text, an image, or other media.
Primitives (8)	This command menu allows you to create simple procedural geometric primitives such as spheres, cubes, and cylinders.
Preferences (9)	This command menu allows you to select or clear a default file and set scene dimensions.
Publish (0)	This command menu allows you to save files. Here you can choose global settings for publishing .mts and .mtx files.

The Debug (D) menu offers additional debug options. Use these options at your own risk.

> **Tip:** For a complete list of Scene Command menu options and their functions, see "Appendix B, Scene Builder Menu Options".

Changing Scene Command Menus

In this guide, each of Scene Builder's nine menus is mentioned both by name and number. For example, the menu shown below is the Preferences (9) menu.

Tab:	Preferences	[9]
Set Scene Width		648
Set Scene Height		507
Window Layout		Add/ Del
Load Default File...		
Clear Default File		
Author Name		
Info Font		Arial

To change Scene Command menus

1   Click the name of the current menu to display the list of all Scene Builder menus.

2   Click the name of the menu you want to use next.

For example, the graphic on the right illustrates how to change from the Transformation (4) menu to the Globals (5) menu.

Tab:	Transformation	[4]
Reset Transform		
Rotate X		0
Rotate Y		0
Rotate Z		0
Translate X		0
Translate Y		0
Translate Z		0
Scale X		0
Scale Y		0
Scale Z		0
Uniform Scale		0

To change menus, click the current menu's name...

Then click the name of the menu you want to use next.

Load	[1]
Instances	[2]
Animation	[3]
Transformation	[4]
Globals	[5]
Textures	[6]
Hot Spots	[7]
Primitives	[8]
Preferences	[9]
Publish	[0]
~~Shadow Y [pos]~~	~~0~~
* BoundShadow	On

Tip: To quickly change between Scene Command menus, you can press the number of the menu on your keyboard. For example, press 4 to display the Transformation (4) menu.

Setting VET Scene Options in Scene Builder

Scene Builder lets you adjust settings for your VET scene. The following illustration shows the three ways you can adjust settings in the Scene Commands menu.

Save MTX...	
Compress File	Off
Verbose MTX	Off
Save MTS...	
Image Quality	
Lightmap Quality	20
Geometry Setting	0.8
Use TrixelsNT	On

For options that toggle (on or off), click to change the option setting.

For options that let you choose from a range of values, click and move the shaded bar...

...or double-click to type a new numeric value. Press Enter.

About Hierarchy Menu

The Hierarchy menus in the upper-left corner of your screen provide a directory of components in the VET scene. There are seven Hierarchy menus:

Rendering Hierarchy (Shift+0)	Lists the hierarchical order in which scene elements are rendered.
Instances (Shift+1)	Lists the hierarchical relationship between parent and child objects in the scene.
Geometries (Shift+2)	Lists all the objects in the scene, including meshes, primitives, and hot spots (widgets).
Materials (Shift+3)	Lists the materials used in the scene.
Textures (Shift+4)	Lists the textures used in the scene.
Animators (Shift+5)	Lists each imported animation instruction tag by name.
Repository (Shift+6)	Lists all the elements in your scene arranged by type.

Tips: To switch between Hierarchy menus in the upper-left corner of Scene Builder, press Shift plus the number of the menu.

On the Texture Hierarchy menu, click a texture to see a 2D image of it in the Object Info window.

If a Hierarchy menu is too long to fit on your screen, use the scroll bar to scroll up and down.

To change Hierarchy menus

1   Click the name of the current menu to display the list of all Hierarchy menus.

2   Click the name of the menu you want to use next.

For example, the graphic on the right illustrates how to change from the Instances (Shift+1) menu to the Geometries (Shift+2) menu.
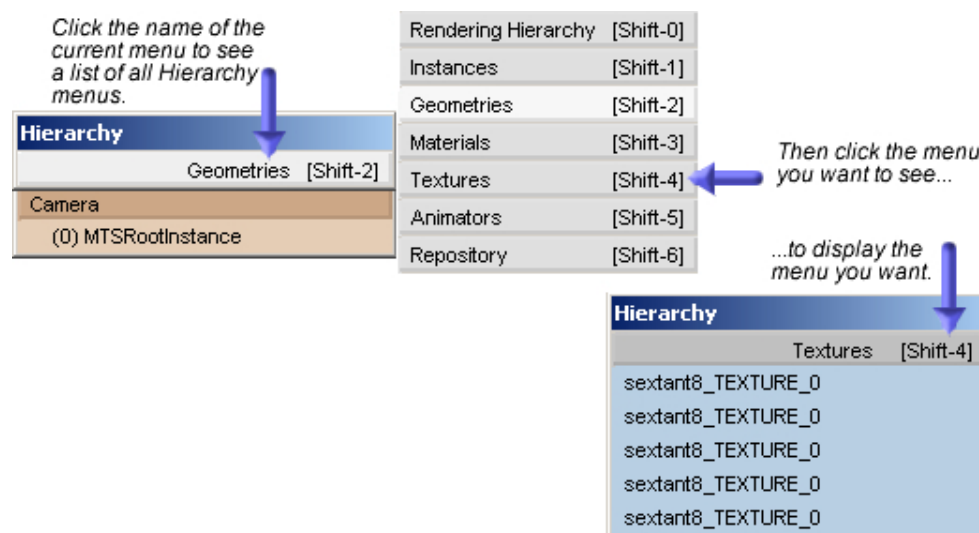
Shortcut: Press Shift + the number indicated to access these menus quickly. For example, press Shift + 2 to view the Geometries (Shift+2) menu.

For more information about using Hierarchy menus, see Chapter 7, Managing Scene Hierarchies.

Chapter 3: Getting Started

Scene Builder Minimum System Requirements

Scene Builder runs under the following minimum system:

- Microsoft® Windows® 98, Windows 2000, Windows Millenium Edition, Windows NT® 4.x, or Windows XP
- Pentium® 166 MHz processor
- 128 MB RAM

- 30 MB available hard-disk space
- TrueColor display (24-bit recommended)
- 1024×768 monitor resolution

Installing Viewpoint Scene Builder

Important: Before installing a new version of Scene Builder, be sure to uninstall any previous version first.

To install Viewpoint Scene Builder

1   Go to the Viewpoint Developer Central website at http://developer.viewpoint.com/.

2   In the upper-left corner, click **Viewpoint Tools** under the **Tools** link.

3   On the Viewpoint Tools page, click **Viewpoint Scene Builder**.

4   Download the Viewpoint Scene Builder application from the Scene Builder page.
This downloads the .exe file for the Scene Builder installation tool.

5   On your computer, double-click the .exe file to launch the Scene Builder installation tool.

6   Follow the on-screen instructions to install Scene Builder on your computer.

Starting and Stopping Viewpoint Scene Builder

To start Scene Builder

- Double-click the Scene Builder icon on your desktop.

This displays the Scene Builder application (shown below).
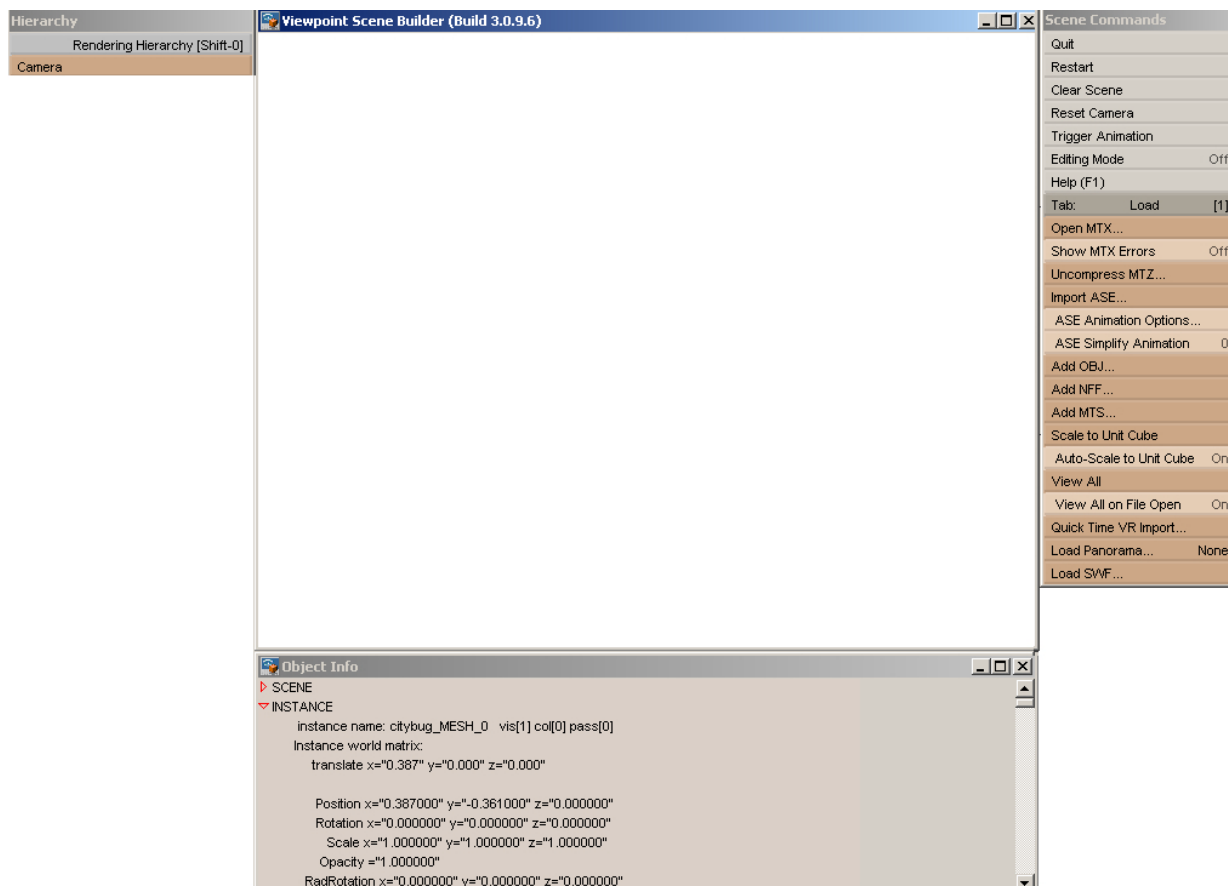
To stop Scene Builder

- In the upper-right corner of Scene Builder, click **Quit**.
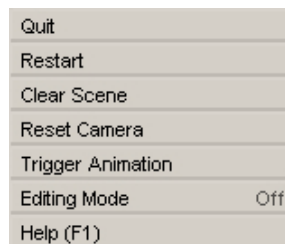
Opening an Existing .mtx File

To open an existing .mtx VET scene description file

1 From the Load (1) menu, click **Open MTX**.

2 Select the .mtx file you want to open and click **OK**.
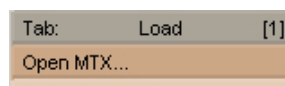
For information about opening an existing .ase or .obj file, see "Chapter 3, Importing 3D Models."

Tip: You can also use this option to insert an MTX into one of your existing scenes. Plus, if you have the **Show MTX Errors** option on, the Object window will display any errors.

Chapter 4: Importing 3D Models

Preparing 3D Content to Use in Scene Builder

To get the most out of Scene Builder, make sure your 3D files are ready for inclusion in a VET scene. This way, you are less likely to lose work in Scene Builder by having to go back to the original 3D modeling application to rework your file.

Before exporting to .ase or .obj, check models in their native applications. ASE is the preferred file format when exporting from 3ds max.

Creating a VET Scene from an Existing .ase or .obj File

You can create a VET scene based on 3D models that you import from other 3D modeling applications. The following diagram shows the process.
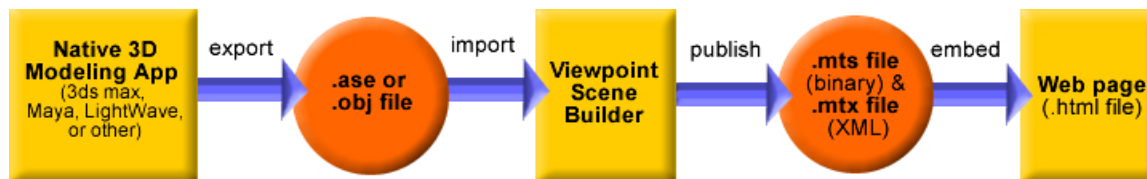
The following table describes each basic step involved in creating a VET scene from an imported .ase or .obj file, and lists where to go to read more about each step:

Basic step	To learn more, read this
1 Export your 3D model from the 3D modeling application.	*Creating 3D Rich Media Web Applications*
• If your 3D modeling application includes a built-in export utility, export the 3D model as a .ase or .obj file. Do *not* export the file in a compressed form (.mts).	(This document is available from Viewpoint Developer Central at http://developer.viewpoint.com/).
• If your 3D modeling application does not include a built-in export utility, use a conversion program such as PolyTrans to convert native scenes file to .mtx format.	
2 In Scene Builder, load or import .ase, .obj, or .mtx file from the 3D modeling application.	The section below called "Importing Files from 3D Modeling Applications"
3 Organize imported animations by frame set.	Chapter 6, Managing Animations
4 Add lightmaps, transparency, bumpmaps, or any other effects or elements to the scene.	Chapter 5, Managing Geometries
5 Publish the VET scene (both .mts and .mtx files.)	Chapter 9, Publishing Your VET Scene Files
6 Add any hot spots to your VET scene.	Chapter 5, Managing Geometries
7 Resave only the scene's .mtx file. Do not resave the .mts file.	Chapter 9, Publishing Your VET Scene Files

| 8 | Use Viewpoint Media Publisher or the MTS3 Interface to embed your VET scene into a web page. | See the *Viewpoint Media Publisher User Guide* for more information about Media Publisher.

See Chapter 2 of *Using JavaScript in VET Web Applications* for information about using the MTS3 Interface.

(These documents are available from Viewpoint Developer Central at http://developer.viewpoint.com/). |

Importing Files from 3D Modeling Applications

You can import files from 3D modeling applications to use in your VET scene. The process varies, depending on the 3D modeling application you use.

- Discreet™ 3ds max™ (formerly, 3D Studio MAX) includes a built-in export utility that lets you export an .ase file.

- Many CAD/CAM applications allow you to export .obj files.

- Alias|Wavefront™ Maya® and Newtek® LightWave 3D™ (Lightwave) include built-in export utilities that allow you to export your 3D model and associated animations in .mtx format.

- You can also use 3D scene converter tools such as Okino™ PolyTrans® to convert native scenes file to .mtx format.

- Right Hemisphere VMI (Virtual Media Integrator) offers publishing from a variety of 3D file formats.

- Viewpoint ZoomView Builder enables you to create zoomable VET scenes from 2D images. ZoomView enables you to easily deploy large, print-quality images online, allowing users to zoom in, pan around, and examine the finest details without special graphics cards or a high-speed Internet access. You can use Viewpoint Scene Builder to enhance ZoomView scenes with hot spots and 3D objects.

For more information, see these documents (available from the Viewpoint Developer Central website at http://developer.viewpoint.com/):

- *Creating 3D Rich Media Web Applications* for information on exporting 3D models from applications other than those mentioned in this chapter. See Chapter 2 of the *Creating 3D Rich Media Web Applications* guide for information about preparing your 3D model to use with VET.

- See Viewpoint Media Exporter for 3ds max User Guide for details about exporting .ase files from 3ds max.

- See *Viewpoint Media Exporter for Maya User Guide* for details about exporting .mtx files from Maya.

- See *Viewpoint Media Exporter for LightWave 6.5 User Guide* for details about exporting .mtx files from LightWave.

To import an .mtx file from a 3D modeling application

1 From the Load (1) menu, click **Open MTX**.

2 Select the .mtx file you want to open and click **OK**.

Tab:	Load	[1]
Open MTX...		
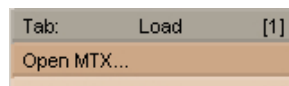
To import an .ase file from a 3D modeling application

1 From the Load (1) menu, click **Import ASE**.

2 Select the .ase file you want to open and click **OK**.

The ASE Behavior Editor dialog box opens automatically.

For details about organizing your model's animations, see "Organizing Animations Associated an Imported 3D Model" in Chapter 6.

Tab:	Load	[1]
Open MTX...		
Show MTX Errors		Off
Uncompress MTZ...		
Import ASE...		

To import an .obj file from a CAD/CAM application

1   From the Load (1) menu, click **Add OBJ**.

2   Select the .obj file you want to open and click **OK**.
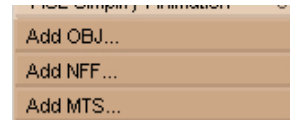
To insert an .mtx file into an existing scene

1   Open the scene to which you want to insert an .mtx file.

2   From the Load (1) menu, click **Open MTX**.

3   Select the .mtx file you want to insert and click **OK**.
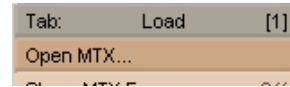
Generating Hot Spots and Animation Ranges through 3ds max

The Viewpoint Scene Builder plug-in in 3ds max enables you generate hot spots and split animations in ranges directly in 3ds max (version 4 or later). This new capability makes it even easier to import and work with 3ds max files in Scene Builder. If you need to make changes to your scene in 3ds max, you no longer have to re-apply all the hot spots and animation ranges to the scene from scratch in Scene Builder because those options become a part of your 3ds max file.

To generate hot spots in 3ds max

1   In 3ds max, open the scene to which you want to add hot spots.

2   In the **Utilities** tool panel on the right side of your screen, click **MaxScript**.

3   Click **Run Script**.

4   Select **viewpoint_export.ms** from the folder where you installed MaxScript during the Scene Builder install.
This option opens the Viewpoint tool panel.

5   Select the object that you want to be treated as hot spot.

6   Click **Convert Object to Hot Spot**.

7   Switch to the **Modify** tool panel on the right side of your screen.
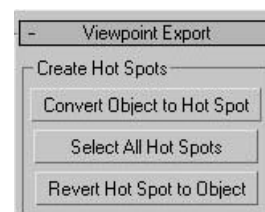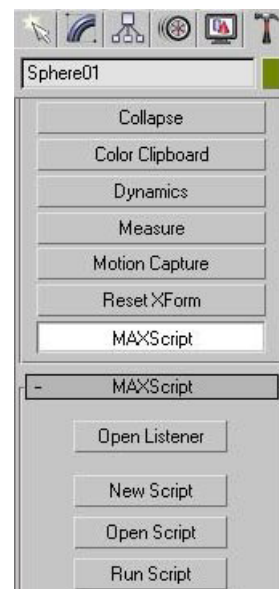
8   In the Hot Spot Properties area, specify the rollover text in the **Text** field.
You can also specify the color, point size, font, and several other hot spot options.

9   Select **File > Export**.

10   In the Save dialog box, select the ASE file format and click **Save**.

11   Switch to the **Utilities** tool panel.

12   Click **Save .mtx**.

13   In the Save dialog box, select Save as Type Viewpoint MTX (*.mtx) and click **Save**.

> Important: You should save the file in the same directory and with the same name as the .ase file.

14   In Scene Builder, click **Open ASE/MTX (max script)**.

> Note: Objects that are primitives in both 3ds max and Scene Builder will be invisible hot spots (for example, cubes and spheres). 3ds max objects that are not primitives (such as, the teapot, myobject), will be visible in Scene Builder. If you want a primitive to appear in Scene Builder as a mesh, change the name of the object in 3ds max to be unique. For example, rename cube to mycube.

To generate animation ranges in 3ds max

This utility enables you to create animation ranges natively in 3ds max and then export them to Scene Builder.

1   In 3ds max, open the scene where you want to create animation ranges.

2   In the **Utilities** tool panel on the right side of your screen, click **MaxScript**.

3   Click **Run Script**.

4   Select **viewpoint_export.ms**.
This option opens the Viewpoint tool panel.

5   Create an animation.
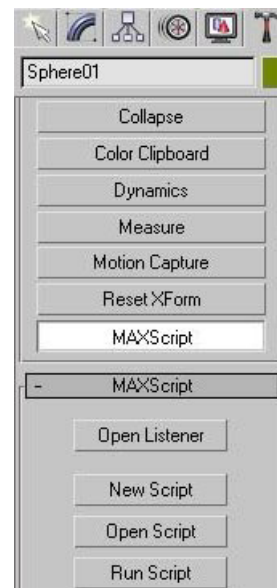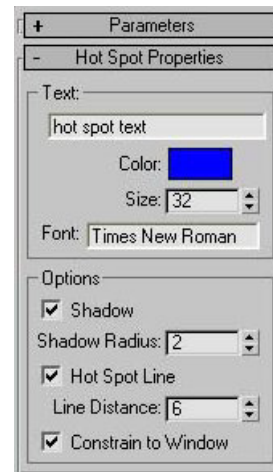
6   Specify the animation names.

7   Specify the start and end frames.

8   Click **Add**.

9   Select **File > Export**.

10 In the Save dialog box, select the ASE file format and click **Save**.

11 Switch to the **Utilities** tool panel.

12 Click **Save .mtx**.

13 In the Save dialog box, select Save as Type Viewpoint MTX (*.mtx) and click **Save**.

> Important: You should save the file in the same directory and with the same name as the .ase file.

14 In Scene Builder, click **Open ASE/MTX (max script)**.
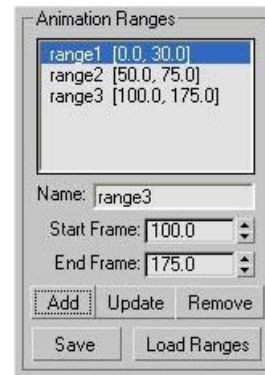
Chapter 5:
Managing Geometries

About Geometries in VET Scenes

A **geometry** is a 3D object or any part of an object that can be individually referenced within the scene. For example, a 3D model of a lamp may include three geometries: the base, the stand, and the shade.

With Scene Builder, in addition to importing 3D models from other 3D modeling applications, you can add simple 3D geometries, called **primitives**, to your scene. Primitives include cubes, spheres, cones, pyramids, cylinders, boxes, and planes.

You can also use Scene Builder to manage the characteristics and textures applied to the geometries in your VET scene, including:

- Textures   You can apply a 2D image as a texture to the geometry. With Scene Builder's Texture Lab, you can refine your scene's texture, add alpha map transparency, add a noisemap, and choose settings by channel. You can also control the type and amount of compression you want to apply.

- Lightmaps   Lightmaps give the illusion of illumination on the geometry. You can load a JPEG image file as a lightmap, or create your own procedural lightmap with Scene Builder. ("Procedural" refers to the fact that this type of lightmap makes procedural calls directly to Viewpoint Media Player instead of referencing a JPEG image, thus causing little noticeable file size increase.)

- Bumpmaps   With a bumpmap, you can give a geometry the appearance of being smooth or bumpy, metallic or fabric, or made of some other particular material.

- Hot spots   You can provide just-in-time information about an object by assigning a clickable 3D area that displays text, image, or other media when the viewer clicks or points to it.

About Instances

Instancing is a common technique to help reduce file size when working with 3D models with duplicate parts.

For example, if a car has four wheels, you can create one wheel and then reference three more instances of it. Then you can transform the three instances to their correct locations.

You can also apply different textures to each instance if you need to. (To do this, you need to change both the texture name and the material name on the instance, otherwise the instance inherits the name from its parent and will also inherit the texture and material settings.)

Adding Primitive Geometries (3D Shapes) to Your Scene

To add a 3D shape and adjust its location in the scene

1 From the Primitives (8) menu, click the 3D shape you want to add.

It is automatically added to the center of the scene.

Now you can change the object's position and size. You can also adjust its color, texture, and other characteristics.

Tab:	Primitives	[8]
Sphere		
Cube		
Box		
Cylinder		
Cone		
Pyramid		
XZ Plane		
XY Plane		
Show Resolution Options		On
Resolution (X and Y)		20
Resolution (X only)		20
Resolution (Y only)		20

Boxes Versus Cubes: While visually quite similar, a box has more segments than a cube, and behaves differently when transformations are applied.

Transforming a Geometry (Move, Rotate, Resize)

To move (translate) a geometry

- In the Scene window, right-click and drag the geometry where you want it to be located in the scene.

Tip: Be sure to look at the geometry from many angles as you adjust its location. To change the camera angle from which the scene is viewed, click and drag any part of the scene.

–Or–

1 In the Scene window, right-click the geometry you want to move or select a geometry by clicking its name on the Hierarchy menu on the left.

2 From the Transformation (4) menu, use the **Translate X**, **Translate Y**, and **Translate Z** sliders to move the geometry along X, Y, and Z axes. (You can also double-click any of these fields to type a number directly.)

Tab:	Transformation	[4]
Reset Object Transform		
Rotate X		0
Rotate Y		0
Rotate Z		0
Translate X		0
Translate Y		0
Translate Z		0
Scale X		0
Scale Y		0
Scale Z		0
Uniform Scale		0

To rotate a geometry

1 In the Scene window, right-click the geometry you want to rotate or select a geometry by clicking its name on the Hierarchy menu on the left.

2 From the Transformation (4) menu, use the **Rotate X**, **Rotate Y**, and **Rotate Z** sliders to change the angle of the geometry in relation to the X, Y, and Z axes.

To resize (scale) a geometry

1   In the Scene window, right-click the geometry you want to scale or select a geometry by clicking its name on the Hierarchy menu on the left.

2   From the Transformation (4) menu, use the **Scale X**, **Scale Y**, and **Scale Z** sliders to resize the length (X), height (Y), and width (Z).

–Or–

To resize the geometry uniformly along all three axes, from the Transformation (4) menu, use the **Uniform Scale** slider.

Adjusting the Opacity of a Geometry

Opacity is a way of measuring how much light can penetrate an object. In a VET scene, 0 opacity makes the object so transparent it is invisible and 100 makes the object completely opaque (in other words, not at all transparent).

In the illustration on the right, the large ball has 50% opacity and the small ball has 100% opacity.
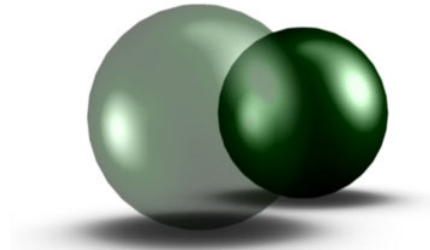
To adjust the opacity of a geometry

1   In the Scene window, right-click the geometry you want to adjust or select a geometry by clicking its name on the Hierarchy menu on the left.

2   On the Instances (2) menu, use the **Opacity** slider to change the geometry's opacity.

Tab:	Instances	[2]
Delete Selected		
Make Instance		
Collapse		Off
Clear All Collapsed		
Visible		Off
Backface Culling		Off
Invert Normals		Off
Invert Lighting		
Antialias		0
Edge Antialias		True
Specularity Wrap		0
Opacity		100

Transparency and Rendering: Using Sort Rule for Overlapping Transparent Geometries

If your VET scene includes multiple semitransparent objects, the order in which they are rendered may affect how the scene appears to the viewer. The Sort Rule option determines a scene with several semitransparent objects and for objects within the same layer. When the **Nearest** sort rule is turned on, only the surfaces closest to the camera are rendered. The **Farthest** sort rule forces all occluded surfaces to be rendered. For the Center sort rule, the visibility criteria depend on the positions of centers of bounding boxes.

Note: The sort rule is set for the entire scene, rather than by instance.

For example, in the left illustration below, the transparent cube cannot be seen inside a transparent sphere because the sort rule is set to **Nearest**. On the right, the cube is visible because the sort rule is changed to **Farthest**.
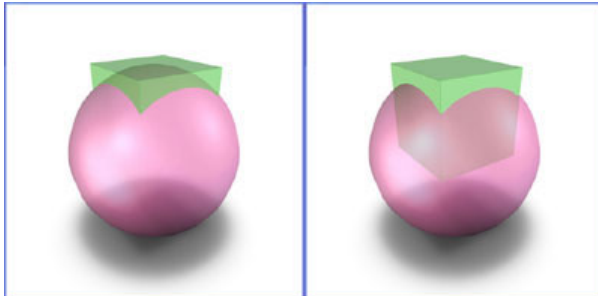
Scene rendering with Sort Rule Nearest (left) and Farthest (right)

To set the sort rule for your scene

1 From the Globals (5) menu, click **Sort Rule**.

2 Choose one of the following sort rules to specify what renders first:

- **Nearest** (default) means that only surfaces closest to the camera are rendered.

- **Farthest** means that all occluded surfaces will also be rendered.

- **Center** means that the rendering criteria depends on the relative position of centers of bounding boxes.

Tab:	Globals	[5]
Render Mode		Default
Lightmap		None
Camera Navigation		Orbit
Show Camera Constraints		Off
Shadow		Off
Blend Shadow		On
Shadow Radius		10
Bound Shadow		On
Shadow Position (Y)		
Shadow Color		☐
Shadow Opacity		0.85
Antialias		
Antialias Passes		0
Render Edges		100
Sort Rule		Nearest

Adding a Texture to a Geometry

If a geometry contains UV mapping coordinates, then you can apply a JPEG image as that geometry's texture. Or you can replace existing textures with a JPEG image.

> Tip: You can select a texture by clicking its name on the Textures (Shift+4) Hierarchy menu.

To add a JPEG file as a texture to a geometry

1   Click the geometry in the Scene window.

2   From the Textures (6) menu, click **Texture (Diffuse)**.

3   Click **Load**.

4   Select the JPEG file and click **OK**.

Tab:	Textures	[6]
Render Mode		Default
Edge Rendering		Default
Edge Bias		100
Material Opacity		100
Material Color (Diffuse)		☐
Texture (Diffuse)		None

Applying Alpha Maps (Alpha Channels)

An **alpha map** (or **alpha channel**) is a grayscale image that acts as a mask creating areas of transparency or semi-transparency depending on the concentration of black or white. White areas are transparent, black areas are opaque, and all grayscales in between provide different levels of semi-transparency.

To apply an alpha map in Texture Lab

1   In Texture Lab, click **Add Alpha Channel**.

2   Select the JPEG image you want to use as an alpha map, and click **OK**.

3   Use the **Alpha Channel Quality** slider to adjust the alpha channel.

You may also choose **Invert Alpha**, to invert how the gradations of transparency are applied. Click **Has Alpha** to toggle the alpha map on and off.

4   Click **Update TrixelsNT Preview** (or **Update JPEG Preview**, depending on the type of compression you choose) to see the results of the settings you choose.

See the **Texture Information** window for data showing results of optimization on file size and streaming.

5   Click **OK** when you are satisfied with the optimized texture.

Applying Lightmaps to a Geometry

A **lightmap** is an image that determines how light interacts with and scatters on the surface of an object. This image essentially traps the environment around the object and reflects that environment in the object's surface. A lighter portion of a lightmap reflects hotly or intensely. Generally, a lightmap is a photographic image and, in a Scene Builder scene, is what the camera sees in any reflective object. You can easily create lightmap files in Adobe® Photoshop® or other 2D graphics application.

In Scene Builder, you can apply you can apply an image file as a lightmap. Alternately, you can apply a procedural lightmap that adds very little to overall file size. For more about procedural lightmaps, read the following section called "About Procedural Lightmaps".

For an image to be used as a lightmap:

* It must be an RGB image.

* The image size must be 256×256.

You can apply lightmaps globally and locally to materials or texture maps. In other words, if you have a model with three different texture maps, you can assign one global lightmap for the whole model or three different lightmaps, one for each of the three texture maps.

> Note: You cannot share same .jpg file between different types of texture mapping (textures, lightmaps, bumpmaps, and so on). To use the same image for several types of mapping, make a copy of the file and give each copy a unique name.

To apply an image as a global lightmap

1 Click the geometry in the Scene window to select it.

   –Or–

   From the Geometries (Shift+2) Hierarchy menu in the upper-left corner, click the name of the object to select it.

2 From the Globals (5) menu, click **Lightmap.**

3 Click **Load**.

4 Select the image file you want to apply and click **Open**.

To apply an image as a local lightmap

1 Right-click to select the geometry to which you want to apply the lightmap.

2 From the Textures (6) menu, click **Lightmap**.

3 Click **Load**.

4 Select the image file you want to apply and click **Open**.

> Shortcut: To quickly apply a lightmap, press the Ctrl key and drag and drop a JPEG image file onto a geometry.

About Procedural Lightmaps

The term **procedural** refers to scene elements you use—such as lightmaps, primitives, and hot spots—that are automatically generated by VMP. Procedural scene elements add very little to overall file size of a VET scene.

Lightmaps are typically created when external texture images (JPEGs) are applied to a scene and stored in the .mts scene resources file. However, you can use Scene Builder to create a procedural lightmap for your VET scene. Procedural lightmaps have a smaller file size than regular lightmaps.

With procedural lightmaps, you can:

• Change lightmap colors point by point, for each of ten light points.

• Set specularity and intensity for each of ten light points.

• Add a background JPEG to a lightmap.

You can apply a procedural lightmap, like other lightmaps, either globally or locally.

Creating a Procedural Lightmap

1 From the Textures (6) menu, click **Create Lightmap**.

2 In the Procedural Lightmaps control window, choose the settings you want for your lightmap.
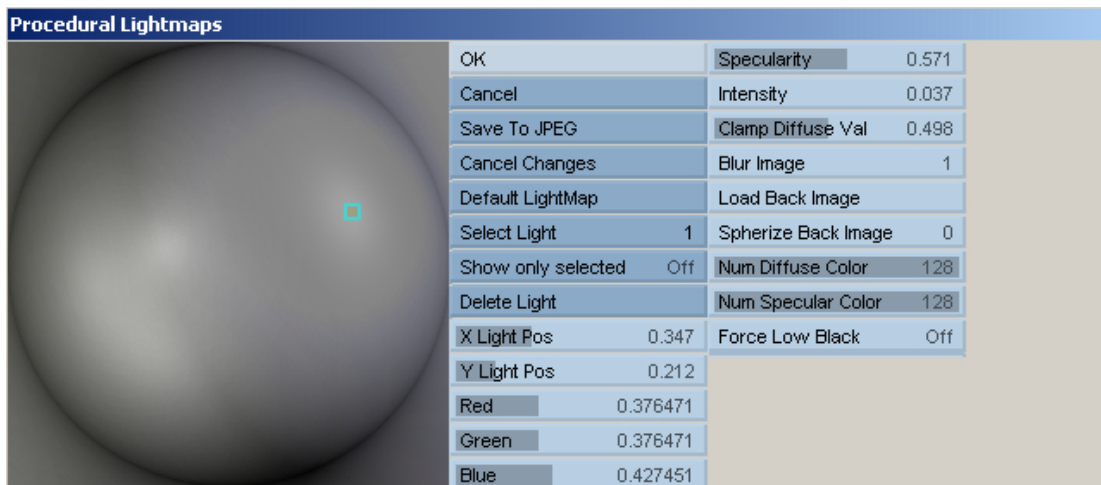
> Tip: See the effects of your settings as you make them, by dragging the Procedural Lightmaps control window to the side of the Scene window.

3   On the preview sphere, click and drag each light point to adjust its position.

4   Adjust the values on the **Red**, **Green**, and **Blue** slider buttons to set the color of the lightmap.

5   Click **Save to JPEG** to create a JPEG file with the lightmap you've designed.

For a description of each menu option in the Procedural Lightmaps tool, see "Procedural Lightmaps Menu" in Appendix B.

To add a background image to a procedural lightmap

1   From the Textures (6) menu, click **Create Lightmap**.

2   In the Procedural Lightmaps window, click **Load Back Image**.

3   Choose the JPEG image you want to use, and click **Open**.

4   Click and drag the **Spherize Back Image** slider, if you want apply a fish-eye lens effect to the back image. Or, double-click the button and type your setting.

5   Click **OK** to apply the lightmap.

Applying Bumpmaps to a Geometry

A **bumpmap** is a grayscale image that you can apply as an emboss pattern to a the surface of a geometry. The bumpmap must have the same pixel size as the diffuse map.

To apply a bumpmap

1   Click the geometry to which you want to apply the bumpmap.

2   From the Textures (6) menu, click **Bumpmap**.

3   Click **Load**.

4   Choose the image file you want to apply, and then click **Open**.

> Shortcut: To quickly apply a bumpmap, press the Shift key, and drag and drop a JPEG image file onto a geometry .

Adding Hot Spots to a VET Scene

Hot spots (sometimes called "widgets") are 3D areas within a VET scene that users can mouse over to display text, an image, or other media.

To add a hot spot

1   From the Hot Spots (7) menu, click **Add Hot Spot** and choose the shape for the hot spot activation area you want to add: sphere, cube, box, cylinder, cone, pyramid, or plane.

2   Click **Show Hot Spots** and **Show Hot Spot Text** to set each to **On**. This allows you to see the hot spot activation area while you are setting the related options. You can set both of these options to **Off** before you save your file.

- **Show Hot Spot Text** When **On**, hot spot text is always visible, regardless of whether the user points or clicks on the hot spot activation area.

- **Show Hot Spots** When **On**, the hot spot activation area shape is visible. Generally, this is set to **Off** in a scene.

3   Click **Hot Spot Options** to set it to **On**.

4   Move the hot spot activation area shape to the place in the scene you want users to click or point.

5   From the Transformation (4) menu, use the **Scale X**, **Y**, and **Z** sliders (to scale each vector separately) or **Uniform Scale** slider to resize the hot spot activation area shape to the dimensions you want.

6   From the Hot Spots (7) menu, click **Rollover Text**, and then type the text you want to display when the user clicks or points to the hot spot activation area.

7   Use **Font** and **Text Color** to change the font style and color.

Tab:	Hot Spots	[7]
Show Hot Spots		Off
Add Hot Spot		Sphere
Rollover Text		
Text Color		▢
Font		
Text Size		32
Show Hot Spot Text		Off
Texture Image		None
Shadow		On
Shadow Radius		3
Hot Spot Line		On
Distance from Hot Spot		6
Keep In Window		On
Hot Spot Options		Off
Text Location (X)		0
Text Location (Y)		0
Text Location (Z)		0
Attach Line (X)		0
Attach Line (Y)		0
Attach Line (Z)		0

> Tip: If you want to wrap lines of hot spot text, use "\n" new line escape sequences to break up the lines. For example,
>
> `"My word, this is a long, long text string!"`
>
> can be broken up with \n
>
>   `"My word, this is \na long, long \ntext string!"`
>
> to create three lines of text.

To learn more about advanced editing of hot spot (such as triggering animation or other action, or applying textures), see the *Viewpoint XML Authoring Guide* available from the Viewpoint Developer Central website (http://developer.viewpoint.com/).

To create a hot spot with a texture in Scene Builder

1   From the Hot Spots (7) menu, click **Add Hot Spot** and then click the shape you want to use for this hot spot.

2   Click **Show Hot Spot Text** to change this option to **On**.

3   Click **Displayable Texture** and click **Load**.

4   Select any JPEG file as the texture for this hot spot.

Now instead of displaying text when users point to (or click) the activation area, the JPEG image displays.

Chapter 6: Managing Animations

About Animations

Animation applications, such as 3ds max, typically provide a single animation timeline. Web animations, however, usually require multiple timelines. For example, you might have an animation in 3ds max with a laptop computer opening and the screen turning on in a single timeline. However, in VET, the two animations will be separate: one for opening the laptop; the other for turning it on. With the ASE Behavior Editor, you can convert single animation timelines into several, enabling you to trigger them individually.

Furthermore, Scene Builder's animation features enable you to organize and test imported animations. Scene Builder lets you divide animations by keyframe. This allows you to edit or add to the animations using Viewpoint's XML commands in the .mtx file. You can also test animations in Scene Builder by playing them frame by frame using the Time Scrubber option.

> Note: VET does not support wildcards for animations that use quaternions. Such animations should be converted to Euler coordinate system.

For details about each animation option in Scene Builder, see the section called "Animation (3) Menu in Appendix B.

Organizing Animations Associated with an Imported 3D Model

Before you export the 3D model file from the native 3D modeling application, be sure to take notes on the animations you've included. In your notes, name the individual animation behaviors descriptively and indicate the order and frame ranges in which you want them to occur. Then, when you import the file using Scene Builder, refer your notes to organize your animations by specifying and naming groups of frames.

To organize animations from imported .ase files

1   Import your .ase file as described in "Importing Files From 3D Modeling Applications" in Chapter 4.

    The ASE Behavior Editor dialog box opens automatically.

2   Referring to your animation notes, name each animation and specify its frame range.

    - In the **Name** field, type the number of the keyframe you want to specify (where 0 is the first keyframe listed in the file, 1 is the next, and so on).

    - In the **Start Time** field, specify type the time increment at which the action starts.

    - In the **Stop Time** field, specify type the time increment at which the action stops.

    - Click **Add** to add each action to the **Animation Ranges** list.

    - Click **Done** when you are finished dividing the imported animation.

3 To review and edit this information later, from the Load (1) menu, click **ASE Animation Options**.

Scene Builder handles the conversion to Viewpoint time format.

Tab:	Load	[1]
Open MTX...		
Show MTX Errors		Off
Uncompress MTZ...		
Import ASE...		

To organize animations from imported .mtx files

1 Load the .mtx file as described in "Importing Files From 3D Modeling Applications" in Chapter 4.

2 On the bottom of the Interaction/Animation (3) menu, click **Split Animations**.

Tab:	Animation	[3]
Animation On/Off		
Reverse Direction		
Rewind		
Show Selected Timeline		
Manual Time Control		
Time Scrubber <-o->		
Fixed Time Step, sec		
Render Animation		
Play Only Once		
Loop Animation		
Simplify Timeline...		
Split Animation...		
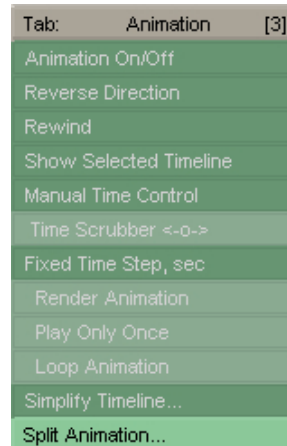
3 In the Split Animation dialog box (shown right), click the shaded bar showing ">>" to see a list of all animations.
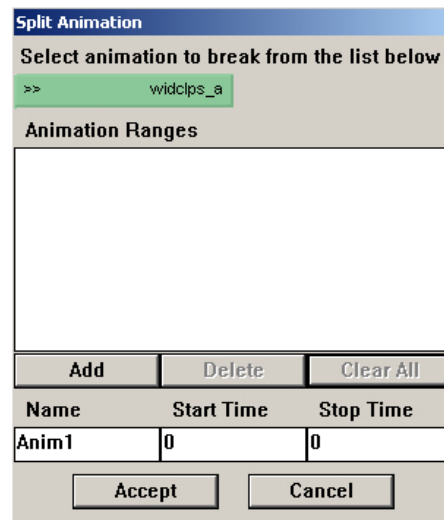
4 Click the animation you want to split.

5 Click the **Add** button to add the first animation range for this animation.

An item called *Anim1* appears in the **Animation Ranges** box.

6 Double-click an item in the Animation Ranges list to display the name in the **Name** box below.

Split Animation

Select animation to break from the list below

>>   widclps_a

Animation Ranges

Add	Delete	Clear All

Name	Start Time	Stop Time
Anim1	0	0

Accept	Cancel

7   Edit the values in the **Name**, **Start Time**, and
Stop Time boxes:

- In the **Name** field at the bottom of the dialog box,
  type a unique name for the action.

- In the **Start Time** field, type the time increment at
  which the specific action starts. (Referring to your
  animation notes for times.)

- In the **Stop Time** field, type the time increment at
  which the specific action stops.

- Click **Store** to add each action to the **Name List**.

8   Click **Change** add the changes to the **Animation
Ranges** box.

9   Repeat steps 6–8 for the remaining portions of this split animation.

10   Click **Accept** to when you are finished dividing the imported animation.

To review and edit this information later, you can reopen this dialog box by choosing **Split Animations** from the
Interaction/Animation (3) menu.

Playing an Animation

To play an animation in Scene Builder

1 From the Animation (Shift+5) Hierarchy menu in the upper-left corner of the screen, click the name of the animation you want to play.

(For more on changing Hierarchy menus, see "About Hierarchy Menu" in Chapter 2.)
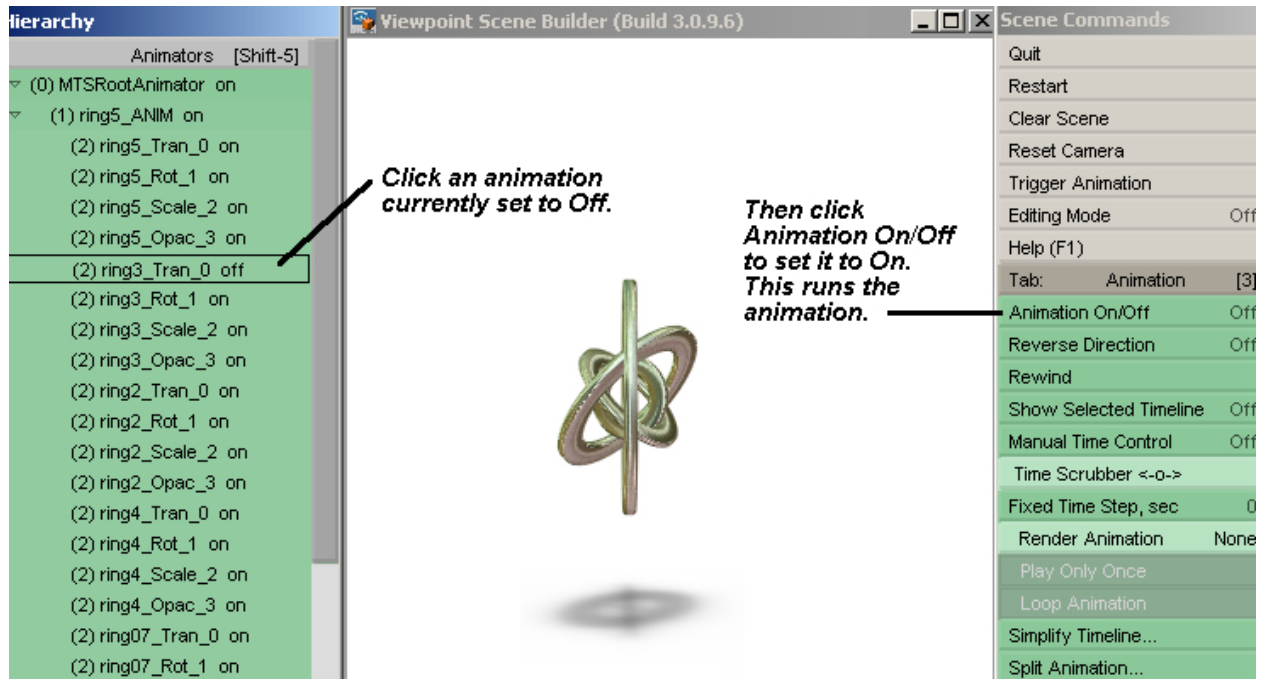
2 From the Interaction/Animation (3) menu, click **Animation On/Off** and set it to **On** to run the animation.

3 Optionally:

- Click **Animation On/Off** again (while the animation is still playing) to set it to **Off** and pause the animation.

- Use the **Reverse Direction** option to change the direction of the animation.

- Use the **Rewind** option to return to the beginning of the animation.

Note: A single animation will typically consist of several timelines. Each timeline is, in turn, an individually addressed animation. For example, if you made an animation corresponding to the rotation and translation of an object, it will open up as an animation with two timelines. You can trigger them and view the spline path individually.

Manually Playing an Animation with Time Scrubber

Time Scrubber allows you manually run an animation so you can inspect it frame by frame and view the changes to values in the Object Info window.

To play an animation manually in Scene Builder

1 From the Animators (Shift+5) Hierarchy menu in the upper-left corner of the screen, click the name of the animation you want to play.

2 From the Animation (3) menu, click **Manual Time Control** to set it to **On**.

To play an animation with Time Scrubber

1 In the upper-left of the screen, open the Animators (Shift+5) Hierarchy menu and click animation you want to play.

   (For more on changing Hierarchy menus, see "About Hierarchy Menu" in Chapter 2.)
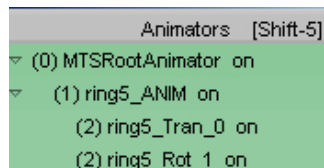
2 From the Interaction/Animation (3) command menu, click **Manual Time Control** to set it to **On**.

3 Drag the **Fixed Time Step** slider to set a time interval (where each increment you drag the Time Scrubber equals the time interval you set here).

4 Drag the **Time Scrubber** slider to move the animation to a specific time value.

   For each time value, you can view changes to timeline values in the Object Information window at the bottom of your screen.
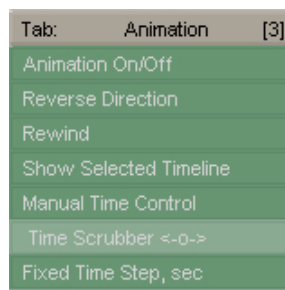
The Time Scrubber always affects the entire animation, even if you have selected a child animator or timeline. You can enter a number past the end of the animation to add keyframes to the animation.

You can navigate through the keyframes on the timeline by using the following:

- Press Alt+Click to move through forward.

- Press Shift+Click to move backward.

If the current animation is a timeline, the value of the timeline displays on the **Time Scrubber** menu option. An asterisk in front of the value indicates you are on a wildcard keyframe, or that one of the frames on either side is a wildcard and that the value shown is affected by a wildcard setting, and may change if the wildcard's value changes.

Viewing an Animation Timeline

To see a visual map of the animation timeline

1 From the Animators (Shift+5) Hierarchy menu in the upper-left corner of the screen, click the name of the animation you want to play.

2 From the Animation (3) menu, click **Show Selected Timeline** to set it to **On**.

> Tip: Right-click the scene to refresh the timeline.
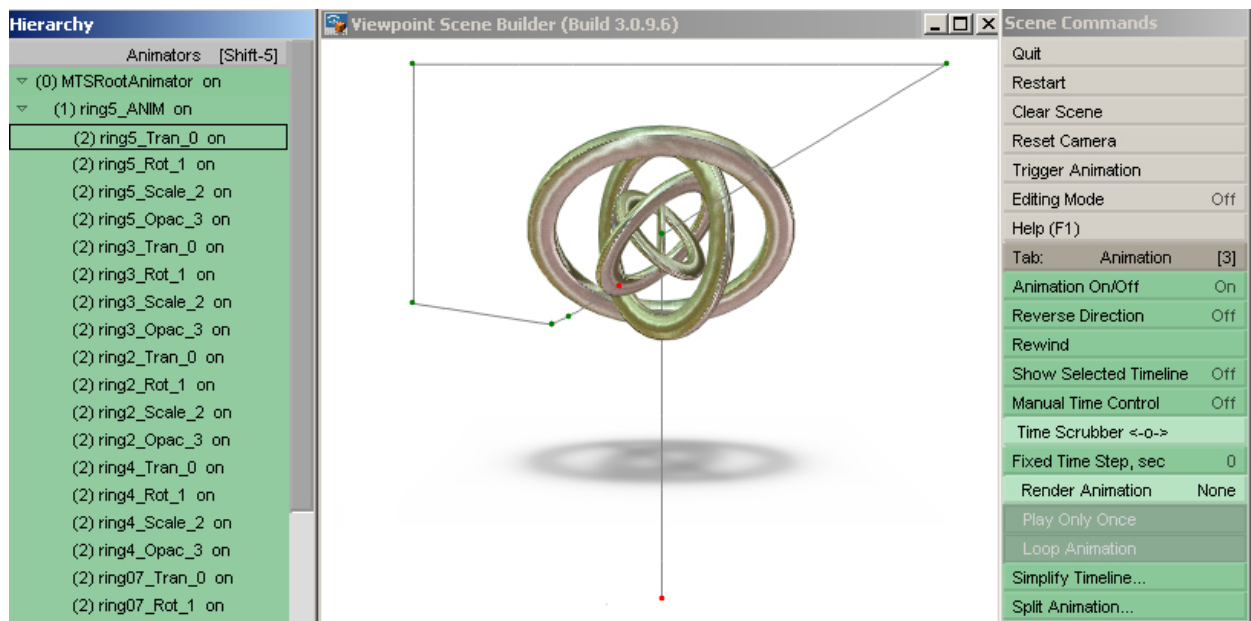
- Red dots indicate keyframes in the animation.

- Green dots indicate keyframes that are part of the parent animation, but not part of the currently selected animation.

3 Now you can run the animation as described in "Playing an Animation" and "Manually Playing an Animation With Time Scrubber" above.

Simplifying an Animation Timeline

Scene Builder can evaluate the timeline for your animation and calculate possible optimizations that will reduce file size. The Simplify Timeline tool is designed to overcome a limitation of the ASE file format for recording animations. When exporting a keyframe animation from 3ds max into an ASE file, all original 3ds max keyframes are disregarded. Instead, the timeline is sampled at equal time intervals. For example, a new keyframe is created every 1/10 second. By changing the Controller Output parameters, the sampling frequency can be changed. VET files do not require uniform timeline sampling. The Simplify Timeline tool enables you to re-sample the animation timeline and optimize it for VET. Thus, to most accurately export the animation spline path from 3ds max to VET, we recommend that you over-sample the number of keyframes in the ASE exporter and then to simplify this animation in Scene Builder.

To simplify an animation's timeline

1   From the Animation (3) menu, click **Simplify Timeline**. This displays the Keyframes Simplification dialog box.
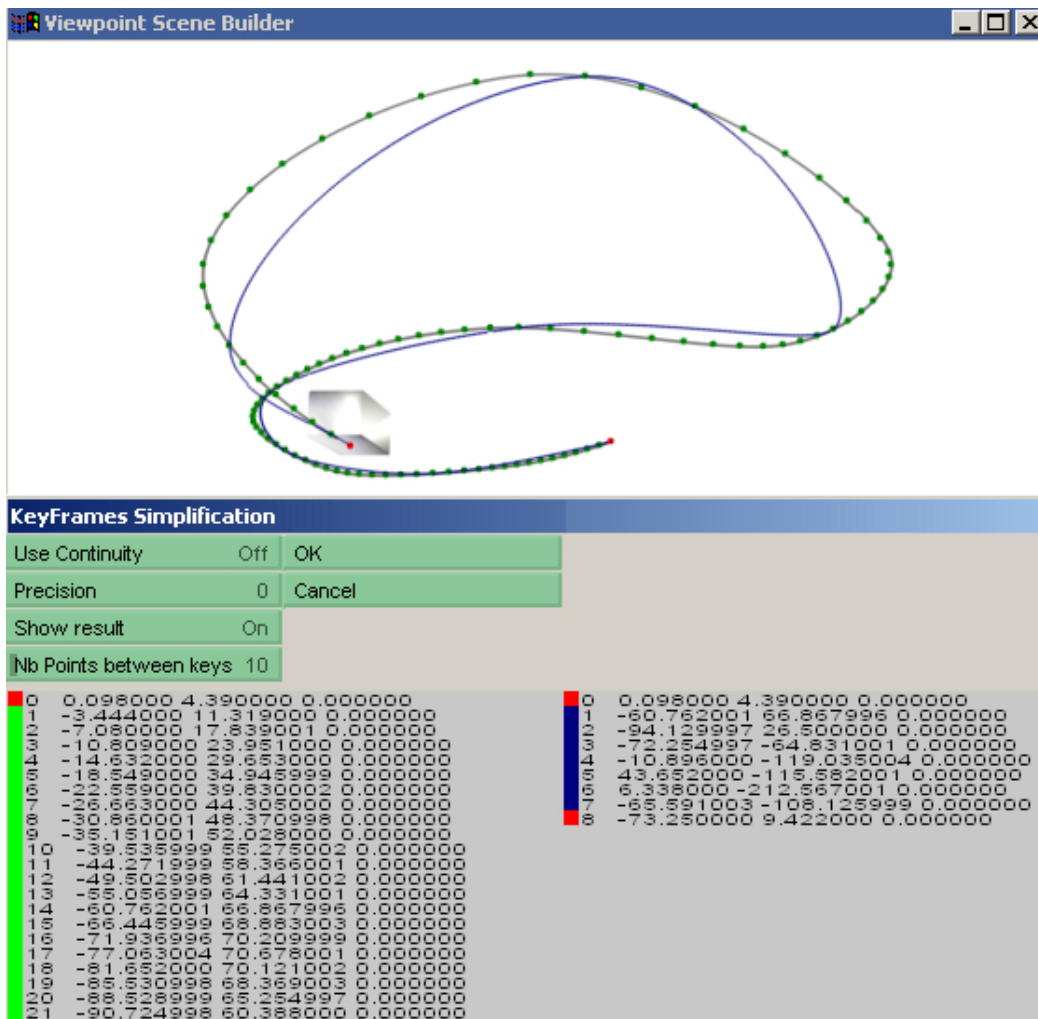
2   Click **Use Continuity** to create a working copy of your keyframe set. This is the set you can experiment with before you save your changes. In the Scene window, the original timeline and keyframes appear show as a green line. The edited timeline and keyframes appear as a blue line.

> Tip: To make sure a specific keyframe is not removed during simplification process, click it.

3   Use the **Precision** and **Number of Points Between Keys** sliders to refine your edited timeline.

4   When your timeline is edited as you like it, click **OK** to save your changes.

Chapter 7: Managing Scene Hierarchies

Overview of the Hierarchy Menus

The Hierarchy menus allow you to select and view scene elements by name. In addition, you can now drag and drop scene elements to change parent-child relationships and rename scene elements. The Hierarchy menus are as follows (press Shift + the numbered specified to display a menu):

Rendering Hierarchy (Shift + 0) Lists the hierarchical order in which scene elements are rendered.	
Instances (Shift + 1)	Lists the hierarchical relationship between parent and child objects in the scene.
Geometries (Shift + 2)	Lists all the objects in the scene, including meshes, primitives, and hot spots.
Materials (Shift + 3)	Lists the materials used in the scene.
Textures (Shift + 4)	Lists the textures used in the scene.
Animators (Shift + 5)	Lists each imported animation instruction tag by name.
Repository (Shift + 6)	Lists all the elements in your scene arranged by type.

> **Tip:** If a Hierarchy menu is too long to fit on your screen, use the scroll bar to scroll up and down.

For information about navigating Hierarchy menus, see "About Hierarchy Menus" in Chapter 2.

About Hierarchies

In a 3D scene, hierarchies describe the parent-child relationships between geometries and between a geometry and the textures and materials applied to it. Animations are also arranged hierarchically.

In a hierarchy, any attribute or action applied to the parent is also applied to the children. A parent element can have multiple children, and which in turn can have children.

For example, in the scooter model below, the Instances Hierarchy menu shows that the geometry "citibug" is the parent of the other geometries that comprise the model, such as "citybug_MESH_0" and "citybug_MESH_1."
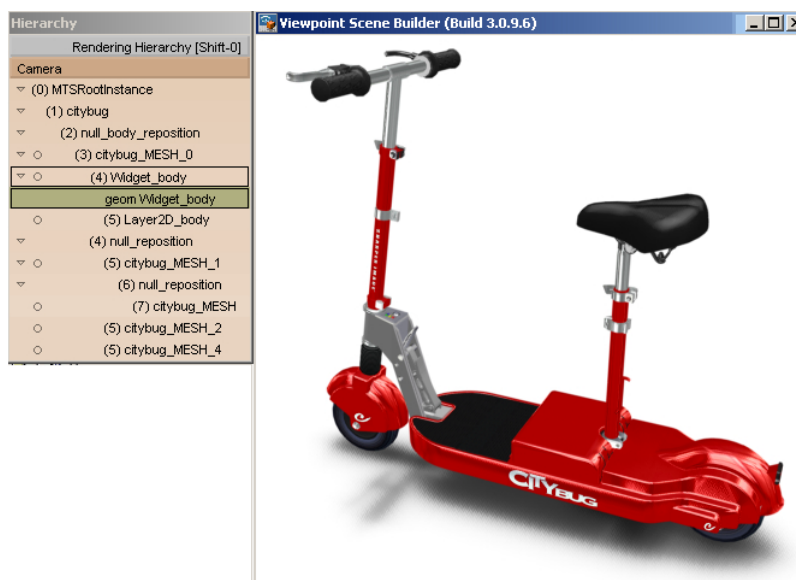
The Instances Hierarchy menu shows the parent-child relationship of geometries in a model.

Editing Hierarchies

Scene Builder lets you control the hierarchies in a scene. You can use the Hierarchy menu in the upper-left corner of Scene Builder to do the following:

- Rename scene elements to descriptive names.

- Modify how your scene functions by rearranging the parent-child relationships among geometries and instances and among animators.

Rename Scene Elements

You can use the Hierarchy menus to rename screen elements. Be sure to use descriptive names, so that if you need to modify or troubleshoot the scene or edit the .mtx file, you can easily identify elements.

To rename a scene element

1   From the Instances (Shift+1) Hierarchy menu, right-click a geometry to select the part you want to rename. The names of the instance and its sub-elements (textures and materials) are highlighted in the Instances Hierarchy menu.

2   From the Instances (Shift+1) Hierarchy menu, double-click the name you want to change.

3   Type the new element name and press Enter.

> Note: Avoid use of spaces in names assigned to elements of your scene hierarchies or members of hierarchies. Use underlines instead.

Defining Parent-Child Relationships in a Scene

By setting parent-child relationships between scene elements, you can organize instances or animations so that settings for a parent element effect the child elements.

To define a parent-child relationship between geometry elements

1   Right-click the model to select each part you want the new parenting to affect. The names of the instances and sub-elements (textures and materials) are highlighted in the Instances (Shift+1) Hierarchy menu.

2   From the Instances (Shift+1) Hierarchy menu, click the element that you want to become the child in the parent-child relationship.

3   Drag the child element on top of the parent element.

The child element name is now listed under the new parent element and is indented to show that it is farther down the hierarchy.

To define a parent-child relationship between animation elements

1   From the Animators (Shift+5) menu, click the element that you want to become the child in the parent-child relationship.

2   Drag the child element on top of the parent element.

The child element name is now listed under the new parent element and is indented to show that it is farther down the hierarchy.

Chapter 8: Setting Other Scene Global Parameters

Setting Your VET Scene's Height and Width

The default scene size is 640×480 pixels. You can change the height and/or width of your scene with Scene Builder.

To set the scene's height and width

- From the Preferences (9) menu (shown right), set these options:

  - Use the **Set Scene Width** slider to adjust the scene width in pixels.

  - Use the **Set Scene Height** slider to set the scene height in pixels.

Tab:	Preferences	[9]
Set Scene Width		648
Set Scene Height		507

Setting the Scene's Camera

The scene's camera is the "lens" through which the VET scene is viewed. You can adjust settings for the scene's camera to constrain how much the user can zoom or rotate.

You can use one of four camera modes for your scene:

- Orbit The camera can rotate around the edge of the scene.

- Walk The camera can move in one direction at a time

- Panorama The camera views the scene around it from the center.

- Still The camera doesn't move.
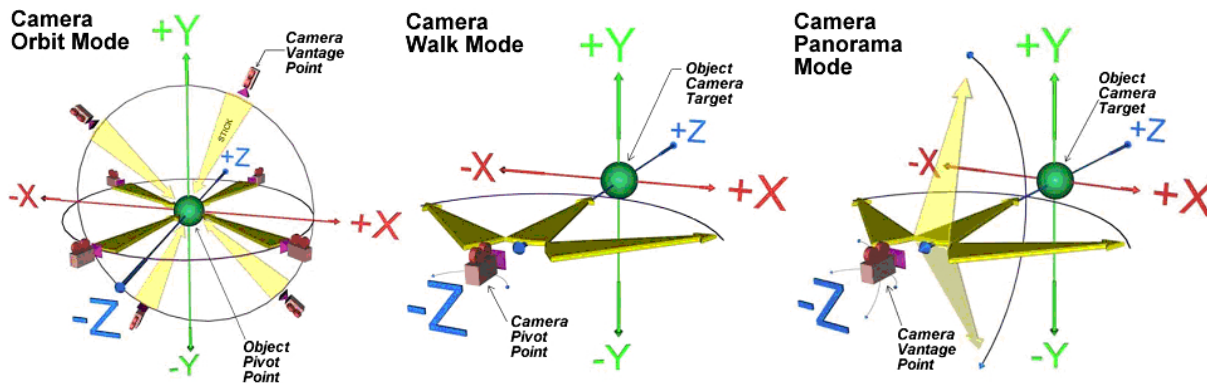
Orbit, Walk, and Panorama camera modes.

To set the camera mode

- From the Globals (5) menu, click **Camera Navigation** and choose the mode you prefer (Orbit, Walk, Panorama, or Still).

Tab:	Globals	[5]
Render Mode		Default
Lightmap		None
Camera Navigation		Orbit

Set Minimum and Maximum Camera Zoom

You can restrict the camera scale to ensure that the panorama image is seen at its best resolution. For example, if users can zoom too close on the panorama, the image gets very pixilated (that is, it looks like a bunch of little blocks instead of a smooth picture).

For example, by setting a higher Min Camera Scale value to 0.5 (default is 0.2), you can prevent a user zooming in too close. Likewise, by reducing the Max Camera Scale value to a range between 0.5 and 2 (default is 1000), you can prevent the user zooming too far out. This is important with a cylindrical panorama, for instance, to keep the user from seeing the top and bottom of the cylinder.

To set minimum and maximum camera zoom

1   From the Globals (5) menu, click **Show Camera Constraints** to set it to **On**.

2   Use the **Min Camera Scale** and **Max Camera Scale** sliders to adjust these settings.

Camera Rotation -X	-90
Camera Rotation +X	90
Camera Rotation -Y	-180
Camera Rotation Y	180
Camera Rotation -Z	-180
Camera Rotation +Z	180
Min Camera Scale	0.2
Max Camera Scale	1000
Min Camera Distance	0
Max Camera Distance	1000
Cam Nearest X	-1e+007
Cam Farthest X	1e+007
Cam Nearest Y	-1e+007
Cam Farthest Y	1e+007
Cam Nearest Z	-1e+007
Cam Farthest Z	1e+007
Reset All Constraints	

Set Camera Rotate Minimum and Maximum

Setting minimum and maximum values for camera rotation is another way to control how your scene is viewed. These settings tell VET how much you can move the camera back and forth along a particular axis (X, Y, or Z).

For example, when the scene is in Orbit Camera mode, if you set both **Camera Rotation –Y** and **Camera Rotation +Y** to 0, the user cannot look up or down in the scene.

To set minimum and maximum camera rotation

1   From the Globals (5) menu, click **Show Camera Constraints** to set it to **On**.

2   Use the **Camera Rotation –X**, **–Y**, and **–Z** sliders to adjust the minimum setting.

3   Use the **Camera Rotation +X**, **+Y**, and **+Z** sliders to adjust the minimum setting.

Specifying a Background Color, Image, or Panorama

You can specify a background color or a background image for your VET scene.

You can also add a panorama as your VET scene's background. In Scene Builder, you can add either an iPIX spherical panorama or a QuickTime VR cylinder panorama to your scene. Use Viewpoint iPIX Utility or Viewpoint QuickTime VR Importer to convert these panorama formats for use in VET scenes.

For more information, see these documents (available from the Viewpoint Developer Central website at http://developer.viewpoint.com/):

• *Enhancing iPIX Panoramas With Viewpoint Experience Technology*

• *Viewpoint QTVR Importer User Guide*

To add a background color

1   From the Globals (5) menu, click **Set Background Color**.

2   Choose the color you want to use and click **OK**.

Tab:	Globals	[5]
Render Mode		Default
Lightmap		None
Camera Navigation		Orbit
Show Camera Constraints	Off	
Shadow		Off
Blend Shadow		On
Shadow Radius		10
Bound Shadow		On
Shadow Position (Y)		
Shadow Color		☐
Shadow Opacity		0.85
Antialias		
Antialias Passes		0
Render Edges		100
Sort Rule		Nearest
Toggle Panorama		
Set Background Color		☐

To add a background image

1   From the Load (1) menu and click **Load Panorama**, and then click **Flat**.

2   Select the JPEG image file you want to import, and then click **Open**. The image is applied to the scene background.

Note: Background images smaller than the scene's height and/or width automatically tile to fill the background. To avoid this, use an image that has the same pixel dimensions as your scene. (From the Preferences (9) menu, use **Set Scene Height** and **Set Scene Width**.)

Tab:	Load	[1]
Open MTX...		
Show MTX Errors		Off
Uncompress MTZ...		
Import ASE...		
ASE Animation Options...		
ASE Simplify Animation		0
Add OBJ...		
Add NFF...		
Add MTS...		
Scale to Unit Cube		
Auto-Scale to Unit Cube		On
View All		
View All on File Open		On
Quick Time VR Import...		
Load Panorama...		None

To add a panorama as a background

1   From the Load (1) menu and click **Load Panorama.**

2   Click **Spherical** to use a converted iPIX panorama.

–Or–

Click **Cylindrical** to use a converted QuickTime VR panorama.

3   Select the JPEG image file of the panorama you want to import, and then click **Open**. The panorama is applied to the scene background.

4   From the Globals (5) menu, click **Camera Navigation** and choose **Panorama**.

5   Click **Shadow** so that it is set to **Off**. (Turning shadows off generally looks better with a panorama.)

Tab:	Globals	[5]
Render Mode		Default
Lightmap		None
Camera Navigation		Orbit
Show Camera Constraints		Off
Shadow		Off

Chapter 9:
Publishing Your VET Scene Files

When you publish your scene, Scene Builder compresses the .mts file containing your textures, models, and lightmaps.

> **Important:** To maintain the visual quality of your scene, plan to publish the .mts files only once.

You may edit and resave the .mtx file as many times as you want.

You can now generate HTML files directly from Scene Builder. Media Publisher functionality has been built into this version, enabling you to preview VET content by quickly embedding it in an HTML file.

Publishing and Saving Your VET Scene Files

Once you've updated your VET scene using Scene Builder, you can save the scene's .mtx and/or .mts files.

About File Compression during Publishing

A central feature of Scene Builder is its proprietary compression of scene elements contained in the .mts file. (The .mts file format is a proprietary binary resource file containing all geometry, materials, and textures in a scene and is referenced by the scene definition file, the .mtx file.

When you publish an .mts file, it is much like saving an image file with JPEG compression. If you publish more than once, the visual quality of your scene degrades.

> **Important:** For the highest quality scene, plan to publish only once from Scene Builder.

Alternately, you can save the scene's .mtx and .mts files separately.

About Default Settings for Your VET Scene

When you publish your scene, Scene Builder's default settings generally produce the best results.

Check that your scene has these optimal settings (found on the Load/Publish (1) menu) before you publish or save:

❑   Image Quality (Image/Texture compression setting): 60 (default).

❑   Lightmap Quality: 60 (default)

❑   Geom. Setting (Geometry compression setting): 0.8 (default).

❑   Use TrixelsNT (Viewpoint's proprietary wavelet compression): On (default). When this is set to Off, textures in the scene are saved with JPEG compression.

For more information about setting Scene Builder's options, see "Appendix B, Scene Builder Menu Options."

To publish and save your scene's .mtx and .mts files

1 From the Publish (0) menu, click **Publish**.

2 Specify a name for your .mtx file and click **OK**. (The .mts file will be given the same name with a filename extension of .mts.)

Note: You can use the **Save MTX** option to save multiple drafts of the .mtx file by giving each draft a different name. However, you should only publish to a compressed .mts file once.

Tab:	Publish	[0]
Save MTX...		
Compress File		Off
Verbose MTX		Off
Use Resource Names		On
Language Encoding		Default
Save MTS...		
Image Quality		60
Lightmap Quality		60
Geometry Setting		0.8
Use TrixelsNT		On
Minimum Triangles		0
Retain Normals		Off
Publish...		
Publish for Tuning Studio...		

To save your scene's .mtx file

1 Optionally, use the following options in the Publish (0) menu to specify how you want your .mtx file saved:

   • Click **Compress File** to set to **On** if you wan to create an .mtz file, a compressed form of the .mtx file.

   • Click **Verbose MTX** to set to **On** if you want to save a version of the .mtx file that includes all tags whether or not they are used in your VET scene.

2 Click **Save MTX**.

3 Specify a name for your .mtx file and click **OK**.

To save your scene's .mts file

Important: To avoid quality degradation, you should save an .mts file *only once* (using either the **Save MTS** or **Publish** option).

1 Optionally, use the following options in the Publish (0) menu to specify how you want your .mtx file saved:

   • Use the **Image Quality** the slider to adjust the image quality and compression (high numbers mean high quality and low compression).

   • Use the **Lightmap Quality** the slider to set the lightmap quality and compression (high numbers mean high quality and low compression).

   • Use the **Geometry Setting** slider to set the geometry quality and compression (high numbers mean high quality and low compression).

   • Click **TrixelsNT** to set it to **Off** if you don't want to use Viewpoint's proprietary wavelet compression to create high-quality 3D in manageable file sizes.

2 Click **Save MTS**.

3 Specify a name for your .mtx file and click **OK**.

To publish your scene in HTML

1 From the Publish (0) menu, verify that the **Generate HTML** option is set to On.

2 Specify the HTML template you want to use.

3 Click **Publish**.
   Scene Builder will prompt you for an MTX filename.

4 Type a name for the .mtx file, and then click **Save**.

5   Type a name for the .html file, and then click **Save**.

6   Double-click the icon for the newly created .html file to view it in your default web browser.

Publishing for Stream Tuning Studio

Viewpoint Stream Tuning Studio contains settings and options that improve the visual presentation of a streaming 3D scene, while dramatically reducing the overall file size. Scene Builder offers some scene optimizing features, but for more control over texture-by-texture settings and triangle count and to test streaming as various settings, you can bring an .mts file through Stream Tuning Studio.

For files you intend to optimize with Stream Tuning Studio, publish with only the compression necessary to convert it to the MTS format.

To publish for use with Stream Tuning Studio

- From the Publish (0) menu, click **Publish for Tuning Studio**.

For more information, see the *Viewpoint Stream Tuning Studio User Guide*, available from the Viewpoint Developer Central website (http://developer.viewpoint.com/).

You can also download the Stream Tuning Studio tool for free from this the Viewpoint Developer Central website (http://developer.viewpoint.com/). In the upper-left corner, click **Create Content**, click **Authoring** and then click **Authoring Tools** to see links for this tool.

Creating a Default .mtx File

The Preferences (9) menu gives you the option to load or clear an .mtx default file. The most common use of a default file is to save custom global settings for reuse. In other words, your default file can be used as a template. The default file can be a blank scene that has default parameters (such as, anti-aliasing, no lightmaps, textures) already set, saving you time to configure those options every time you open a new file.

To save and load a custom default file

1   In Scene Builder, set the global settings you want to save.

For instance, you may want to turn anti-aliasing off, or change **Sort Rule** from **Default** to **Nearest**.

2   From the Publish (0) menu, choose **Save MTX**.

Be sure to name your file something descriptive, such as "ProjectSettings.mtx".

3   From the Preferences (9) menu, choose **Select Default File**.

4   Choose the default you saved and click **Open**.

5   Restart Scene Builder.
The default file will be opened and executed.

Appendix A: Help, Resources, and Feedback

Viewpoint Developer Central: A Complete Resource

The Viewpoint Developer Central website is a complete resource for VET content developers. At Developer Central you can get Viewpoint applications, user guides, downloadable example files, support, production tips and techniques—to name just a few of the offerings there.

Go to Viewpoint Developer Central website (http://developer.viewpoint.com) to:

- Get Assistance For questions about using Viewpoint Experience Technology, click **Forums** under **Support** in the left navigation bar.

- Get Examples Click **Examples & Tips** in the left navigation bar.

- Subscribe to the Viewpoint Developer Newsletter Learn new production tips and techniques for creating 3D and rich media content for the web with VET. Click **Newsletter** in the left navigation bar.

- Give Feedback About Viewpoint Applications Viewpoint Corporation values your feedback. Direct your comments and suggestions to the Viewpoint Forums**.**

You can also visit Viewpoint Corporation's main web page for company news, links to websites featuring VET, and more.

Download Viewpoint Applications, Guides, and Examples

Viewpoint Developer Central website (http://developer.viewpoint.com/) is updated continuously with the latest versions of its applications, user guides, and examples. Find links to the following in the left navigation bar.

Viewpoint Applications

You can download Viewpoint applications free of charge. Among applications available for download are these:

- Viewpoint Media Player The web browser plug-in necessary to view Viewpoint content with Netscape Navigator or Internet Explorer.

- Viewpoint Scene Builder An application designed to assemble and edit the content of a VET scene before its output to Viewpoint Media Files (.mts and .mtx/.mtz).

- Viewpoint Media Publisher A utility that provides a fast and convenient path to the web for Viewpoint content. Quickly create VET web applications from Viewpoint media files (.mtx/.mtz) by embedding them in web (HTML) pages or running transformations on .mtx (XML) files through built-in XSLT support.

- Viewpoint Stream Tuning Studio An application designed to aid in reducing the file size of Viewpoint 3D content.

- Viewpoint Control Panel A utility designed to aid in the content creation, technical support, and development of VET-enabled websites and software.

User Guides

Check out these documents (available from the Viewpoint Developer Central website at http://developer.viewpoint.com/), for more information on Viewpoint Experience Technology and related utilities:

See this document	To learn about
Viewpoint Experience Technology: Getting Started	What Viewpoint Experience Technology is and how you can use rich media components—including 2D photos and drawings, 3D models, animation, ZoomView images, Macromedia Flash movies, video, text, and audio—to create rich media content.
Creating 3D Rich Media Web Applications	Creating a basic 3D VET-enabled web application and publish it to a web page.
Viewpoint ZoomView Technology User Guide	Using ZoomView to publish interactive, high-resolution, zoomable images on the web.
Viewpoint Stream Tuning Studio Guide	Stream Tuning Studio is an application for optimizing .mts file sizes.
Viewpoint Media Publisher Guide	A utility that provides a fast and convenient path to the web for Viewpoint Experience Technology (VET) content. Quickly create VET web applications from Viewpoint Media Files (.mtx/.mtz) by embedding them in web (HTML) pages or running transformations on .mtx (XML) files through built-in XSLT support.
Viewpoint Integration Guide for Macromedia Flash	Using VET and VMP to integrate Macromedia Flash with animated 3D, high-resolution photographs, object movies and panoramas.
Viewpoint Experience Technology: Technical Overview	The architecture of a VET scene, including the key components that comprise it: objects, animations, events, and properties. You'll learn how to combine these components and organize them in the VET scene's .mtx description file.
VET Deployment Guide	Steps that administrators can take to set up the web server with VET content.
Viewpoint XML Reference Guide	The new online *Viewpoint XML Reference Guide* is a powerful reference tool containing the most up-to-date information and examples for the XML tags and properties that control a Viewpoint Experience Technology (VET) scene. VET uses XML scripted in an .mtx file to orchestrate the elements of a scene, including animation, interactivity, and loading of files, as well as ZoomView and HyperView functionality. **Note:** This online reference replaces the PDF documents, *Viewpoint Experience Technology XML Reference Guide* and *Viewpoint Experience Technology XML Authoring Overview*.

Examples

You'll also find several online examples of VET content on the Viewpoint Developer Central website. Each example offers downloadable files that illustrate specific techniques or ways to solve particular problems. The files for each example are commented.

Click this link to choose from a list of available examples that you can download to your computer.

Appendix B:
Scene Builder Menu Options

Following are descriptions of the command menu buttons located on the right side of the Scene window. Navigate quickly through the command menus by pressing the corresponding number keys on your keyboard.

Main Commands Menu Tools

Below are brief descriptions of buttons that appear at the top of all the command menus.

Quit
Restart
Clear Scene
Reset Camera
Trigger Animation
Editing Mode   Off
Help (F1)

Quit closes the Scene Builder application. Publish or save any work you want to keep before choosing Quit.

Click **Restart** to quit your current session of Scene Builder, and open a new session. If you've chosen a custom default file, it will automatically reload. Before clicking Restart, be sure to publish or save any work you want to keep.

Shortcut: Press F5 to restart Scene Builder and reopen the current file.

Clear Scene deletes an object from a scene or deletes an entire scene. Deleting a whole scene clears everything, allowing you to start a new scene.

Reset Camera places camera in its original orientation to your scene. Does not reset Camera Mode (see "Animation (3) Menu" below).

Trigger Animation starts the selected animation in a scene. It is recommended you use this option to test your animations upon loading your file into Scene Builder before you begin working on the scene. Then, you can easily reload the file to reset to the original location of animated elements. When you are finished with your scene, publish first to retain the original states of animated elements, and then you can test the animation again.

Editing mode lets you edit the scene (On) or preview your scene as if it was playing on the the scene as if you were viewing it on the web via Viewpoint Media Player (Off).

Help displays this document (*Scene Builder User Guide*).

Scene Commands Menus

Load	[1]
Instances	[2]
Animation	[3]
Transformation	[4]
Globals	[5]
Textures	[6]
Hot Spots	[7]
Primitives	[8]
Preferences	[9]
Publish	[0]

The **Load (1)** menu allows you to open an existing .mtx file or import a file into your VET scene.

The **Instances (2)** menu allows you to control and change polygons. You can flip normals, make objects/geometries into double-sided polygons, and change the crease angle and transparency.

The **Animation (3)** menu allows you to control animation properties in a scene. You can reset an animation or change the camera mode. You can also collapse objects/geometries.

The **Transformation (4)** menu allows you to change the properties of objects/geometries (rotation, scale, and translation).

The **Global Parameters (5)** menu gives you control over most of the scene parameter values. You can change shadow properties as well as load in global lightmaps and panoramas.

The **Textures (6)** menu allows you to control your object's material properties and rendering mode. You can also load lightmaps and panoramas.

The **Hot Spots (7)** menu provides you with tools to create and modify hot spots.

The **Primitives (8)** menu allows you to add 3D shapes such as spheres, cubes, and cylinders to the scene.

The **Preferences (9)** menu allows you to choose or clear a defaults file.

The **Publish (0)** menu lets you control settings for publishing or saving .mtx and .mts files.

Load (1) Menu

Tab:	Load	[1]
Open MTX...		
Show MTX Errors		Off
Uncompress MTZ...		
Import ASE...		
ASE Animation Options...		
ASE Simplify Animation		0
Open ASE/MTX (max script)...		
Add OBJ...		
Add NFF...		
Add MTS...		
Scale to Unit Cube		
Auto-Scale to Unit Cube		On
View All		
View All on File Open		On
Quick Time VR Import...		
Load Panorama...		None
Load SWF...		
Open MTX from URL		

Open MTX opens and displays a scene. You can open both .mtx and .xml files.

Uncompress MTZ uncompresses an .mtz file as an .mtx file in the same folder. An .mtx file is an editable XML document.

Import ASE opens an .ase (ASCII Scene Export) file exported from Discreet 3ds max. Currently, Scene Builder supports only the .ase file format from 3ds max 3.0 or greater.

Click **ASE Animation Options** to display the ASE Behavior Editor where you can name (and edit names of) actions as well as specify frame ranges of animation frame sets.

ASE Simplify Animation allows setting of a keyframe variation tolerance. If the variance of a keyframe is between any two keyframes is within the tolerance level, that keyframe is removed. This helps reduce file size.

Open ASE/MTX (max script) simultaneously opens .ase and .mtx files generated by viewpoint_export.ms (a max script) in 3ds max (version 4 or later).

Add OBJ adds a specified .obj file (from a CAD/CAM application) to the scene.

Add NFF adds a specified .nff file to the scene. (Note that only geometry and diffuse color information is supported for imported .nff files.)

Add MTS adds a specified .mts file to the scene. The .mts extension indicates that the file is in Viewpoint's proprietary format containing geometry and texture information.

Scale to Unit Cube allows you to view all objects in a scene in their entirety, select all objects in a scene, and scale them into an invisible unit-sized bounding box for optimal rendering.

When **Auto-Scale to Unit Cube** is On, objects resize at load time so that all elements in a scene can be seen in their entirety. On (default) selects all objects in a scene and scales them (down or up) into an invisible unit-sized bounding box for optimal rendering.

View All repositions the camera to fit all objects into view.

When set to On, **View All On File Open** automatically repositions the camera to fit all objects in view. On is the default.

Quick Time VR Import allows you to import an image grid for object movies (Quick Time VR files).

Load Panorama loads one of three types of panoramic JPEG images:

- Cylindrical panoramas are generally converted from the QuickTime VR .mov file format.

- Spherical panoramas are JPEGs converted from iPIX panoramic images.

- Flat panoramas are JPEG images used as a still scene background.

Load SWF loads a Macromedia Flash .swf file.

Open MTX from URL enables you to open a VET scene directly from a URL.

Instances (2) Menu

Tab:	Instances	[2]
Delete Selected		
Make Instance		
Collapse		Off
Clear All Collapsed		
Visible		Off
Backface Culling		Off
Invert Normals		Off
Invert Lighting		
Antialias		0
Edge Antialias		True
Specularity Wrap		0
Opacity		100
Assign Render Layer		0
Billboard		Off
ZBuffer		Off
Shadow		On
Use Crease Angle		Off
Crease Angle		
Recompute Normals		
Pass Click		1

Delete Selected deletes from the scene the selected element and its related lightmaps, bumpmaps, and other applied effects.

Make Instance creates identical iterations of a selected object in the scene. Any changes you make to one instance apply to all instances of that object. Using this tool for duplicated objects can reduce file size dramatically.

Collapse hides an instance (and its subtree) in a scene so that it is still contained within the Scene Builder repository, but not rendered. This is a "cloaking" command.

Corresponding XML tag: Collapsed

Clear All Collapsed uncollapses all geometries to make them visible in the scene.

Visible works much like the collapse function above; however, you can also make the selected object invisible and remove it from a scene entirely.

Corresponding XML tag: Visible

When **Backface Culling** is Off, the selected geometries are treated as doubled-sided polygons. Backface Culling On saves rendering resources, by rendering only the part of the object that faces the camera. (If Backface Direction is On, you won't see the changes made by Flip Polygons or Backface Culling.) The default is On.

Corresponding XML tag: BackFaceCull

Invert Normals affects how objects are rendered. When it is On, the direction that the polygons' faces are rendered in the selected geometry changes by reversing all scene is reversed. Choose Off to see the interior of the selected object in your scene. (This option takes visual precedence Flip Polygons and Backface Culling; that is, if you turn this option On, you won't see the changes made by Flip Polygons or Backface Culling.) The default is On.

Invert Lighting inverts polygon orientation in a scene by flipping all polygon normals 180 degrees without inverting surfaces. This affects the model physically and changes the description of the affected geometry in the scene's .MTS file. This is used primarily as a tool for debugging converted geometry. (If Backface Direction is On, you won't see the changes made by Flip Polygons or Backface Culling.)

Antialias applies antialiasing to selected geometries in a scene, where –1 means never antialias, 0 means antialias based on performance, and 1 means always Antialias. For the selected object, this option overrides the Antialias option in the Global Parameters (5) menu.

Corresponding XML tag: Antialias

Edge Antialias applies antialiasing to creases, open edges, materials, or all of the above (true). Default is True.

Corresponding XML tag: Edge AntiAlias

Specularity Wrap changes the way the lightmap is applied by interpolating between lightmap rendering effect (SpecWrap=0) and environmental reflection map effect (SpecWrap=2).

Corresponding XML tag: SpecWrap

The **Opacity** slider allows you to set the opacity for an object, with settings ranging between 0 and 100. 100 makes an object completely opaque; 0 makes it completely transparent.

Corresponding XML tag: Opacity

Assign Render Layer reassigns the layer to which the selected instance is rendered. Unless otherwise specified, layers are rendered back to front, with the lowest layer numbers rendered first.

Corresponding XML tag: RenderLayer

When **Billboard** is applied to an object, the positive Z axis of the selected object always faces the camera regardless of what occurs in the rest of the scene. Default is Off.

Corresponding XML tag: Billboard

ZBuffer determines the visibility of an object in a scene. For example, if you have a box and a sphere and the box is inside the sphere, select the box and assign the ZBuffer to be Off. The entire box becomes visible. If the box's ZBuffer is turned On, then the box is invisible.

Corresponding XML tag: ZBuffer

Shadow turns the shadow On or Off for the selected object. The default is On.

Corresponding XML tag: DoShadow

Use Crease Angle allows you to choose between using the assigned smoothing groups of the imported model or the crease angle assigned by Scene Builder.

Sets the **Crease Angle** between 0 and 180. Adjusting the crease angle determines whether and how much rounding to an object's angles is applied.

Corresponding XML tag: CreaseAngle

Recompute Normals recalculates the normals based on the change in the crease angle set by Crease Angle.

Pass Click allows the click of a parent geometry to pass along to the child object/geometry. In a scene, this is useful if you want a click one part of a model to trigger an action in another part (child) of the selected model. 0 means don't pass click, 1 means pass click to the next object through the Zbuffer, and 2 means pass click up through the hierarchy.

Corresponding XML tag: PassClick

Animation (3) Menu

Tab:	Animation	[3]
Animation On/Off		
Reverse Direction		
Rewind		
Show Selected Timeline		
Manual Time Control		
Time Scrubber <-o->		
Fixed Time Step, sec		
Render Animation		
Play Only Once		
Loop Animation		
Simplify Timeline...		
Split Animation...		

Animation On/Off pauses (Off) or resumes (On) an animation.

Corresponding XML tag: On

Reverse Direction plays the selected animation backward (On) or forward (Off).

Rewind rewinds the selected animation in a scene. This resets the entire animation and sets the model back to the starting point of the animation just run.

Show Selected Timeline shows the timeline for the selected animation.

Manual Time Control allows you to manually track animation actions, which is useful when troubleshooting. Choose On to enable the Time Scrubber.

Time Scrubber allows you to play the animation manually (drag the slider) or jump to a specific time in the animation (double-click the option and type a numerical value).

Fixed Time Step lets you set fixed time intervals in seconds for your animations.

Render Animation lets you specify whether the animation is rendered first, as the scene's background ("Pre") or in the foreground ("Post").

Corresponding XML tag: RenderAnim

Play Only Once sets an animation to automatically end when it has played through once.

Corresponding XML tag: RenderAnim

Loop Animation loops an animation the specified number of times. The default is 1.

Corresponding XML tag: Clamp

Simplify Timeline displays the Keyframe Simplification dialog box where you can streamline your timeline.

Split Animation displays a dialog box that allows you to divide non-ASE animations by frame set.

Transformation (4) Menu

Tab:	Transformation	[4]
Reset Object Transform		
Rotate X		0
Rotate Y		0
Rotate Z		0
Translate X		0
Translate Y		0
Translate Z		0
Scale X		0
Scale Y		0
Scale Z		0
Uniform Scale		0

Reset Object Transform sets Rotation and Translation to 0 and Scale to 1 for the selected object..

Rotates X rotates the selected object on the X axis.

Rotate Y rotates the selected object on the Y axis.

Rotate Z rotates the selected object on the Z axis.

Translate X translates (moves) the selected object on the X axis.

Translate Y translates the selected object on the Y axis.

Translate Z translates the selected object on the Z axis.

Scale X scales the selected object on the X axis.

Scale Y scales the selected object on the Y axis.

Scale Z scales the selected object on the Z axis.

Uniform Scale scales the selected object proportionally along the X, Y, and Z axes.

Global Parameters (5) Menu

Tab:	Globals	[5]
Render Mode		Default
Lightmap		None
Camera Navigation		Orbit
Show Camera Constraints		Off
Shadow		Off
Blend Shadow		On
Shadow Radius		10
Bound Shadow		On
Shadow Position (Y)		
Shadow Color		☐
Shadow Opacity		0.85
Antialias		
Antialias Passes		0
Render Edges		100
Sort Rule		Nearest
Toggle Panorama		
Set Background Color		☐

Render Mode assigns a rendering mode to the entire scene:
Default – Set to LightmapTexture, or the value from the .mtx file;
Texture - Textures are rendered, but lightmaps are not;
Wire - Only the wireframe is rendered;
Point - Only vertexes are rendered;
Lightmap - Lightmaps are rendered, but textures are not;
LightmapTexture - Everything is rendered;
LightmapTexMod - Everything is rendered, but material color is burned into texture.
For a specific texture, you can override this setting using the Rendering Mode option on the Textures (6) menu.

Corresponding XML tag: RenderMode

Lightmap loads or clears a globally applied 256x256 pixel lightmap—that is, one applied to the entire scene. Click the option, and then choose Load to select a lightmap, or choose None to clear a lightmap.

For an object, this setting can be overridden by using the Lightmap option on the Textures (6) menu to specify a lightmap for that object.

Corresponding XML tag: GlobalLightmap

Camera Navigation lets you choose from four camera modes: Orbit, Walk, Panorama, or Still.

Corresponding XML tag: CameraModeSelect

Show Camera Constraints shows (On) or hides (Off) the camera controls listed in the "Global Parameters (5) Menu/Camera Settings" section below. The default is Off.

Click **Shadow** to view (On) or hide (Off) geometry shadows in a scene. The default is On.

Corresponding XML tag: DoShadow

Blend Shadow removes the white shadow plane and blends geometry shadows with a scene background such as a panorama image (On). The default is Off.

Corresponding XML tag: BlendShadow

Shadow Radius controls the blurring strength of shadows and edges. The higher the value, the more blurred the shadows' edges.

Corresponding XML tag: ShadowRadius

Bound Shadow binds the shadow to the bottom of the bounding box for the scene. The default is On.

Corresponding XML tag: BoundShadow

Shadow Position (Y) moves the shadow plane up and down. You must set Bound Shadow to Off for this to have an effect.

Corresponding XML tag: ShadowY

Shadow Color lets you choose a custom shadow color. The default is black.

Corresponding XML tag: ShadowColor

Shadow Opacity controls the intensity of the shadow from lighter to darker within a range of 0 to 1.0.

Corresponding XML tag: ShadowOpacity

Antialias smoothes any jagged edges visible in the scene, where –1 means never antialias, 0 means antialias based on performance and 1 means always antialias.

For a specific instance, you can override this setting using the Antialias option on the Instances (2) menu.

Corresponding XML tag: AntiAlias

Antialias Passes controls the number of progressive antialiasing passes. A higher number means more rendering passes, which increases image quality, but slows performance. Experiment for the optimal quality/performance ratio.

Corresponding XML tag: AccumMax

Render Edges affects the strength of rendered edges to settings ranging between 0 and 600 percent. The result is a subtle effect that darkens or lightens polygon edges.

Corresponding XML tag: EdgeBias

Sort Rule lets you control the effects of multiple transparencies in a scene. This option sets the priority of geometries rendered in the scene, where Nearest (0) means only surfaces closest to the camera are rendered, Farthest (1) means all occluded surfaces will also be rendered, and Center (2) means the rendering criteria depends on the relative position of centers of bounding boxes.

Corresponding XML tag: SortRule

Toggle Panorama shows or hides the panorama image in the scene. The default is On.

Corresponding XML tag: TogglePano

Set Background Color displays a palette from which you can select a scene background color.

Corresponding XML tag: BackColor

Global Parameters (5) Menu/Camera Settings

The following options from the Global (5) menu are visible when **Show Camera Constraints** is On.

Camera Rotation –X limits the rotation in the negative direction of the X axis. To adjust the setting, click and drag the shaded slider, or double-click the option and type a numerical value (-180 to 180).

Corresponding XML tag: CamRotMinX

Camera Rotation +X limits the rotation in the positive direction of the Z axis. To adjust the setting, click and drag the shaded slider, or double-click the option and type a numerical value (-180 to 180).

Corresponding XML tag: CamRotMaxX

Camera Rotation –Y limits the rotation in the negative direction of the Y axis. To adjust the setting, click and drag the shaded slider, or double-click the option and type a numerical value (-180 to 180).

Corresponding XML tag: CamRotMinY

Camera Rotation +Y limits the rotation in the positive direction of the Z axis. To adjust the setting, click and drag the shaded slider, or double-click the option and type a numerical value (-180 to 180).

Corresponding XML tag: CamRotMaxY

Camera Rotation –Z limits the rotation in the negative direction of the Z axis. To adjust the setting, click and drag the shaded slider, or double-click the option and type a numerical value (-180 to 180).

Corresponding XML tag: CamRotMinZ

Camera Rotation +Z limits the rotation in the positive direction of the Z axis. To adjust the setting, click and drag the shaded slider, or double-click the option and type a numerical value (-180 to 180).

Corresponding XML tag: CamRotMaxZ

Min Camera Scale sets the minimum range for the field of view. To adjust the setting, drag the shaded slider, or double-click the option and type a numerical value (0.1 to 1000).

Corresponding XML tag: CamScaleMin

Max Camera Scale sets the maximum range for the field of view. To adjust the setting, drag the shaded slider, or double-click the option and type a numerical value (0.1 to 1000).

Corresponding XML tag: CamScaleMax

Min Camera Distance sets the minimum camera distance a user can zoom to. To adjust the setting, click and drag the shaded slider, or double-click the option and type a numerical value (0 to 1000).

Corresponding XML tag: CamDistMin

Max Camera Distance sets the maximum camera distance a user can zoom to. To adjust the setting, click and drag the shaded slider, or double-click the option and type a numerical value (0 to 1000).

Corresponding XML tag: CamDistMax

Cam Nearest X sets the nearest camera position on the X axis in Walk mode.

Corresponding XML tag: CamPosMinX

Cam Farthest X sets the farthest camera position on the X axis in Walk mode.

Corresponding XML tag: CamPosMaxX

Cam Nearest Y sets the nearest camera position on the Y axis in Walk mode.

Corresponding XML tag: CamPosMinY

Cam Farthest Y sets the farthest camera position on the Y axis in Walk mode.

Corresponding XML tag: CamPosMaxY

Cam Nearest Z sets the nearest camera position on the Z axis in Walk mode.

Corresponding XML tag: CamPosMinZ

Cam Farthest Z sets the farthest camera position on the Z axis in Walk mode.

Corresponding XML tag: CamPosMaxZ

Reset All Constraints removes any camera constraints and resets the camera parameters to their default values.

Materials (6) Menu

Tab:	Textures	[6]
Render Mode		Default
Edge Rendering		Default
Edge Bias		100
Material Opacity		100
Material Color (Diffuse)		☐
Texture (Diffuse)		None
Texture Lab...		
Lightmap		None
Lightmap Lab...		
Bumpmap		None
Bumpmap Strength		1
Enviromental Dither		0
Texture Bilinear Filter		-1
Alpha Channel		Off
Mip		Off
Mip Bias		
Select Object Materials		
Deselect Object Materials		

Render Mode assigns a <u>rendering</u> modes to a scene or to selected geometry in a scene:

Default - Applies the value from Globals Render Mode

Texture - Textures are rendered but lightmaps are not

Wire - Only the wireframe is rendered

Point - Only vertexes are rendered

Lightmap - Lightmaps are rendered but textures are not

LightmapTexture (default) - Everything is rendered

LightmapTexMod - Everything is rendered but material color is burned into texture

For a specific object, this option overrides the Rendering Mode setting in the Globals menu (5).

Corresponding XML tag: RenderMode

Edge Rendering offers rendering options for the edges of the scene's geometries.

Corresponding XML tag: EdgeMode

Edge Bias removes <u>edge</u> artifacts (jagged edges) that may appear when geometry is viewed at close proximity. It is most useful for scenes originally created in third-party software. It does not improve scenes created with procedural geometry only.

Corresponding XML tag: EdgeBias

Material Opacity sets <u>opacity</u> of the selected object within a range of 0 to 100. 100 makes the object completely opaque; 0 makes the object invisible (having only a shadow).

Corresponding XML tag: Opacity

Material Color (Diffuse) sets a solid (<u>diffuse</u>) color for the selected material. (How this color appears depends on the render mode). This option is especially useful if you want to match the underlying color of an object to its applied texture, to avoid color discrepancy when rendering.

Corresponding XML tag: Diffuse

Texture Diffuse loads a JPEG file as a <u>texture</u> to the selected material of an object. If you choose None, it removes the current JPEG texture file.

Corresponding XML tag: Diffuse

Texture Lab lets you test and set compression for a geometry's <u>texture</u>.

Lightmap applies a 256x256 lightmap to the selected object. Choose None to remove a lightmap.

For a specific object, this option overrides the Lightmap setting on the Globals menu (5).

Corresponding XML tag: Lightmap

Lightmap Lab allows you to create a custom <u>procedural</u> <u>lightmap</u>.

Bumpmap applies a <u>bumpmap</u> to the selected material. (Note that this option requires that a diffuse texture of the same size is also applied to the selected material.) Choose None to remove a bumpmap.

Corresponding XML tag: Bump

Bumpmap Strength sets the depth of the impression made by a <u>bumpmap</u>.

Corresponding XML tag: BumpStrength

Environmental Dither introduces lightmap dithering to remove lightmap rendering artifacts.

Corresponding XML tag: Dither

Texture Bilinear Filter applies a bilinear interpolation for textures that may improve the quality of texture rendering. Select the material for which you want to adjust this setting. –1 means never apply, 0 means apply based on performance, and 1 means always apply.

Corresponding XML tag: Filter

Alpha Channel marks the texture as having an applied alpha map (Alpha channel image is loaded through Texture Lab). Default is Off.

Corresponding XML tag: HasAlpha

Mip enable or disable Mip mapping, which prefilters an image by antialiasing using multiple resolutions of the original texture. Mip mapping creates a blurring effect that eliminates artifacts for selected materials when artifacts appear on tiled textures. The default is Off.

Corresponding XML tag: Mip

Mip Bias sets the strength of Mip mapping when Mip is set to On.

Corresponding XML tag: MipBias

Select Object Materials selects all materials of the object in the current selection. An object in a scene can have more than one material. With this tool, you can select all materials instead of one by one.

Deselect Object Materials deselects all materials of the object in the current selection. This tool clears all selections of materials of the selected object.

Hot Spots (7) Menu

Tab:	Hot Spots	[7]
Show Hot Spots		Off
Add Hot Spot		Sphere
Rollover Text		
Text Color		▢
Font		
Text Size		32
Show Hot Spot Text		Off
Texture Image		None
Shadow		On
Shadow Radius		3
Hot Spot Line		On
Distance from Hot Spot		6
Keep In Window		On
Hot Spot Options		Off
Text Location (X)		0
Text Location (Y)		0
Text Location (Z)		0
Attach Line (X)		0
Attach Line (Y)		0
Attach Line (Z)		0
Anchor Hot Spot		On
Pin Source (X)		0
Pin Source (Y)		0
Destination Pin (X)		0
Destination Pin (Y)		0
Pin Source Coord		
Pin Dest Coord		Absolute
Reset to Default Values		

Show Hot Spots displays (On) or hides (Off) hot spots as you work in a scene. This option will not cause hot spots to publish as visible. The default is On.

Add Hot Spot lets you choose the shape of the hot spot activation area and adds a hot spot to the scene. (Set Show Hot Spots to On to see this shape.)

Double-click **_Rollover Text_**, and then type in your own text. This text displays when you point to the hot spot shape on in the Scene window.

Corresponding XML tag: WidgetAssignRollover

Click **Text Color** to choose a text color other than the default gold color.

Corresponding XML tag: TextColor

Click **Font** to choose a text font other than the default font.

Corresponding XML tag: Font

Use the **Text Size** slider to change the size of hot spot text.

Corresponding XML tag: TextSize

Show Hot Spot Text makes the hot spot text or texture visible at all times (On). The default is Off.

Click **Texture Image** to apply a .jpg file as a texture to a hot spot. The texture will display in place of any hot spot text.

Corresponding XML tag: Texture

When **Shadow** is On, a drop-shadow displays beneath the hot spot text or texture. The default is On.

Corresponding XML tag: Shadow

Shadow Radius adjusts the size of the hot spot text or texture shadow.

Corresponding XML tag: ShadowRadius

Choose whether you want to display the **Hot Spot Line** (the line between the clickable hot spot activation area and the displayable hot spot text or texture).

Corresponding XML tag: WidgetLine

Distance from Hot Spot moves the displayable hot spot text or texture closer or farther from the activation area, and adjusts the hot spot line accordingly.

Corresponding XML tag: Radius

Keep In Window forces the hot spot display area to stay within the VMP window when this option is On.

Hot Spot Options shows or hides the options that follow for hot spot orientation (Text Location and Attach Line). The default is Off (options are hidden).

Text Location (X), **Text Location (Y)**, or **Text Location (Z)** reorients the hot spot text or texture along the X, Y, or Z axis, respectively.

Corresponding XML tags: WidgetCenterX, WidgetCenterY, WidgetCenterZ

Attach Line (X), **Attach Line (Y)**, or **Attach Line (Z)** relocates along the X, Y, or Z axis the end of the hot spot line that is closest to the clickable activation area.

Corresponding XML tags: TrackX, TrackY, TrackZ

Anchor Hot Spot hides or displays the options that follow for anchoring the displayable text or texture associated with the hot spot.

Pin Source (X) or **Pin Source (Y)** sets the X or Y offset (respectively) for the source of the pinned hot spot.

Corresponding XML tags: SrcPinX, SrcPinY

Destination Pin (X) or **Destination Pin (Y)** sets the X or Y offset (respectively) for the destination of the pinned hot spot.

Corresponding XML tags: DstPinX, DstPinY

Pin Source Coord and **Pin Dest Coord** specifies absolute or relative coordinates for the source and destination of the pinned hot spot.

Corresponding XML tag: PinSrcCord, PinDestCord

Reset to Default Values resets hot spot settings to their original values.

Primitives (8) Menu

Tab:	Primitives	[8]
Sphere		
Cube		
Box		
Cylinder		
Cone		
Pyramid		
XZ Plane		
XY Plane		
Show Resolution Options		On
Resolution (X and Y)		20
Resolution (X only)		20
Resolution (Y only)		20

Sphere creates a sphere in the center of the scene.

Cube creates a cube in the center of the scene.

Box creates a box in the center of the scene. A box has more segments than a cube, and behaves differently when transformations are applied.

Cylinder creates a cylinder in the center of the scene.

Cone creates a cone in the center of the scene.

Pyramid creates a pyramid in the center of the scene.

XZ Plane creates a horizontal plane in the center of the scene.

XY Plane creates a vertical plane in the center of the scene.

Show Resolution Options shows or hides the following three resolution options. (Be sure to set these options before you create a primitive from the options above.)

Resolution (X and Y) is a slider that sets both X and Y resolution for the selected object. Resolution (also called tessellation) determines the fineness of the segments creating the surface of a model. Higher tessellation creates a smoother model.

Resolution (X only) slider sets X resolution for the object.

Resolution (Y only) slider sets Y resolution for the object.

Preferences (9) Menu

Tab:	Preferences	[9]
Set Scene Width		648
Set Scene Height		507
Window Layout		Add/Del
Load Default File...		
Clear Default File		
Author Name		
Info Font		Arial

Set Scene Width lets you set the exact pixel width of the Scene window, as you want it to display in a web browser.

Set Scene Height lets you set the exact pixel height of the Scene window, as you want it to display in a web browser.

Load Default File loads a file containing your customized set of defaults.

Clear Default File resets to Scene Builder's original defaults and clear the custom default file.

Author Name lets you type your name so it will be added to the scene's .mtx file.

Info Font changes the font of the text in the Object Information window. Type the name of any system font, such as Arial (default), Times New Roman, and so on.

Publish (0) Menu

Tab:	Publish	[0]
Save MTX...		
Compress File		Off
Verbose MTX		Off
Use Resource Names		Off
Language Encoding		Default
Save MTS...		
Image Quality		60
Lightmap Quality		20
Geometry Precision		0.8
Use TrixelsNT		On
Minimum Triangles		0
Retain Normals		Off
Publish...		
Generate HTML		Off
Template		
HTML Window Width		
HTML Window Height		
HTML BKey		
Publish for Tuning Studio...		

Save MTX saves an .mtx or an .mtz file that contains the scene description referencing an external data file (usually one or more .mts files).

Compress File lets you save the scene to a compressed .mtz file (On). If this option is off, the scene is saved to an .mtx file.

In the published file, **Use Resource Names** preserves the original names taken from the imported file.

Language Encoding allows you to publish your VET scene with a double-byte character set (required for languages such as Kanji).

Save MTS saves all geometry and textures into a single, compressed .mts file. Unlike Publish, this does not save the corresponding .mtx file. Because Save MTS compresses the scene elements, republishing or resaving an .mts file results in a loss of visual fidelity.

Image Quality controls image compression for a scene within a range of 0 to 100. A higher setting increases the image quality but decreases compression (100 means no compression). Images that contain text, for instance, require a higher image quality so the text to remains readable.

Lightmap Quality lets you to control the quality of lightmap compression within a range of 0 to 100. A higher setting increases the lightmap quality but decreases compression (100 means no compression).

Geometry Precision controls geometry compression: the higher the setting, the better the quality (and the larger the file). Settings range between 0 and 1.6. Default is 0.8.

Use TrixelsNT lets you use TrixelsNT (Viewpoint's proprietary wavelet compression) as the compression format for textures. On is the default.

For a selected geometry, **Minimum Triangles** sets the minimum triangle count by percentage (either for the instance if an object is selected or globally if nothing is selected) at which the geometry displays when the model is streamed by VMP.

Corresponding XML tag: MinTriCount

For selected geometry, **Retain Normals** specifies whether or not to publish normals to the scene's .mts file. Choose On to correctly publish files with explicit normals. The explicit normals can be exported from CAD/CAM applications using an .obj file format.

Corresponding XML tag: SaveNormals

Publish produces two files: an .mtx file and an .mts file. Because Publish compresses the scene elements, republishing or resaving an .mts file results in a loss of visual fidelity.

Shortcut: You can press "p" or "P" to publish your scene.

Generate HTML creates an HTML file when you click Publish. This feature enables you to test VET content by allowing you to preview it in a web browser.

Publish for Tuning Studio lets you export an .mts file with maximum quality settings that you can import into Viewpoint Stream Tuning Studio. Stream Tuning Studio converts your .mts scene file to the highest quality with the smallest file size.

Texture Lab Menu

OK	
Cancel	
Load Texture...	
Show Channel · · · · RGB	
Reset View	
Add Alpha Channel	
Invert Alpha	
*HasAlpha · · · · Off	
Compression · · · TrixelsNT	
Reset to Default Quality	
TrixelsNT Global Quality · · 100	
Y Channel Quality · · 100	
Cb Channel Quality · · 100	
Cr Channel Quality · · 100	
Alpha channel quality · · 100	
Update TrixelsNT Preview	
Match JPEG Size	
Global Noise	
Use NoiseMap · · · Off	
Noise on Noisemap	
Noisemap Size	

Click **Load Texture** to choose the texture you want to analyze and compress.

Click **Show Channels**, and then choose from a list of channels in the texture image you want to view: RGB, RGBA, R, G, B, A, YCbCr, Y, Cb, and Cr.

If you zoomed in or out on or moved a texture preview, click **Reset View** to fit the texture into the preview window again.

Add Alpha Channel displays a dialog box allowing you to choose an Alpha channel to add to the texture. The Alpha channel acts as a mask.

Invert Alpha reapplies the Alpha Channel as a negative: dark areas become light and vice versa.

HasAlpha applies the Alpha channel you selected with **Add Alpha Channel** to the loaded texture. The value is On if you have added an Alpha channel. Choose Off to disable the Alpha channel.

Click **Compression** to choose TrixelsNT (Viewpoint's proprietary wavelet compression) or JPEG compression method.

Reset to Default Quality resets the texture map to its default quality setting.

TrixelsNT Global Quality adjusts the total quality of the compressed texture image. You can also adjust the compression of each channel using the controls below. The range is 0 to 100; default is 60.

Y Channel Quality adjusts compression for the Y channel. The default compression for the Y channel, which is luminosity, is very low. The range is 0.01 to 100; default is 10.

Cb Channel Quality adjusts compression for the Cb channel. The default compression for this channel is high. The range is 0.01 to 10; default is 1.

Cr Channel Quality adjusts compression for the Cr channel. The default compression for this channel is high. The range is 0.01 to 10; default is 1.

Alpha Channel Quality adjusts compression for the Alpha, or mask, channel. The default compression for this channel is low. The range is 0.01 to 10; default is 10.

Click **Update TrixelsNT Preview** or **Update JPEG Preview** (depending on whether you choose Viewpoint's proprietary TrixelsNT compression or JPEG compression) to view the effects of compression on the texture file.

Match JPEG Size is available when you have created both JPEG and TrixelsNT preview of a texture (see option above). By clicking this, the TrixelsNT version of the texture is created so that its file size is comparable to the JPEG compressed version.

Note: Before you use this option, be sure the JPEG file is the optimal file size to match. This option can cause the texture file size to increase.

Use **Global Noise** to set the intensity of the noisemap (from 0 to 100).

Click **Use Noisemap** to apply noise to a texture. Default is Off.

Noise on Noisemap adjusts the fineness or coarseness of the noisemap on a texture. The higher the number, the coarser the noisemap.

Click **Noisemap Size** to choose from a menu noisemap sizes from 8x8 to 512x512. A larger size noisemap creates a coarser noise channel for the texture.

Procedural Lightmap Menu

OK
Cancel
Save To JPEG
Cancel Changes
Default LightMap
Select Light — 1
Show only selected — Off
Delete Light
X Light Pos — 0.347
Y Light Pos — 0.212
Red — 0.376471
Green — 0.376471
Blue — 0.427451
Specularity — 0.571
Intensity — 0.037
Clamp Diffuse Val — 0.498
Blur Image — 1
Load Back Image
Spherize Back Image — 0
Num Diffuse Color — 128
Num Specular Color — 128
Force Low Black — Off

Save to JPG saves the procedural lightmap effects you've created as a JPEG image file. You can edit this file in a 2D graphics application and apply it as a lightmap.

Cancel Changes resets to the last lightmap applied to the scene. If no lightmap has been applied to the scene yet, resets to the default lightmap.

Default Lightmap removes all custom procedural lightmap settings, and reverts to the default lightmap.

Click **Select Light** and choose from the menu to select a light point. Points1 – 5 are on the face of the geometry; points 6 – 10 on the back of the geometry.

When set to On, **Show Only Selected** shows only the lighting effect for the selected light point.

Delete Light removes all the lighting for the selected light point.

X Light Pos moves the selected light point around the X axis.

Y Light Pos moves the selected light point around the Y axis.

The **Red** slider button controls the red value for the selected light point on a scale of 0 to 1.0.

The **Green** slider button controls the green value for the selected light point on a scale of 0 to 1.0.

The **Blue** slider button controls the blue value for the selected light point on a scale of 0 to 1.0.

Specularity determines how sharp or diffuse an edge the light has at the selected light point. Sets the shininess at a light point by determining how much light is reflected.

Intensity determines how bright the light is at the selected light point.

Clamp Diffuse Val sets the value of diffuse light from 0 to 1.0 for the entire geometry. At 1.0, diffuse light is reflected off the entire surface. At 0, no diffuse light is reflected.

Blur Image determines the softness, or blur, applied to the light.

Load Back Image adds a JPEG image to your lightmap background. Overall file sizes are smaller than if you loaded a JPEG lightmap using the **Light** option.

Spherize Back Image zooms and distorts the background image for a fish-eye lens effect.

Num Diffuse Color sets the number of gradations of diffuse color values. A higher number of gradations results in smoother transitions between shades of diffuse colors.

Num Specular Color sets the number of gradations of specular light values. A higher number of gradations results in smoother transitions between shades of light colors.

Force Low Black displays the preview model with a black background.

Appendix C:
Resetting Elements of Your Scene

You can use the following menu options to reset elements of your scene.

Menu	Use these menu items to reset scene elements
Main Command Menu Tools	• Click **Restart** to quit your current session of Scene Builder, and open a new session. If you've chosen a custom default file, it will automatically reload. Before clicking Restart, be sure to publish or save any work you want to keep. • **Clear Scene** deletes an entire scene. Deleting a whole scene clears all related animations, lightmaps and the like, allowing you to start a new scene. • **Reset Camera** places the camera in its original orientation to your scene. Does not reset Camera Mode (see the "Animation (3) Menu" section above).
Load (1) Menu	• Click **Load Panorama**, and then choose **None** to clear a panorama from a scene.
Instances (2) Menu	• **Delete Selected** deletes from the scene the selected element and its related lightmaps, bumpmaps, and other applied effects. • **Clear All Collapsed** restores any and all collapsed geometry in a scene.
Animation (3) Menu	• **Rewind** rewinds the selected animation in a scene. This resets the entire animation and sets the model back to the starting point of the animation just played.
Transformation (4) Menu	• **Reset Object Transform** resets an object to its original imported state. Choose this command to clear all modifications to the selected object and resets the transform properties.
Globals (5) Menu	• **Set Background Color** displays a palette from which you can select a scene background color. • **Reset All Constraints** resets the camera parameters to their default values.
Textures (6) Menu	• Click **Texture Diffuse**, and choose **None** to remove the texture from the selected object. • Click **Lightmap**, and choose **None** to remove a lightmap from the selected object. • Click **Bumpmap**, and choose **None** to remove the bumpmap from the selected object.
Hot Spots (7) Menu	• **Reset to Default Values** resets the rollover text and hot spot activation area to their original state.
Preferences (9) Menu	• **Clear Default File** clears the custom defaults file and resets to Scene Builder's original defaults.

Appendix D: Keyboard Shortcuts

Commonly Used Keyboard Shortcuts

Use this...	To do this...
` (accent key, upper left on keyboard)	Cycles through command menus.
Backspace or Delete	Delete selected object.
0 through 9	Tab through the Scene Command menus on the right side of the screen.
Shift + 0 through 6	Tab through the Hierarchy menus on the left side of the screen.
M	View scene data, such as polygon count, fps, memory usage, and so on.
R	Reset camera position.
W	Tab through the camera modes.
Right-click + Drag	Moves the selected geometry. (When Pass Events to Scene is On, zooms the camera in and out.)
Drag & drop	Apply a texture to a geometry.
Ctrl + Drag & drop	Apply a lightmap to a geometry.
Shift + Drag & drop	Apply a bumpmap to a geometry.
P or P	Publish the scene.

Camera Shortcuts

Click + Drag	Moves the camera position based on the camera mode selected.
Ctrl + Alt + Click + Drag	Change the perspective of the camera.
Right-click + Drag	When Pass Events to Scene is On, zooms the camera in and out. (When Pass Events to Scene is Off, moves the selected object.)

Hierarchy Menu Shortcuts

Shift + 0 through 6	Tab through the Hierarchy menus on the left.
Click + Drag	To an item on the Instances tab: Drag an instances below another instance to make it a child.
Alt + Click	On an item on the Instances tab: Shows all information about an instance.
Click a texture name	Display the texture in the Object Info window.
Double-click an element name	Allows you to rename the element.

Additional Shortcut Keys

Use this...	To do this...
Use this...	To do this...
Ctrl + D	Enable Debug command menu (for power users and developers).
E	Load global lightmap.
R	Reset camera.
S	Toggle shadow.
Shift + S	Toggle the Blend Shadow option.
X	Open an .mtx file.
Shift + X	Save an mtx file.
Ctrl + Right-click	Load a lightmap.
Ctrl + Alt + Right-click	Load a texture.

Appendix E: Frequently Asked Questions

The following FAQs were gleaned from Support Forums on Viewpoint Developer Central (http://developer.viewpoint.com/) and from the questions asked through technical support.

Q: Do panoramic images have to be sized to the power of 2 (i.e. 128, 256 etc)?

A: No. It is not required for any diffuse texture maps, alpha channels, or bumpmaps to be sized to powers of 2. However, lightmaps should be 256x256 pixels.

Q: When I open an .ase file with animations, an ASE Animation Options dialog box displays. What's the purpose of it?

A: ASE Animation Options dialog box enables you to split animations by frames. The most commonly used animation authoring software packages, such as Discreet 3ds max, provide a single timeline for animations. Web animations, however, usually require multiple timelines.

For example, in 3ds max, a model of a computer laptop opens and the screen is activated on a single timeline. For VET, the two animations typically need be separated: one for opening the laptop, and the other for turning on the power. Those two animations can be separately triggered by different events, such as clicking buttons. The ASE Behavior Editor and its complementary **Split Animation** tool on the **Animations [3]** menu are the tools for splitting a single animation timeline into several. In a typical workflow, in 3ds max you could animate opening the laptop in a range of frames 0-100 and the animation for powering up (the screen activates) in a range of frames 101-200. Then, in the **ASE Behavior Editor**, you split one timeline into two, the first covering frames 0-100 and the second frames 101-200.

Q: What's the purpose of the Simplify Timeline tool on the Animations menu?

A: **Simplify Timeline** tool on the **Animations [3]** menu enables you to remove redundant animation key frames by interpolating the timeline. Removing key frames reduces the file size.

The tool is primarily designed to overcome the limitations of the ASE file format. In an ASE file, the animation timeline is sampled at equal intervals, thus creating an excessive number of keyframes. For example, the original animation created in discreet 3ds max might have keyframes at 0, 0.15, and 5 seconds. When this animation is exported into ASE, then the original keyframes will be disregarded and new ones created at 0, 0.2, 0.4, 0.6 … 4.8, 5.0 seconds. Note that the keyframe at 0.15 sec is now missing. The density of new keyframes is defined through the options of the ASE exporter.

The default settings of the ASE exporter work fine in most cases, producing smooth animations with a reasonable number of keyframes. The timeline re-sampling might occasionally result in large published file sizes or an inaccurate animation path. The dramatic example of the latter is when the original animation contained a section of frozen motion in the middle of it: when played in VET, the animation might never perfectly freeze. In this case, you should export the ASE file with an excessive number of keyframes, and then use the Simplify Timeline tool to reduce the number of keyframes.

Q: When I open a file with an animation, I'm not sure how to play that animation.

A: To start an animation, choose it on the **Animators [Shift-5]** hierarchy menu on the left, and then click **Trigger Animation** on the **Scene Commands** menu on the right.

Q: Is it possible to constrain users from walking through walls with the camera? Can I create collision objects in Scene Builder?

A: Scene Builder does not support collision detection, and it is not possible to constrain users from walking through walls. Of course, you can limit some camera interaction, but if you want true collision detection, you should take a look at Adobe Atmosphere.

> Note: Some collision detection can be faked using the VolumeTrigger tag, but you can't really tie that into a camera. See an example on Derek Davies's website (http://cole.viewpoint.com/~ddavies). Keep in mind that even VolumeTrigger has some limitations.

Q: How do I change the focal length of the camera in Scene Builder?

A: On the **Rendering Hierarchy [Shift-0]** menu, click **Camera**. Then, on the **Scene Commands** menu, choose **Transformation [4]**. Click and drag on the **Scale Z** button. Click **Yes** to the warning message, and continue dragging the slider on the **Scale Z** button to change the camera's focal length. You can see the Scale Z values in the Object Info window.

Q: Are double faces supported?

A: Sure. On the **Instances [2]** menu, click the **Backface Culling** button so that it is set to **Off**.

Q: I'm usually happy with the results of simulating the environment mapping with lightmaps. However, when I've got a flat surface it doesn't work. Is there a way to get good environment mapping for flat surfaces?

A: Use the **Specular Wrap** option in the **Materials [6]** menu.

Q: How does Sort Rule work on the Global Parameters [5] menu?
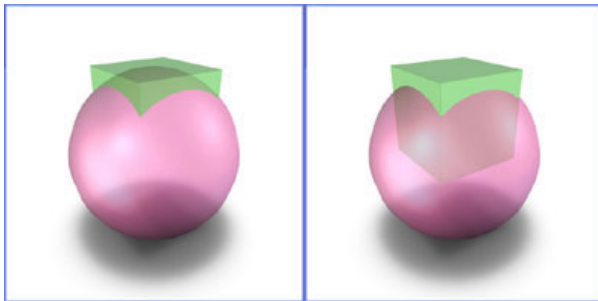
Scene rendering with Sort Rule Nearest (left) and Furthest (right).

A: The illustration above shows the difference between Nearest (default, left image) and Furthest (right image) Sort Rules. When you have several semitransparent objects, the Sort Rules determines the visibility criteria for different surfaces. When the Nearest sort rule is turned on, only the surfaces closest to the camera are rendered. The Furthest sort rule forces all occluded surfaces to be rendered. For the Center sort rule, the visibility criteria depend on the center positions of bounding boxes.

Q: What are the advantages of procedural lightmaps, and how can I generate them?

A: Procedural lightmaps add very little to the overall scene file size because they are created with X-Y positions and RGB colors of up to ten lights that are scripted in the .mtx file. Regular lightmaps are 256x256 JPEG images that increase overall file size. You can use an additional image as a background for a procedural lightmap, but then the files size advantage might disappear. Scene Builder includes a **Lightmap Lab**, a simple authoring solution for procedural lightmaps.

Q: Can I change the shape of an existing hot spot?

A: Scene Builder does not provide such functionality. You can easily change the hot spot shape (for instance, change a box to a sphere) by manually editing an .mtx file in a text or XML editor.

Q: How do I load SWF animation files?

A: You can use Macromedia Flash (.swf) files as a background or foreground of the scene, as a texture, as a bumpmap, or as a lightmap. You cannot use them in alpha channels.

To load a .swf file as a scene background

1   Click on an empty part of the background to make sure that no scene objects are selected.

2   Click **Load SWF** on the **Load [1]** menu to add the Flash file.
By default, the loaded .swf file is rendered on the scene background.

3   To make the SWF animation render on the foreground, select the **SWF animator** on the **Hierarchy Animators [Shift-5]** menu, and then on the **Animation [3]** menu, click **Render Animation** and choose **Post**.

To load a .swf file as a diffuse texture

1   Select the material.

2   On the **Materials [6]** menu, open the **Texture (Diffuse)** dialog.

3   Select your .swf file and load it.
       The material must have UV coordinates.

To load a .swf file as a bumpmap

Use the Bumpmap function on the **Materials [6]** menu.
The material must have a diffuse texture already loaded.

To load a .swf file as a lightmap

Use the Lightmap function on the **Materials [6]** menu.
The lightmap .swf file must have resolution of 256x256 pixels.

Q: How is Publish for Tuning Studio different from Publish?

When you **Publish for Tuning Studio**, textures and lightmaps are saved with maximum quality (no compression). This is done to avoid repeated JPEG or Trixel NT compression of images—first in Scene Builder, and then in Viewpoint Stream Tuning Studio. Set the texture compression type and level of compression in Stream Tuning Studio.

Q: My textures look fine in the modeling application, but when I bring the model into Scene Builder, they disappear.

A: Most likely, the geometry does not have explicit UV coordinates. Scene Builder requires that all textures be UV-mapped. See your modeling application user manual to find out how to convert implicit mapping (such as spherical or cylindrical) into explicit UV mapping.

Q: Does Scene Builder preserve resource names?

A: Yes. For example, name an object in 3ds max, and save the scene as an .ase file. Open the .ase file Scene Builder, publish it, and check the instance name in the .mtx file. The instance name coincides with the name in 3ds max. The naming structure is preserved in the .mts file as well. Keep in mind, however, that only the newest (March 2002) version 2.5 of Stream Tuning Studio preserves resource names. Stream Tuning Studio 2.1 replaces all resource names with default names such as MATERIAL_0.

Q: Do I need to convert from Quaternions to Euler using the tool on the Debug [D] menu?

A: Rarely. Scene Builder already performs the conversion if it's necessary when publishing files. With imported spline path and rotation animations, you have the option of saving your animation values with either Quaternion or Euler values. Quaternion values are classified as "quat" types, whereas Euler values are classified as "R3D" values. Note that the number of values you'll find in the timeline for both quat and R3D types can vary, depending on your original animation. For instance, if you animate an object along a TCB spline with ease-to and ease-from values, and then save it as an R3D type animation, you get eight values: X, Y, Z, T, C, and B, plus ease to and ease from. The same animation saved out as a quat type gives you nine values.

Q: Is there a way to see an animation's spline path in Scene Builder?

A: Yes. Select your animation from the Animation hierarchy list, and then click **Show Spline Path**.

Q: Is there a command-line interface for Scene Builder?

A: No. However, future versions of Scene Builder may incorporate this functionality.

Q: Once I published my model in VET file format, is there a way back to my original data file?

A: No. Once the content is published in MTX/MTS format, it cannot be converted to any other file format. To save content in another format, start with your original content from the 3D authoring application.

Q: What is the purpose of the Simplify Timeline tool?

A: It is primarily designed to overcome a limitation of the ASE file format for recording animations. When exporting a keyframe animation from 3ds max into an ASE file, all original 3ds max keyframes are disregarded.

Instead, the timeline is sampled at equal time intervals. For example, a new keyframe is created every 1/10 second. By changing the Controller Output parameters, the sampling frequency can be changed. VET files do not require uniform timeline sampling. The Simplify Timeline tool enables you to resample the animation timeline and optimize it for VET. Thus, to accurately export the animation spline path from 3ds max to VET, we recommend that you over-sample the number of keyframes in the ASE exporter and then simplify this animation in Scene Builder.

Glossary

Term	Definition
3D	Three-dimensional. An object or volume that exists in the dimensions of width, height, and depth.
action	Something that happens in a VET web application. This can be triggered by a user clicking or pointing to a part of the scene (for example, an object), by other logic coded into the scene (such as the start state of a transition).
alpha map	(Also called *alpha channel*) A grayscale image that acts as a mask creating areas of transparency or semi-transparency depending on the concentration of black or white. White areas are transparent, black areas are opaque, and all grayscales in between provide different levels of semi-transparency.
animation	A motion or transition added to a media atom or a group of media atoms over time. Examples include an object moving around a scene, transitions from one color or texture to another, or an object becoming visible.
antialiasing	Intermediate colors (or shades of gray) in the pixels between contrasting colored regions. Antialiasing improves the appearance of objects in renderings by removing jagged, stair-step edges.
.ase	ASCII Scene Export file format. Scene Builder imports .ase files from 3ds max (formerly, 3D Studio MAX) 3.0 or greater.
axis	An imaginary line that represents a dimension in space. In 3D space, there are three axes: X, Y, and Z. (The plural of axis is axes.)
Broadcast Key	A unique alphanumeric string issued by Viewpoint Corporation to companies or individuals licensed to broadcast VET content. The string is stored in a text (.txt) file that is referenced by VET-enabled web pages. VET content without a Broadcast Key displays with a watermark.
bumpmap	An image that is applied to the texture of a geometry to make it appear not as a smooth surface, but as a rough surface that responds to different angles of illumination.
camera	The view from which a scene is rendered. Also called the *scene camera*.
collapse	To hide a geometry in a scene so that the geometry is still contained within the Scene Builder repository, but not rendered. This is a "cloaking" command.
crease angle	The angle between two edges.
diffuse	To project light over an entire area of an object; scattered light.
edge	Where two adjacent polygons connect.
edge bias	Removes edge artifacts that may appear when geometry is viewed at close proximity. It is most useful for scenes originally created in third-party software. Adjusting edge bias does not improve scenes created with procedural geometry only.
element	The complete statement of an XML command contained between an opening and closing tag. Elements include attributes and values and may contain nested elements, also known as subelements.
geometry	Defines all polygons making up an object.
global	Describes properties added to an entire scene.
flip polygons	Inverts the geometry of a 3D model.
hot spot	An area in a scene made up of a procedural shape (usually invisible) and created in Scene Builder. Hot spots are generally used to define a 3D area that when interacted with

	displays a text annotation, texture, or Flash movie. For instance, when a user points to a hot spot, a text-based annotation may appear.
hierarchy	A list of things that are linked together in a parent-child structure. Each child must have a parent and can in turn have children of its own.
instance	A referencable element within the instancing hierarchy of geometries and their related textures and other materials. See also instancing, hierarchy.
instancing	Creating a copy of a specific object in a scene by referencing it. Creating an instance of an object that already exists can help maintain small file size, since the polygons and textures need only be defined once. For example, the tires on a car model can be created this way: The first tire's mesh and texture is defined and the other three tires are instanced.
interactors	Elements that allow the user to alter or interact with the scene by clicking or pointing to certain areas within the scene. Interactors are defined by XML code in the .mtx file for a VET web application.
iPIX	A spherical panorama file format created by Interactive Pictures Corporation that allows viewers to view images that immerse them in a multi-dimensional, 360° X 360° environment.
lightmap	An image that determines how light interacts with and scatters on the surface of an object. This image essentially traps the environment around the object and reflects that environment in the object's surface. Material properties such as diffusion, specularity, and reflection are captured in the lightmap. The lightmap in any Viewpoint scene is what the camera sees in any reflective materials of an object. Any spherical image can be used as a lightmap image.
map	To apply a 2D image onto the surface of an object.
materials	Surfaces added to the mesh to give it a finished appearance unlike wireframe rendering.
media atoms	Components of a Viewpoint scene: 3D objects, material properties, sound, object movies, animators, interactors, and the definition of the 3D environment (that is, panoramas or the maps of environmental lightmaps).
Mip mapping	A method of prefiltering an image by antialiasing using multiple resolutions of the original texture. Mip mapping creates a blurring effect that eliminates artifacts for selected materials when artifacts appear on tiled textures.
.mtl	A text-based file that describes the material that is associated to an .obj file.
.mts	A binary resource file (with a filename extension of .mts) containing all geometry, materials, and texture information for a VET scene. MTS is an open-specification 3D file format developed by MetaCreations and Intel Architecture Labs.
.mtx	A Viewpoint XML scene file (with a filename extension of .mtx) that contains the hierarchical relationships between objects and other elements in the scene. This file is the script for staging the scene elements and usually references an .mts file. Also see XML.
.mtz	The filename extension (.mtz) for the compressed form of an .mtx file and the preferred format for web-enabled Viewpoint content. Complex animations in an .mtx file can make file size large. Compressing these large .mtx files enables fast downloading of Viewpoint scenes.
.nff	(Neutral File Format) Files that use a minimal scene-description language, in order to test various rendering algorithms and efficiency schemes and to describe the 3D geometry and basic surface characteristics of objects, the placement of lights, and the viewing fulcrum for the eye. Some additional information is provided for aesthetic reasons (such as the color of the objects— not strictly necessary for testing the efficiency of rendering algorithms). Scene Builder imports .nff files.

normal	A vector that is perpendicular to the surface of a polygon. The direction the normal points indicates the outer surface ("face") of the polygon.
.obj	A 3D file format (Wavefront Object File) that defines the geometry and other properties for objects in Wavefront's Advanced Visualizer. These files can also be used to transfer geometric data back and forth between the Advanced Visualizer and other 3D applications. Scene Builder imports .obj files.
opacity	A way of measuring how much light can penetrate an object. In a VET scene, 0 opacity makes the object so transparent it is invisible and 100 makes the object completely opaque (in other words, not at all transparent).
panorama	A panorama is a 360-degree image in which the camera is in the center. QTVR and iPIX panoramas can be used in a Viewpoint scene.
polygon	3D scenes are drawn using polygons or triangles, vastly simplifying the computer creation of a 3D world. Triangles are defined as three coordinates—X, Y, and Z—one for each vertex. Polygons generally have one side or "face". If the polygon gets inverted or "flipped" (which may happen during export/import, for example), its face is not visible to the viewer. Also see normal.
procedural	Refers to elements in a VET scene—such as lightmaps, primitives, and hot spots—that are rendered based on calls to the Viewpoint Media Player (VMP) rather than calls to an external file, such as a JPEG file. Procedural scene elements add very little to overall file size of a VET scene.
properties	Attributes of a media atom. Also see media atoms.
QuickTime VR	(QTVR) Apple Computer, Inc.'s proprietary technology for creating cylindrical panorama and object movie files (.mov format) that allow viewers to be immersed in a 360° environment.
render	The transformation of 3D data into 2D frames for display on a computer screen.
rotate	To move an object around a specific center and axis.
root instance	The default, highest-level parent object in an mtx file.
scale	To resize an object along one or more axes (X, Y, and/or Z).
shadow blend	Toggles the shadows in the scene between shadows that blend with an environment and those that are projected onto the ground plane.
shadow opacity	A shadow's intensity.
scene	The highest level of the VET hierarchy (MTSScene tag in XML). Scene contains all elements of the .mtx and .mts files.
.swf	The Macromedia Flash movie file extension. May be pronounced "swif."
specularity	Defines an object's shiny highlights. When an object is rotated, how much it reflects depends on the material properties. The color of this reflection is defined by the specularity. Specularity determines how sharp or diffuse an edge the light has at the selected light point and sets the shininess at that point by determining how much light is reflected.
tessellation	Decomposing a complex surface into a series of simple ones that approximate the complex surface. Determines the finesses of the segments making up the model. A higher tessellation results in a smoother model but larger file size. Scene Builder allows the user to define the surface of procedural geometry and allows the user to adjust the number of triangles that define that surface.
texture	A picture on the surface, usually a JPEG or similar image file. This image file is rendered over polygons to give the object a realistic-looking surface.

tiling	The method of repeating a texture more than once across an object or part of an object. A tiled texture looks best if its edges seamlessly match up with each other, top to bottom and side to side. Tiling is a common method of using the smallest texture possible to cover a large area, such as a texture of a brick tiling across a large polygon or object to create an entire brick wall.
transformation	Transformations refer to these three actions: translation, rotation, and scaling. See translate, rotate, scale.
translate	To move the object along the X, Y, or Z axis in the scene.
TrixelsNT	Viewpoint's proprietary image compression using wavelets. Used to create high-quality 3D scenes in small file sizes.
uncollapse	To render all collapsed (hidden) geometries in a scene. Also see collapse.
VET	Viewpoint Experience Technology. Viewpoint Corporation's unique technology that streams 3D and rich media content (media atoms) over the Internet via Viewpoint Media Player.
Viewpoint Media Player	(VMP) The web browser plug-in required to view VET content with Netscape Navigator or Internet Explorer.
VMP	See Viewpoint Media Player.
wavelet	An image compression method.
widget	See hot spot.
wireframe	A representation of a 3D object that shows only the edges of its polygons.
XML	Extensible Markup Language. A markup language for documents containing structured information with instructions for content (words, pictures, and so on) and the role that content plays (for example, content in a section heading has a different meaning from content in a footnote, figure caption, or database table). Viewpoint Experience Technology uses XML to define all properties of a scene.
ZBuffer	A third buffer where depth data is stored that determines which textures are visible and which are hidden.