User Guide

Atlas Comparison Viewer

The Atlas Comparison Viewer is used to visualize the output from the Atlas Creation Tool. The Viewer focuses on image quality comparisons to allow developers to test whether texturing from a generated texture atlas results in acceptable image quality for their texture assets. The Viewer displays quads that are textured either with the original texture or with the same texture accessed out of the generated texture atlas. The Viewer also computes an optionally amplified per-pixel color-difference between these two texturing methods.

The Atlas Comparison Viewer includes a performance visualization mode that demonstrates the performance advantage inherent to texture atlases.

Since the Atlas Comparison Viewer example ships with complete source code, it is useful as a blueprint for how to write a command line-tool to adjust a model's texture coordinates to enable texturing from atlases.

Various controls let users change filtering, addressing, and drawing modes as well as camera controls. The next chapter describes these controls in detail.

For more information, please also refer to:

- Atlas Creation Tool User's Guide at `../AtlasCreationTool/Docs/UserGuide.doc.`
- *Batching Via Texture Atlases* white paper at `../AtlasCreationTool/Docs/ Batching_Via_Texture_Atlases.doc.`

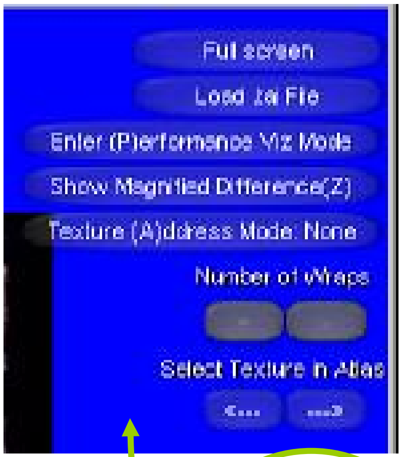
Using the Atlas Comparison Viewer

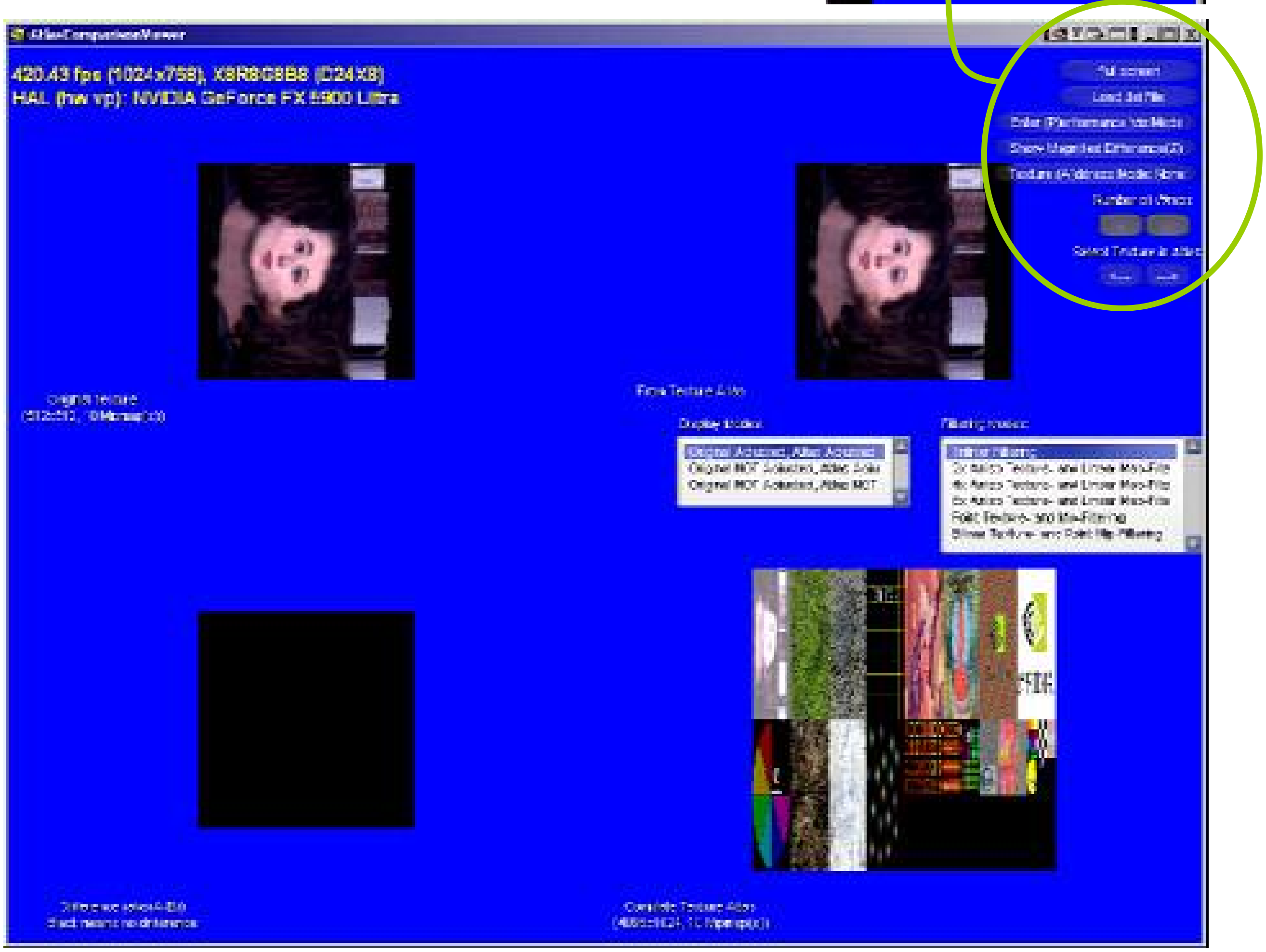
To use the Viewer, first generate texture atlases using the Atlas Creation Tool (see `../AtlasCreationTool`). The Atlas Creation Tool comes with a default texture atlas (the files Default.tai and Default0.dds represent the atlas generated from the textures in the Textures directory).

Starting **`AtlasComparisonViewer.exe`** in the `AtlasComparisonViewer` directory automatically loads the **`Default.tai`** file. The application displays four quads as shown in Figure 1. Users are able to load their own **`.tai`** files using the **Load .tai File** option.

The top-left quadrant in Figure 1 shows a quad that is texture-mapped with the original texture. The top-right quadrant shows another quad that is textured with part of the texture atlas that corresponds to the texture in the top-left quadrant. The bottom-left quadrant shows the absolute difference of the top-left and top-right views. Finally, the bottom-right quadrant shows the texture atlas in its entirety and highlights the currently selected texture.

The yellow text in the top-left lists frame-rate, display resolution and format, selected DirectX adapter, and the graphics hardware description. The user-interface elements in the center of the screen describe the current texture filtering mode and the current address mode (see below for a detailed description what these modes influence).


Full screen
Load .tai File
Enter (P)erformance Viz Mode
Show Magnified Difference(Z)
Texture (A)ddress Mode: None
Number of Wraps
Select Texture in Atlas
<...
...>



420.43 fps (1024x768), X8R8G8B8 (D24X8)
HAL (hw vp): NVIDIA GeForce FX 5900 Ultra

Figure 1. Texture Atlas Viewer on Start-up

Keyboard Controls

Table 1 lists the keyboard controls.

Table 1. Keyboard Commands

Key/Button	Description
F2	Brings up a standard control-panel allowing customization of which device the sample renders on, windowed versus full-screen, choice of color- and depth-buffer formats to use, as well as anti-aliasing and refresh-rate options.
Load .tai File	Allows the user to load a different texture atlas (.tai) file.
Select Texture in Atlas Control	Select the next/previous texture in the atlas.
Filtering Modes Control	Cycle through the texture filtering modes. Supported texture filtering modes are: point filtering (the Direct3D states min- and mip-filter are set to point), bilinear filtering (min-filter set to linear, mip-filter set to point), trilinear filtering (min- and mip-filter set to linear), and 2x/4x/8x/16x anisotropic filtering as supported by the graphics hardware (min-filter set to anisotropic, mip-filter set to linear, and max-anisotropy set to 2x/4x/8x/16x, respectively).
Display Modes Control	Cycle through display modes. Supported display modes are: • 'Original adjusted, atlas adjusted' (the texture coordinates for both the original texture quad and the texture-from-atlas quad range from (1/texture_width, 1/texture_height) in the top left corner to (1-1/texture_width, 1-1/texture_height) in the bottom-right corner. • 'Original NOT adjusted, atlas adjusted' (the texture coordinates for the original texture quad range from (0, 0) in the top-left corner to (1, 1) in the bottom-right corner, and the texture coordinates for the texture-from-atlas quad range from (1/texture_width, 1/texture_height) in the top left corner to (1-1/texture_width, 1-1/texture_height) in the bottom-right corner.) • 'Original NOT adjusted, atlas NOT adjusted' (the texture coordinates for both the original texture quad and the texture-from-atlas quad range from (0, 0) in the top left corner to (1, 1) in the bottom-right corner.). See the white paper "*Batching Via Texture Atlases*" (../AtlasCreationTool/Docs/ Batching_Via_Texture_Atlases.doc) for a detailed discussion for the reasons behind supporting these different modes and their relative pros and cons.
Show Magnified Difference (Z)	When this button is pressed the bottom-left quadrant shows an amplified absolute difference between the top-left and top-right views: the absolute difference is multiplied by 16 to emphasize image differences.

Key/Button	Description
Texture (A)ddress Mode	Toggle address mode between none, clamp, wrap, and mirror. It is possible to emulate the various texture address modes in a pixel-shader when texturing out of an atlas. These different address modes demonstrate that capability. See Figure 2 for a screenshot when in wrap-mode. This feature is only available on graphics hardware supporting Shader Model 2.a or better.
Number of Wraps Control	Increase/decrease number of times a texture wraps when in wrap-mode. This feature is only available on graphics hardware supporting Shader Model 2.a or better.
Left Mouse Button	Rotate the top-left, top-right, and bottom-left quads.
Mouse Wheel	Zooms the top-left, top-right, and bottom-left quads in/out.
Enter (P)erformance Viz Mode	Enters performance-visualization mode. Performance visualization mode renders multiple quads simultaneously, one for each texture. All these quads only require as many draw calls as there are atlases when texturing out of the atlases versus one draw call per quad when texturing from regular textures (see Figure 3 for a screen-shot). Controls in the lower-left corner adjust the total number of quads on-screen. Performance-visualization mode counts and displays how many DrawIndexedPrimitive() calls are issued to generate the image. The bottom of the screen displays this number. As indicated above, texturing from the original textures versus texturing from a corresponding atlas significantly influences that number: Texturing from an atlas typically reduces the required number of DrawIndexedPrimitive() calls, potentially resulting in higher frame-rates.
Rendering from Texture	When in performance-visualization mode, this button toggles between texturing these quads from the original textures and texturing from an atlas.
ESC	Quits the application.

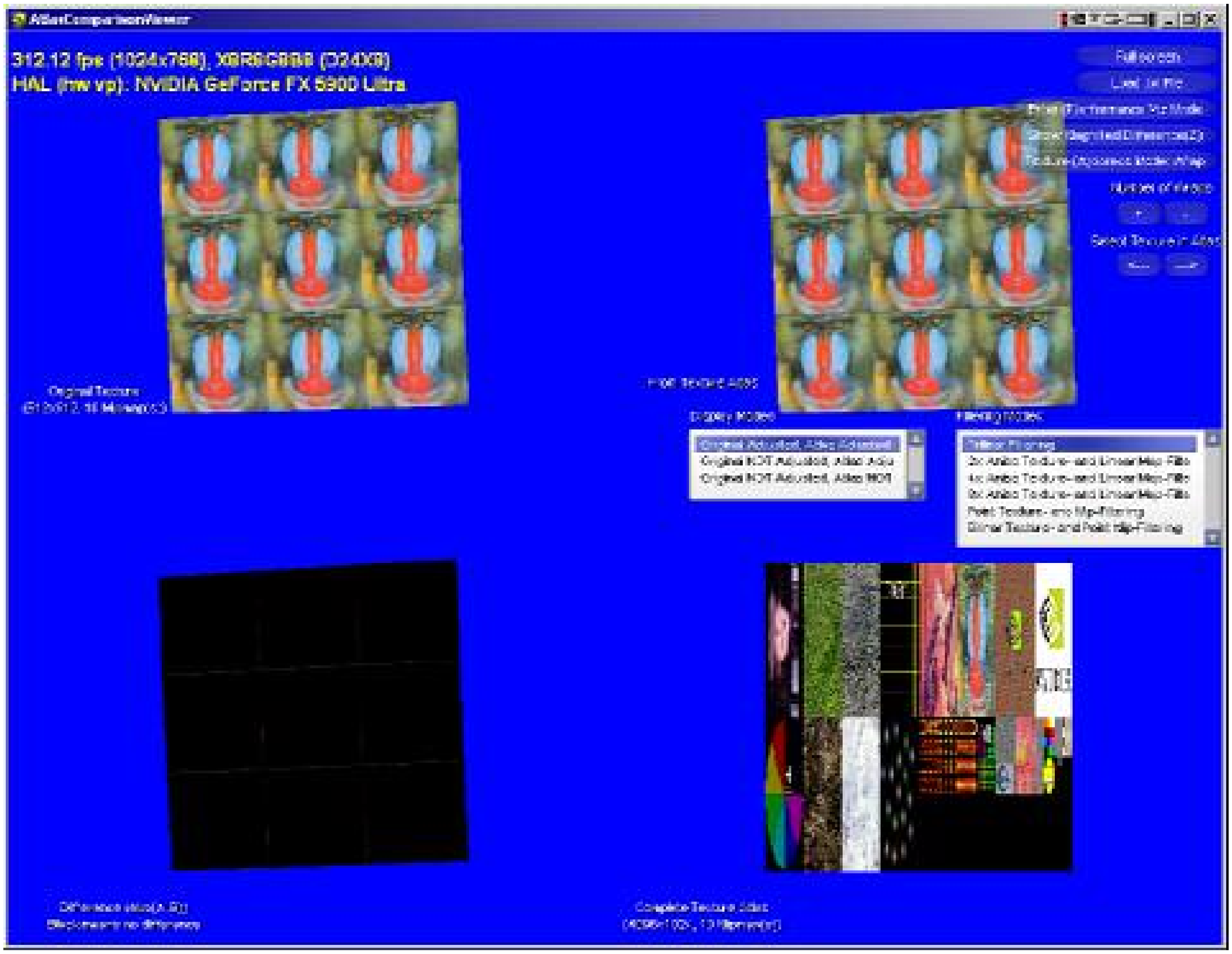
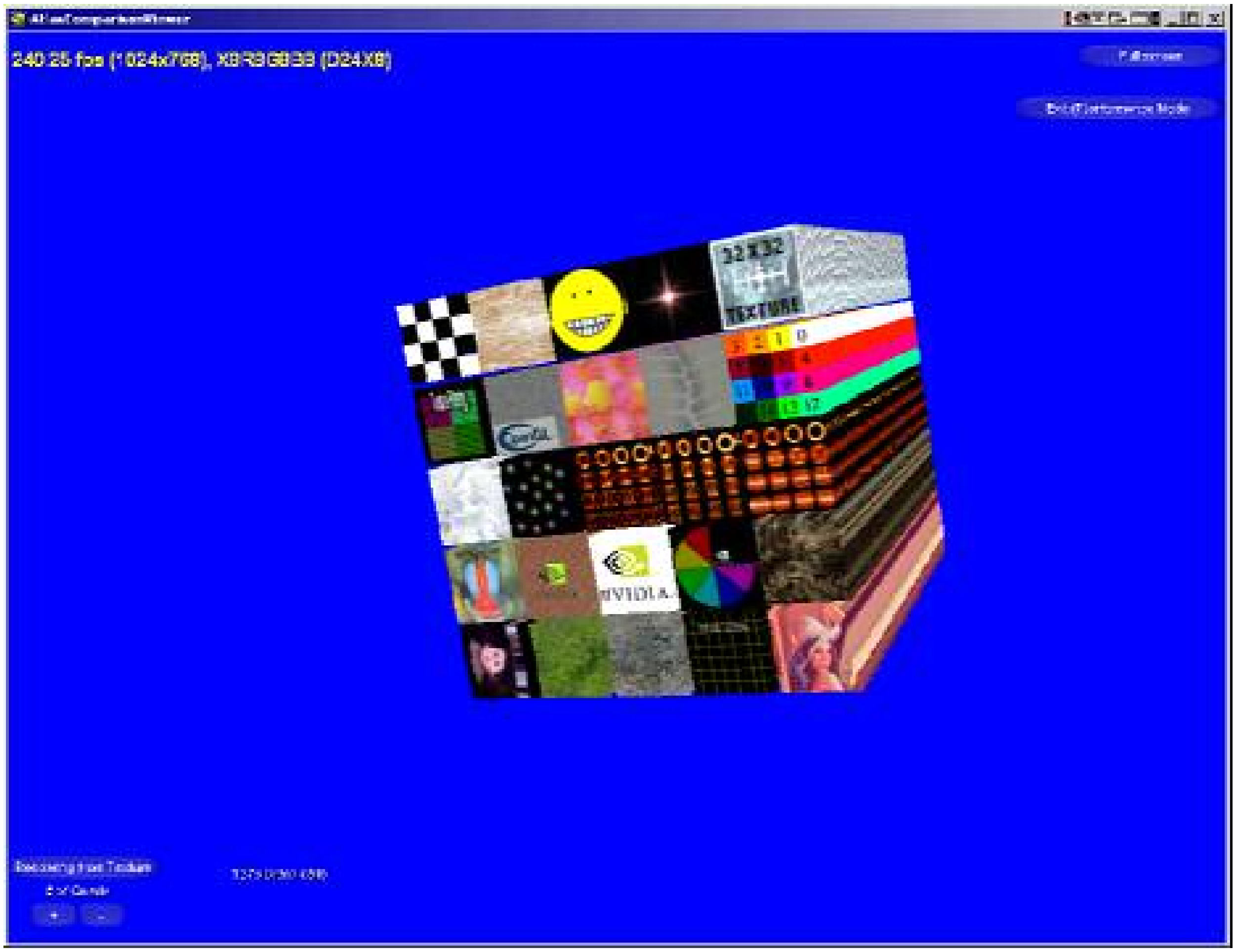

AtlasComparisonViewer
312.12 fps (1024x768), X8R8G8B8 (D24X8)
HAL (hw vp): NVIDIA GeForce FX 5900 Ultra
Full screen
Load .tai file
Original Texture
(512x512, 10 Mipmap(s))
Display Modes
Original Adjusted, Atlas Adjusted
Original NOT Adjusted, Atlas Adju
Original NOT Adjusted, Atlas NOT
Filtering Modes
Trilinear Filtering
2x Aniso Texture- and Linear Mip-Filte
4x Aniso Texture- and Linear Mip-Filte
8x Aniso Texture- and Linear Mip-Filte
Point Texture- and Mip-Filtering
Bilinear Texture- and Point Mip-Filtering
Number of Wraps
+
-
Select Texture in Atlas
Complete Texture Atlas
(4096x1024, 13 Mipmap(s))

Figure 2. Application in Wrap Mode



240.25 fps (1024x768), X8R8G8B8 (D24X8)

Figure 3. Performance-Visualization Mode

Typical Use Case

The typical use case is a user generating a texture atlas from a collection of textures and loading this atlas into the Atlas Comparison Viewer. The user selects the various textures contained in the atlas and chooses the appropriate display-, address- and filtering-modes for the selected texture. The user then examines the resulting image-differences while rotating and zooming the textured quads, possibly magnifying the color differences (using the **z** key).

Known Bugs

At this time there are no known bugs.

Possible Next Version Features

The following is a list of currently unimplemented features under consideration for the next version of this application.

- ❑ Recognize and properly handle cubemap atlases—depends on the Atlas Creation Tool to generate cubemap atlases.
- ❑ Use pixel shader to clamp to the proper minimum mipmap.
  Clamping to a minimum mipmap, however, seems unnecessary: We cannot discern image errors that are caused by accessing an atlas mipmap that is too small for a given texture.

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