

# Tcl3D: Catching up with OpenGL



# Tcl3D: Doing 3D with Tcl

Tcl3D  
Doing 3D with Tcl

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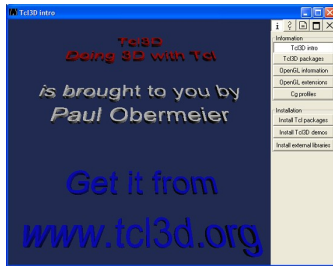
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# Presentation Overview

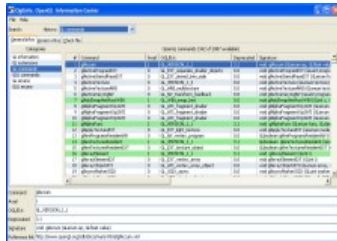


## 1. Tcl3D and OpenGL Quick Tour



## 2. Tcl3D module tcl3dOgl

Challenges  
Wrapping details  
Examples

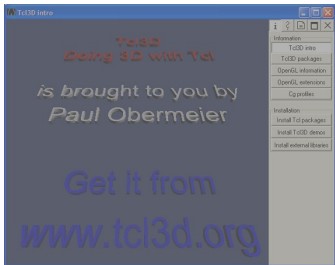


## 3. Tcl3D application OglInfo

# Tcl3D and OpenGL Quick Tour

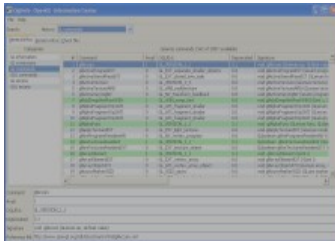


## 1. Tcl3D and OpenGL Quick Tour



## 2. Tcl3D module tcl3dOgl

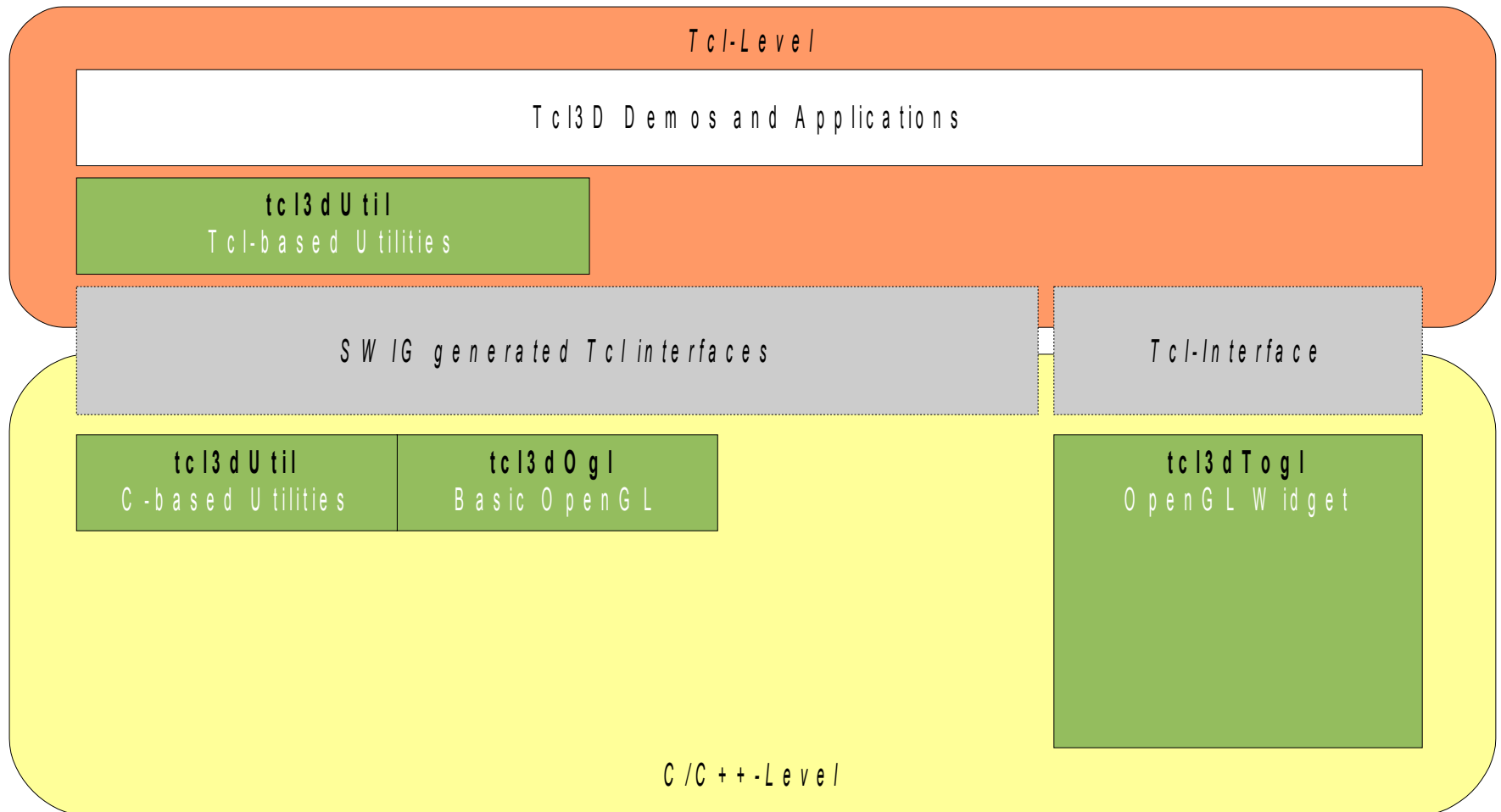
Challenges  
Wrapping details  
Examples



## 3. Tcl3D application OglInfo

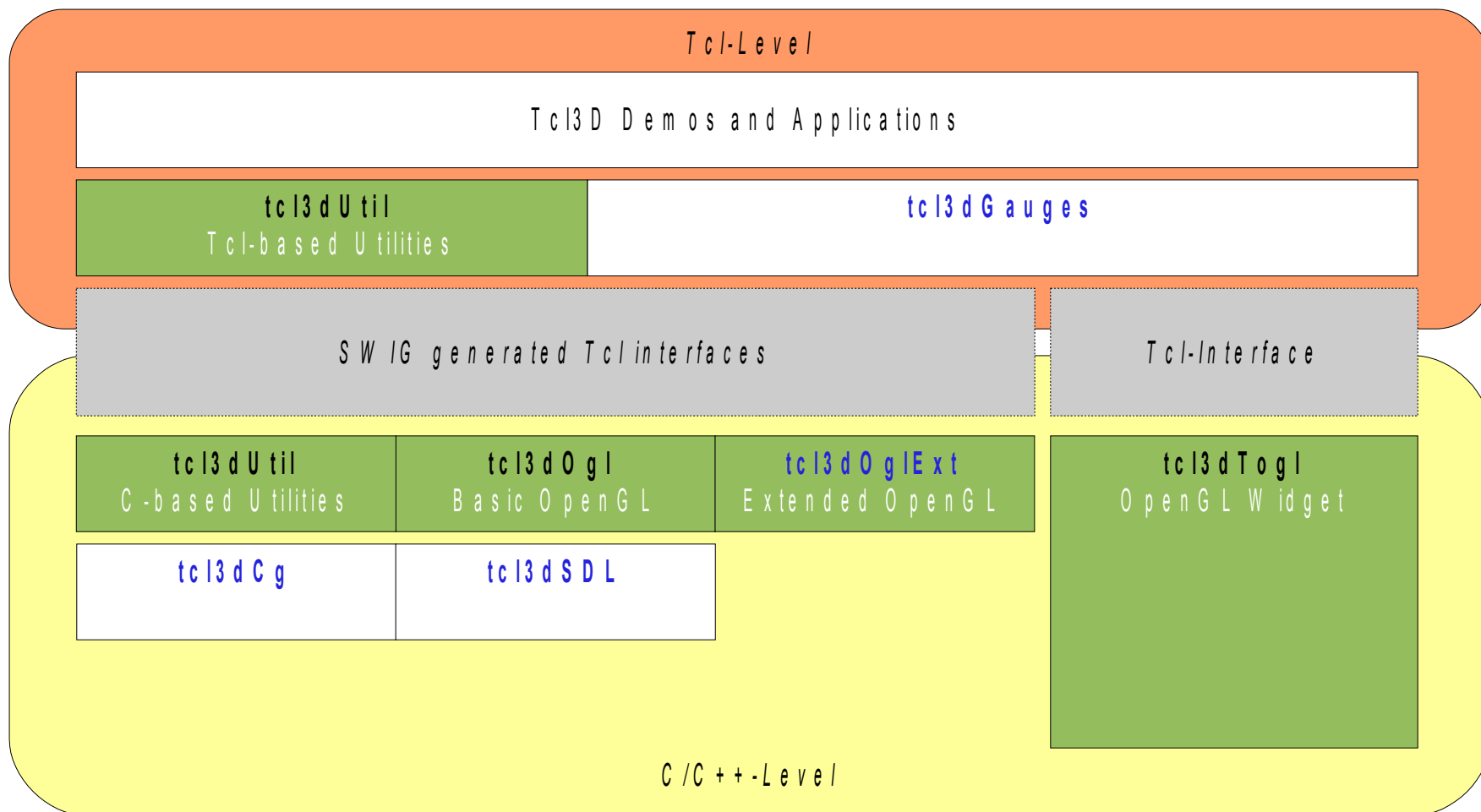
# Tcl3D History: Version 0.1

Released 2005/05/29 as TclOgl: **Basic OpenGL wrapping**, Togl widget with Tcl callbacks.



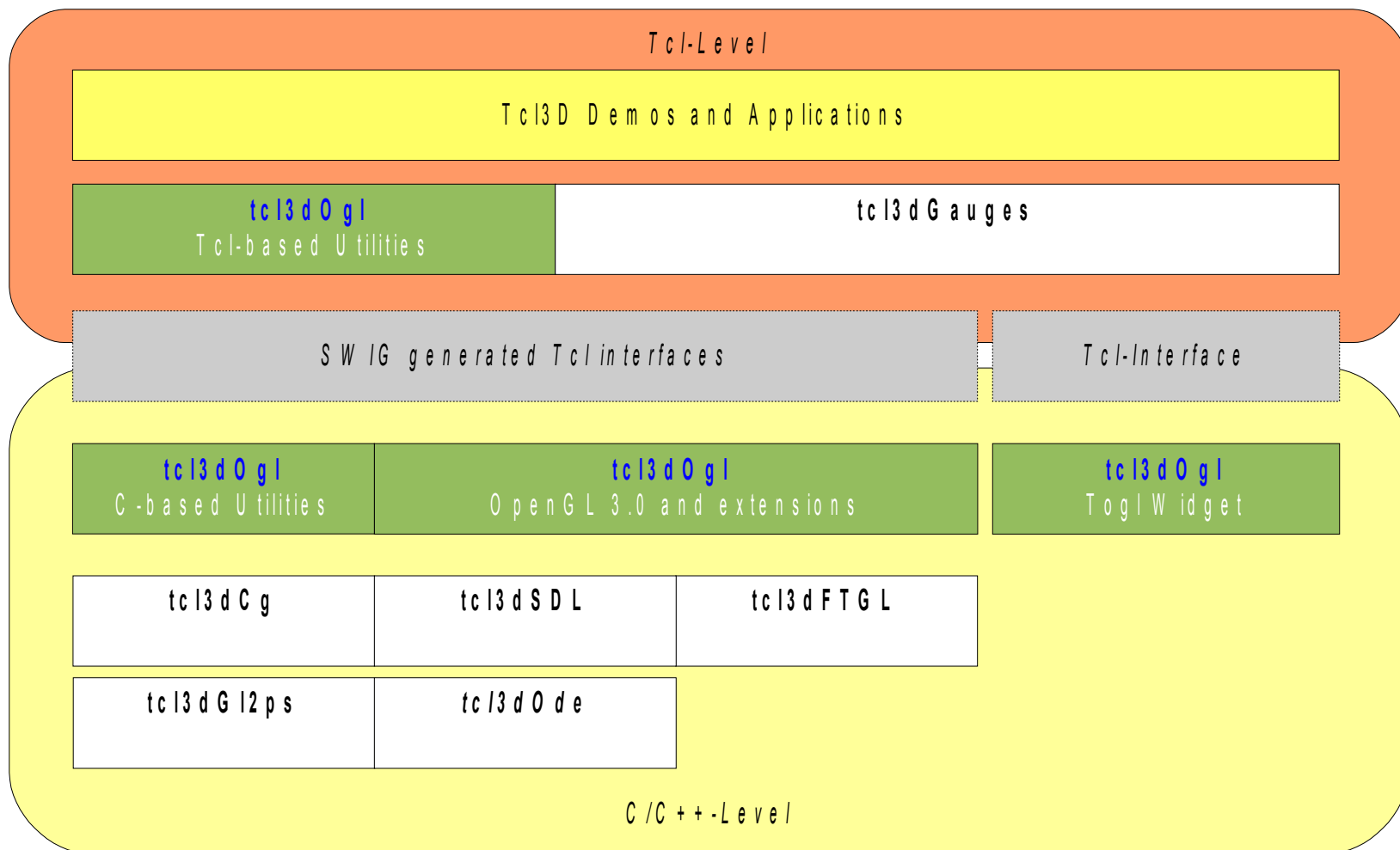
# Tcl3D History: Version 0.2

Released 2006/01/07: Major rewrite and support of new libraries: **OpenGL 2.0**, **OpenGL extensions**, Cg, SDL, gauges. Domain [www.tcl3d.org](http://www.tcl3d.org) created.



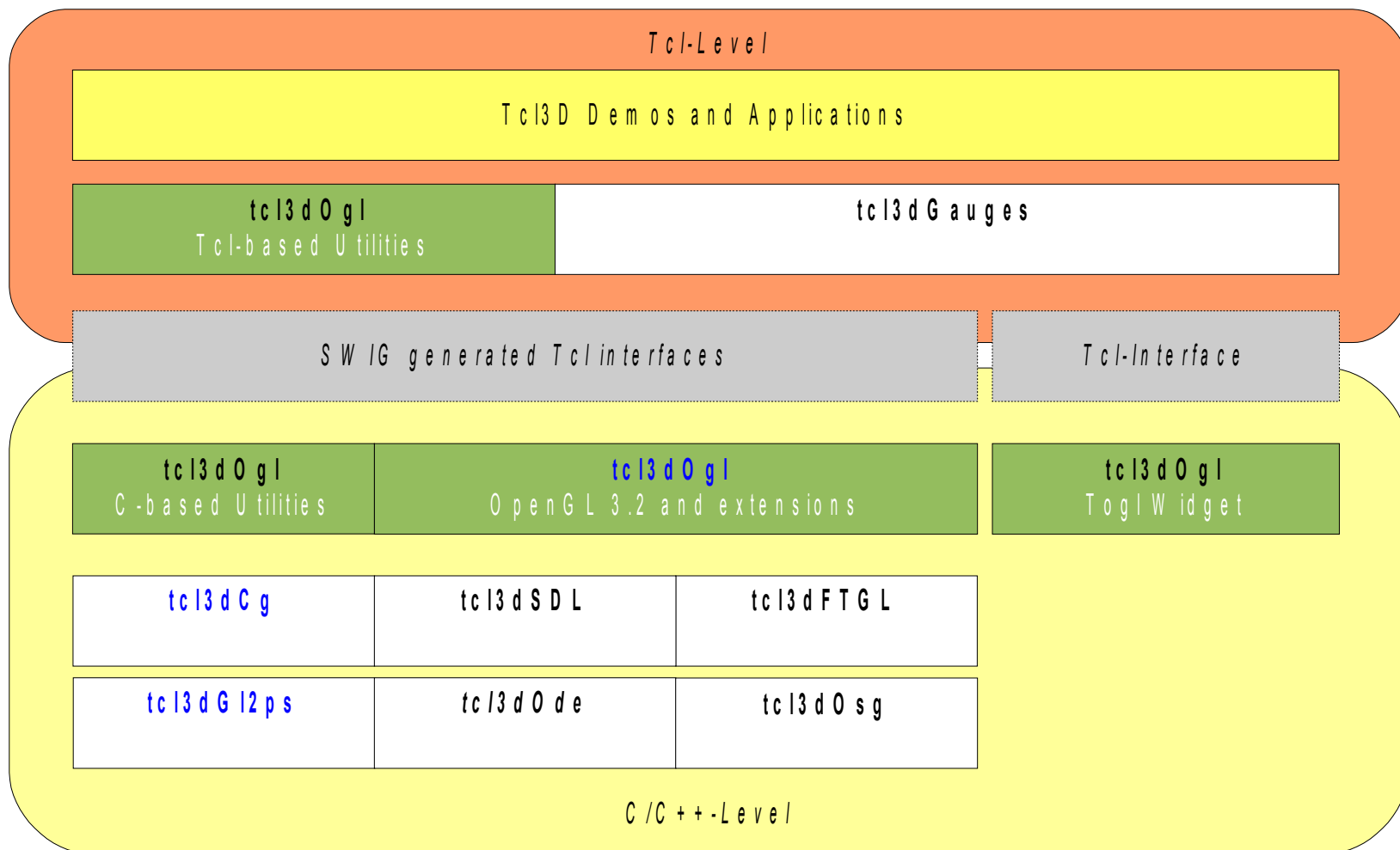
# Tcl3D History: Version 0.4.0

Released 2008/12/30: OpenGL wrapping based on GLEW 1.5.1. **Support of OpenGL 3.0.** Reorganization of Tcl3D core module.



# Tcl3D History: Version 0.4.2

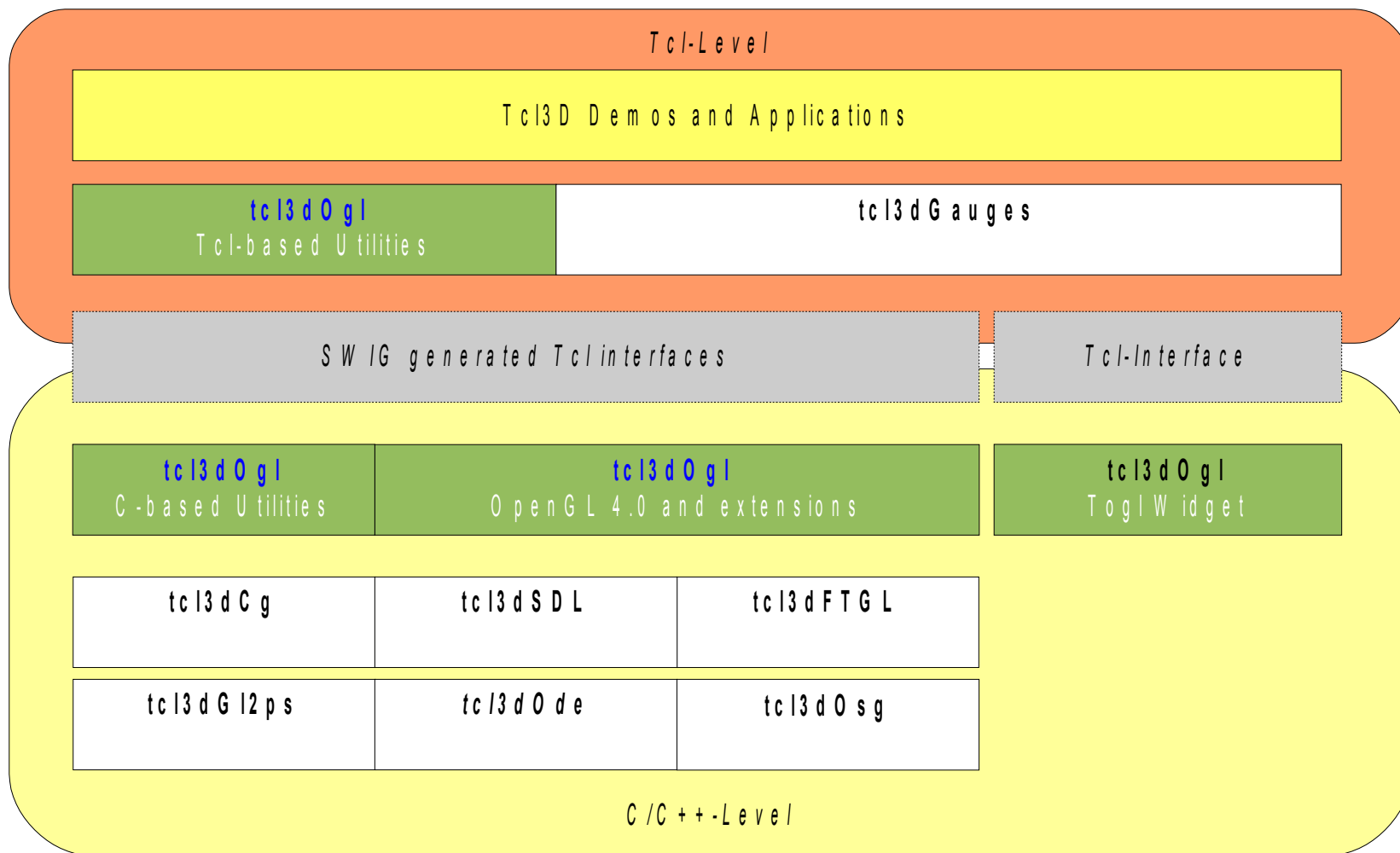
Released 2010/03/28: OpenGL wrapping based on GLEW 1.5.3. **Support of OpenGL 3.2.** Advanced OpenGL information functions.





# Tcl3D Future: Version 0.5

To be released: OpenGL wrapping based on GLEW 1.5.4. **Support of OpenGL 3.3 and 4.0.** Utility functions for fixed function pipeline replacement. Tcl/Tk >= 8.5 required.



# Timeline of OpenGL

OpenGL 1.0	01/1992	First release based on SGI's IRIS GL.
OpenGL 1.1	01/1997	Textures and texture formats on GPU hardware.
OpenGL 1.2	03/1998	Volume textures, packed pixels, normal rescaling, image processing.
OpenGL 1.2.1	10/1998	Multi-textures.
OpenGL 1.3	08/2001	Cubemap texture, multi-sampling, texture unit combine operations.
OpenGL 1.4	07/2002	Hardware shadowing support, fog coordinates, automatic mipmap generation.
OpenGL 1.5	07/2003	Vertex buffer objects, occlusion queries, extended shadowing functions.
OpenGL 2.0	09/2004	User-programmable shaders. OpenGL Shading Language (GLSL).
OpenGL 2.1	07/2006	Pixel buffer objects, sRGB textures, non-square matrices. GLSL 1.20
OpenGL 3.0	07/2008	Frame buffer objects, hardware instancing, vertex array objects. GLSL 1.30.
OpenGL 3.1	03/2009	Texture Buffer Objects, Uniform Buffer Objects, GLSL 1.40.
OpenGL 3.2	08/2009	Geometry Shader, Sync and Fence objects, GLSL 1.50.
OpenGL 3.3	03/2010	Backport of OpenGL 4.0 functionality for use on previous GPU HW, GLSL 3.30.
OpenGL 4.0	03/2010	Shader subroutines, 64-bit floating point support, GLSL 4.00.

OpenGL 2.0 introduced the OpenGL Shading Language GLSL.

OpenGL 3.0 introduced a **deprecation mechanism** to simplify the API in future revisions.

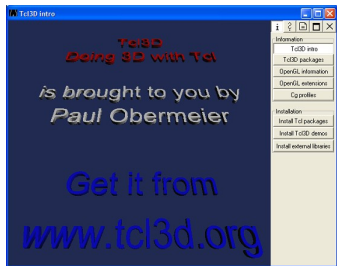
OpenGL 3.1 removed legacy functionality: All fixed-function options, direct mode, color index.

# Timeline of OpenGL and Tcl3D

OpenGL 1.0	01/1992			
OpenGL 1.1	01/1997			
OpenGL 1.2	03/1998			
OpenGL 1.2.1	10/1998			
OpenGL 1.3	08/2001			
OpenGL 1.4	07/2002			
OpenGL 1.5	07/2003			
OpenGL 2.0	09/2004			
	05/2005	Tcl3D 0.1.0	OpenGL 1.1	(Wrapping based on gl.h)
	01/2006	Tcl3D 0.2.0	OpenGL 2.0	(Wrapping based on OglExt)
OpenGL 2.1	07/2006			
OpenGL 3.0	07/2008			
	12/2008	Tcl3D 0.4.0	OpenGL 3.0	(Wrapping based on GLEW)
OpenGL 3.1	03/2009			
OpenGL 3.2	08/2009			
	03/2010	Tcl3D 0.4.2	OpenGL 3.2	(Wrapping based on GLEW)
OpenGL 3.3	03/2010			
OpenGL 4.0	03/2010			
	??/2010	Tcl3D 0.5.0	OpenGL 3.3/4.0	(Wrapping based on GLEW)

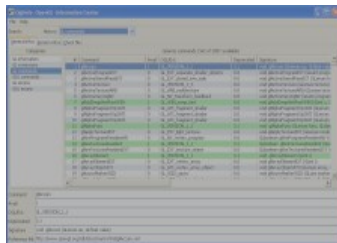


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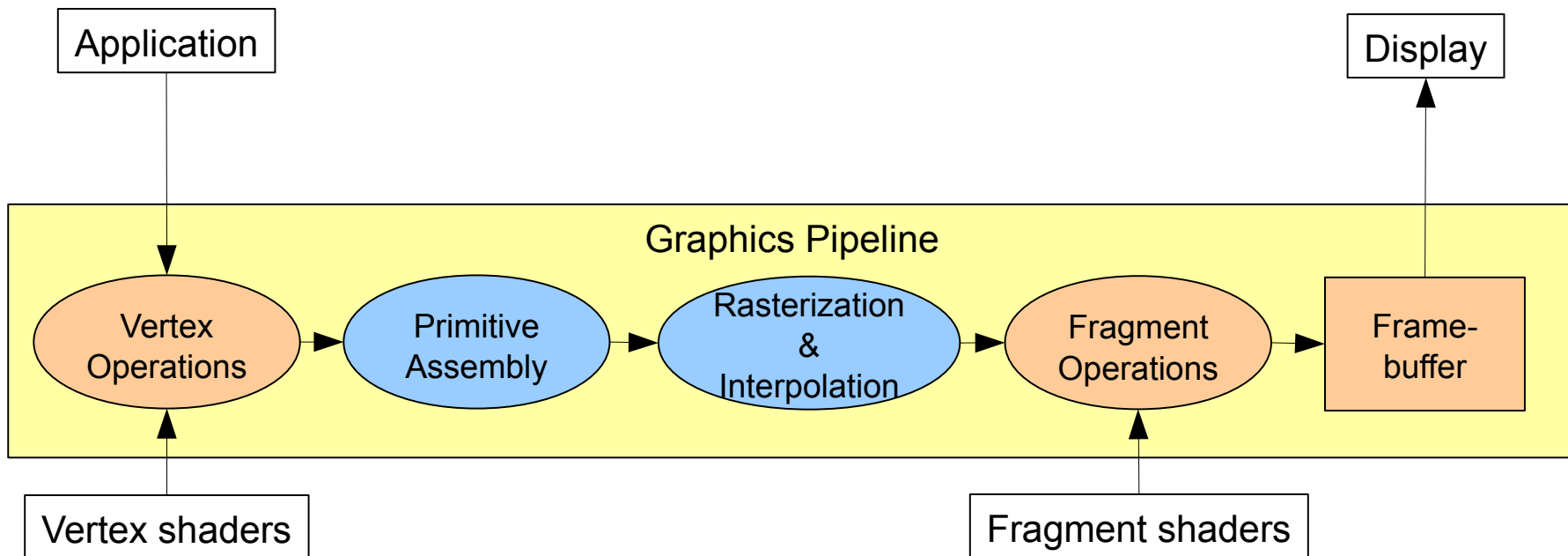
## 3. Tcl3D application OglInfo

# Challenge: Deprecation of functionality

Starting with OpenGL 3.1 the functionality of the fixed-function pipeline was declared deprecated.

OpenGL version	# of functions	# of deprecated functions
1.1	336	272
1.2	4	1
1.3	46	37
1.4	47	38
1.5	19	0
2.0	93	36
2.1	6	0
3.0	55	20
3.1	4	0
3.2	3	0
3.3	0	0
4.0	5	0
<b>Total</b>	<b>618</b>	<b>404 (65%)</b>

# Fixed-Function Pipeline vs. Shaders



The deprecated functions are mainly from the following categories:

Vertex Specification

*glBegin, glEnd, glVertex, glNormal, glColor, glTexCoord, ...*

Display Lists

*glNewList, glCallList, glGenLists, ...*

Lighting

*glMaterial, glLight, glLightModel, glShadeModel, ...*

Matrix operations

*glLoadMatrix, glMultMatrix, glTranslate, glRotate, glScale, ...*

Fog

Clipping

Evaluation

Selection and Feedback

Convolution filters

ColorTables

# tcl3dOgl: Deprecated functions replacement (1)

For the deprecated matrix functions, replacement functions have been integrated into the OpenGL module of Tcl3D.

All functions have the same signature, with the exception, that the tcl3d functions have an additional parameter at the end for returning the calculated matrix:

```
void gluPerspective (GLdouble fovy, GLdouble aspect, GLdouble zNear, GLdouble zFar)
void tcl3dPerspective (double fovy, double aspect, double zNear, double zFar, float *res)
```

## *Viewing related functions*

<b>Deprecated GL function</b>	<b>tcl3dOgl function</b>
glFrustum	tcl3dFrustum
glOrtho	tcl3dOrtho
gluPerspective	tcl3dPerspective
gluLookAt	tcl3dLookAt



## *Modelling related functions*

<b>Deprecated GL function</b>	<b>tcl3dOgl function</b>
glRotate[f d]	tcl3dRotate[f d]
glTranslate[f d]	tcl3dTranslate[f d]
glScale[f d]	tcl3dScale[f d]
glLoadIdentity	tcl3dMatfIdentity, tcl3dMatdIdentity
glMultMatrix[f d]	tcl3dMatfMult[f d]
glLoadMatrix[f d]	No replacement, use glUniformMatrix* functions.
glMatrixMode	No replacement
glPushMatrix	No replacement
glPopMatrix	No replacement

## *Shader related utility functions*

tcl3dOglReadShaderFile

tcl3dOglShaderSource

tcl3dOglBuildProgram

tcl3dOglDestroyProgram

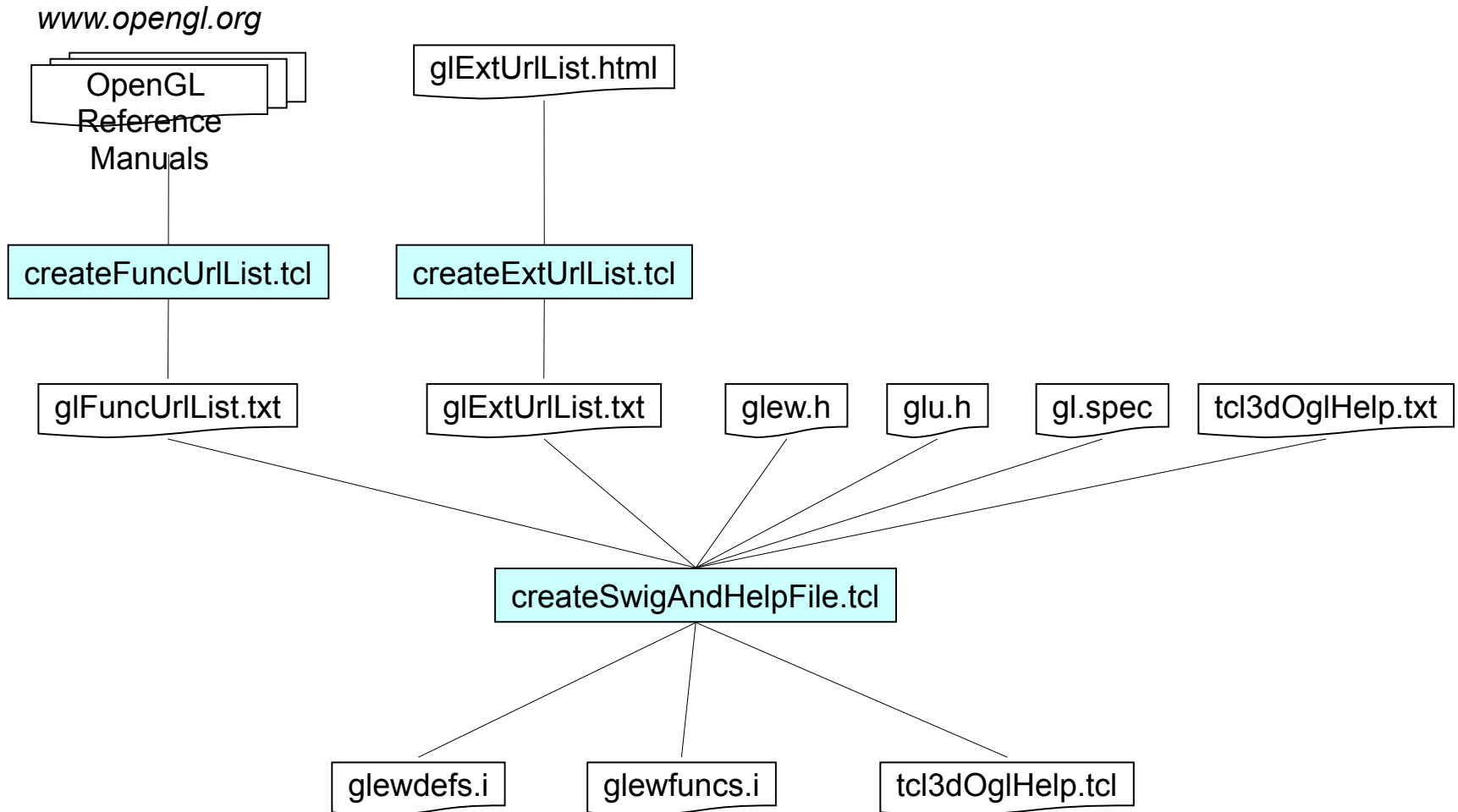
tcl3dOglBuildProgram takes the source strings of a vertex, a fragment and a geometry shader program.

It compiles and links the shader sources into a GLSL shader program.

The identifiers of the generated shader programs are returned as a **dictionary**.

# tcl3dOgl: Advanced build process

Use several sources of OpenGL information during the build process.



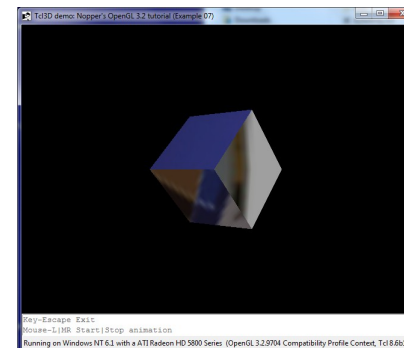
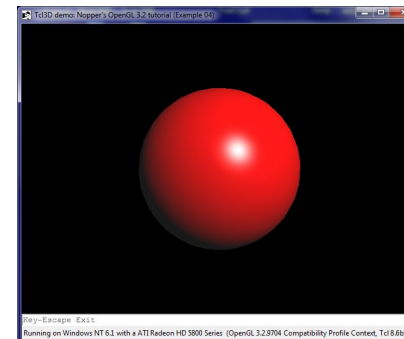
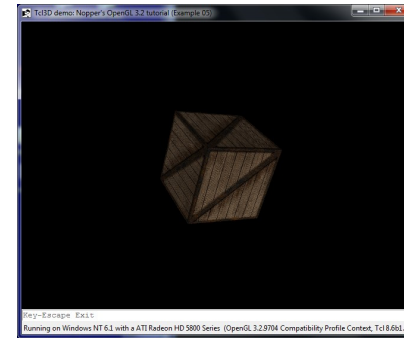
# tcl3dOgl: Advanced information functions

With the gathered data available, the following advanced information functions have been implemented.

<code>tcl3dOglGetFuncList</code>	Get list of OpenGL and GLU functions (all, gl, glu)
<code>tcl3dOglGetVersionList</code>	Get list of OpenGL versions and extensions
<code>tcl3dOglGetExtensionList</code>	Get list of OpenGL extensions (all, glew, driver)
<code>tcl3dOglIsFuncWrapped</code>	Check if OpenGL or GLU function is wrapped
<code>tcl3dOglGetFuncSignature</code>	Get the signature of an OpenGL or GLU function (c, tcl)
<code>tcl3dOglGetFuncVersion</code>	Get the version or extension name of an OpenGL function
<code>tcl3dOglGetEnumVersion</code>	Get the version or extension name of an OpenGL enumeration
<code>tcl3dOglGetFuncDeprecated</code>	Get the version, an OpenGL function has been declared deprecated
<code>tcl3dOglGetVersionFuncs</code>	Get the function names of an OpenGL version or extension
<code>tcl3dOglGetVersionEnums</code>	Get the enumeration names of an OpenGL version or extension
<code>tcl3dOglGetUrl</code>	Get the URL of the documentation of an OpenGL item (function, enum, extension)

# Examples: OpenGL 3.2 demos

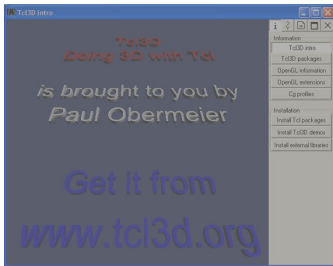
Some of the OpenGL 3.2 demos from <http://www.nopper.tv/opengl.html> using only non-deprecated functions have been ported to Tcl3D using the replacement functions.



# Tcl3D Application OglInfo

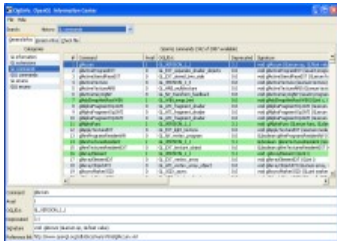


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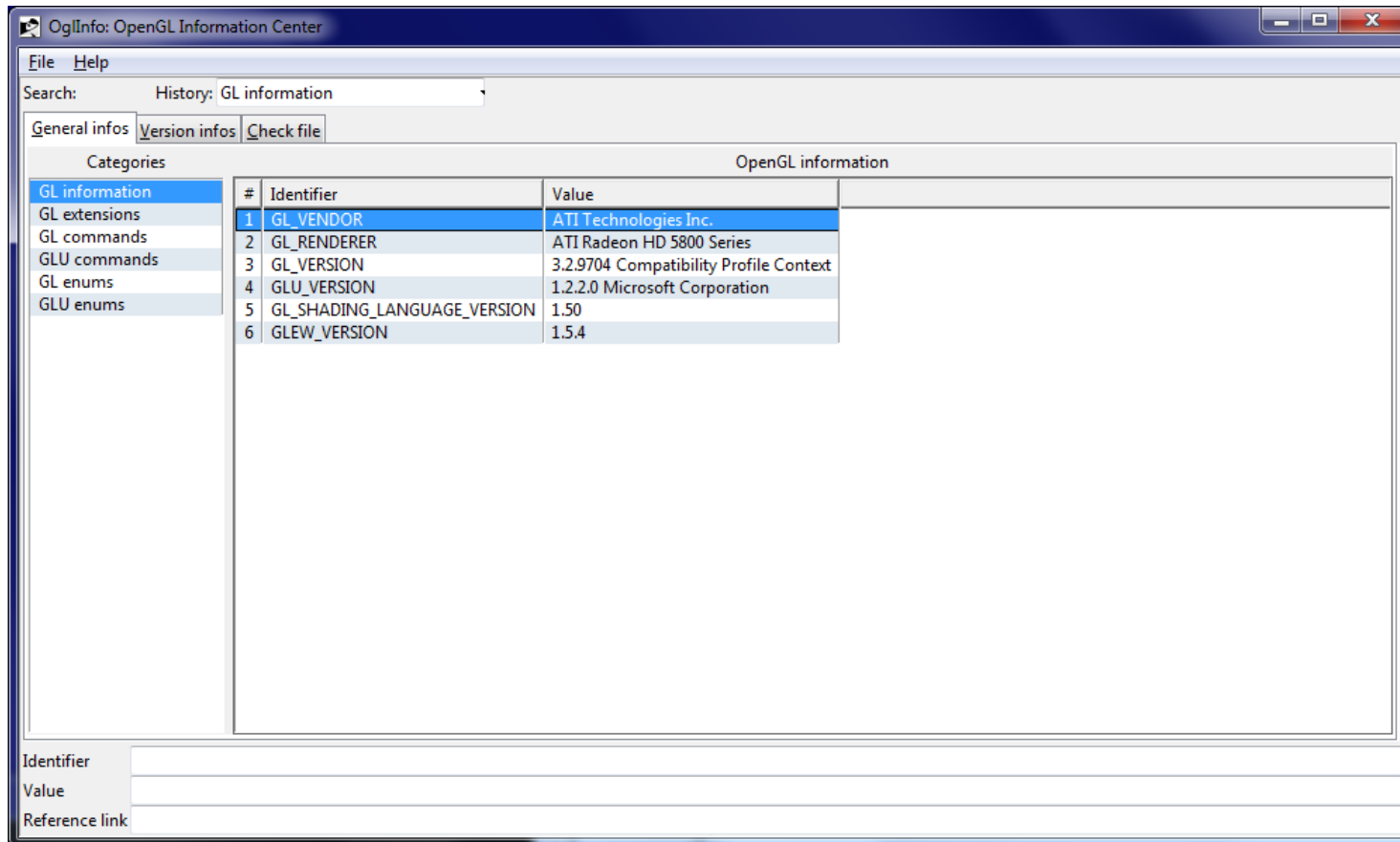
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## 3. Tcl3D application OglInfo

# OgInfo: Putting it all together

With the help of the advanced OpenGL information functions, a new Tile based application **OgInfo** has been developed. It serves as an OpenGL information center, supplying all the information, an OpenGL developer (both C/C++ and Tcl) needs.

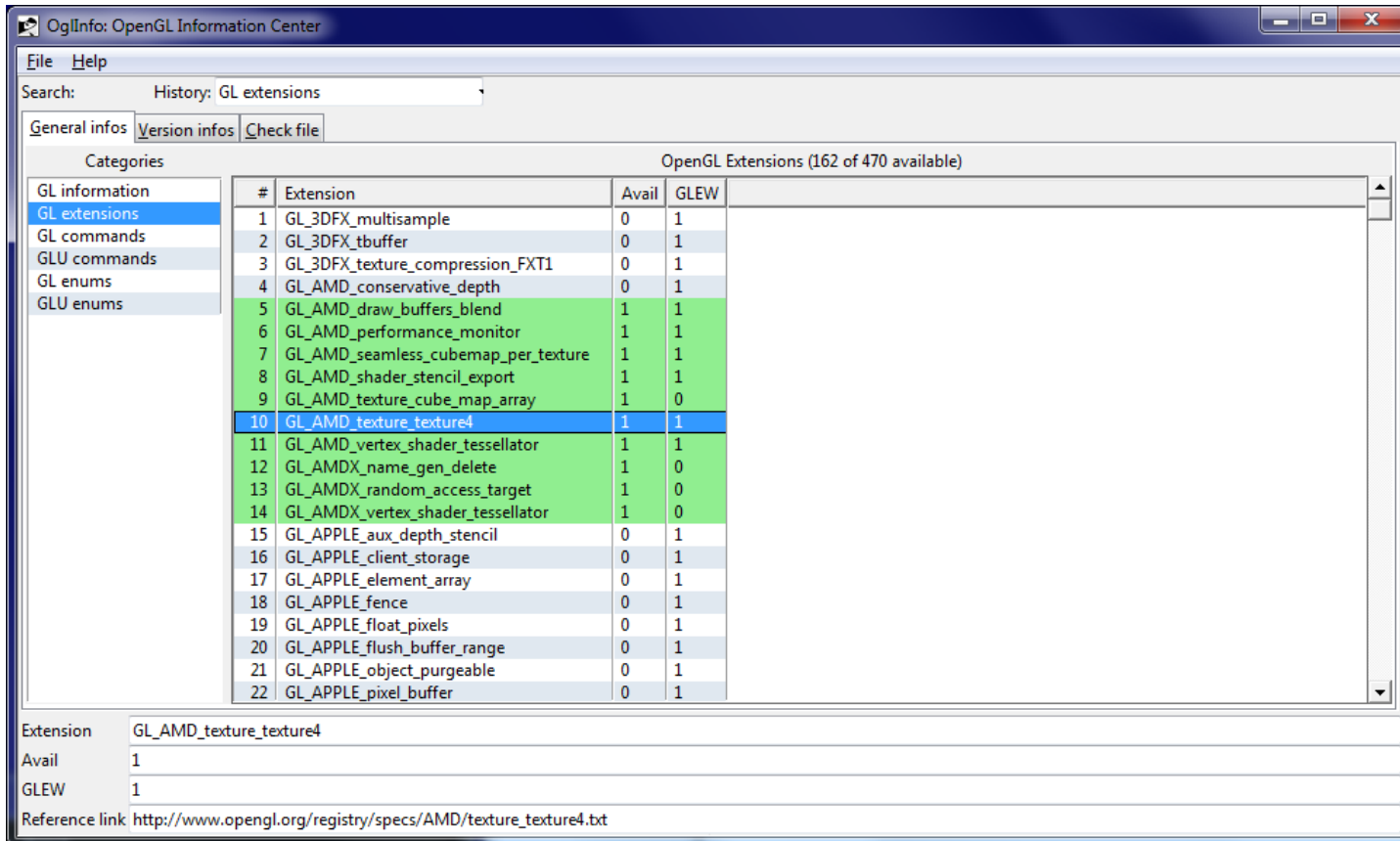


# OgInfo: OpenGL extensions

## List of all OpenGL extensions.

The following information about each extension is provided:

- Information about availability on current hardware
- Extension is wrapped by GLEW



The screenshot shows the 'OgInfo: OpenGL Information Center' window. The search bar contains 'History: GL extensions'. The 'Version infos' tab is selected. The main area displays a table of OpenGL extensions (162 of 470 available). The table has columns for '#', 'Extension', 'Avail', and 'GLEW'. The extension 'GL\_AMD\_texture\_texture4' is highlighted in blue, and its details are shown in the bottom panel.

#	Extension	Avail	GLEW
1	GL_3DFX_multisample	0	1
2	GL_3DFX_tbuffer	0	1
3	GL_3DFX_texture_compression_FXT1	0	1
4	GL_AMD_conservative_depth	0	1
5	GL_AMD_draw_buffers_blend	1	1
6	GL_AMD_performance_monitor	1	1
7	GL_AMD_seamless_cubemap_per_texture	1	1
8	GL_AMD_shader_stencil_export	1	1
9	GL_AMD_texture_cube_map_array	1	0
10	GL_AMD_texture_texture4	1	1
11	GL_AMD_vertex_shader_tessellator	1	1
12	GL_AMDX_name_gen_delete	1	0
13	GL_AMDX_random_access_target	1	0
14	GL_AMDX_vertex_shader_tessellator	1	0
15	GL_APPLE_aux_depth_stencil	0	1
16	GL_APPLE_client_storage	0	1
17	GL_APPLE_element_array	0	1
18	GL_APPLE_fence	0	1
19	GL_APPLE_float_pixels	0	1
20	GL_APPLE_flush_buffer_range	0	1
21	GL_APPLE_object_purgeable	0	1
22	GL_APPLE_pixel_buffer	0	1

Extension: GL\_AMD\_texture\_texture4  
Avail: 1  
GLEW: 1  
Reference link: [http://www.opengl.org/registry/specs/AMD/texture\\_texture4.txt](http://www.opengl.org/registry/specs/AMD/texture_texture4.txt)



# OgInfo: OpenGL commands

## List of all OpenGL core and extension functions.

The following information about each function is provided:

- Availability on current hardware
- Corresponding OpenGL version or extension
- Deprecated since OpenGL version
- Signature of function
- URL of official documentation page

OgInfo: OpenGL Information Center

Search: glBegin History: GL commands

General info | **Version info** | Check file

Categories: OpenGL commands (1360 of 2087 available)

GL information	#	Command	Avail	OGL/Ext	Deprecated	Signature
GL extensions	9	glAlphaFragmentOp2ATI	1	GL_ATI_fragment_shader	0.0	void glAlphaFragmentOp2ATI
<b>GL commands</b>	10	glAlphaFragmentOp3ATI	1	GL_ATI_fragment_shader	0.0	void glAlphaFragmentOp3ATI
GLU commands	11	glAlphaFunc	1	GL_VERSION_1_1	3.1	void glAlphaFunc
GL enums	12	glApplyTextureEXT	0	GL_EXT_light_texture	0.0	void glApplyTextureEXT
GLU enums	13	glAreProgramsResidentNV	0	GL_NV_vertex_program	0.0	GLboolean glAreProgramsResidentNV
	14	glAreTexturesResident	1	GL_VERSION_1_1	3.1	GLboolean glAreTexturesResident
	15	glAreTexturesResidentEXT	1	GL_EXT_texture_object	0.0	GLboolean glAreTexturesResidentEXT
	16	glArrayElement	1	GL_VERSION_1_1	3.1	void glArrayElement
	17	glArrayElementEXT	1	GL_EXT_vertex_array	0.0	void glArrayElementEXT
	18	glArrayObjectATI	0	GL_ATI_vertex_array_object	0.0	void glArrayObjectATI
	19	glAsyncMarkerSGIX	0	GL_SGIX_async	0.0	void glAsyncMarkerSGIX
	20	glAttachObjectARB	1	GL_ARB_shader_objects	0.0	void glAttachObjectARB
	21	glAttachShader	1	GL_VERSION_2_0	0.0	void glAttachShader
	<b>22</b>	<b>glBegin</b>	<b>1</b>	<b>GL_VERSION_1_1</b>	<b>3.1</b>	<b>void glBegin (GLenum mode)</b>
	23	glBeginConditionalRender	1	GL_VERSION_3_0	0.0	void glBeginConditionalRender
	24	glBeginConditionalRenderNV	1	GL_NV_conditional_render	0.0	void glBeginConditionalRenderNV
	25	glBeginFragmentShaderATI	1	GL_ATI_fragment_shader	0.0	void glBeginFragmentShaderATI
	26	glBeginOcclusionQueryNV	0	GL_NV_occlusion_query	0.0	void glBeginOcclusionQueryNV

Command: glBegin

Avail: 1

OGL/Ext: GL\_VERSION\_1\_1

Deprecated: 3.1

Signature: void glBegin (GLenum mode)

Reference link: <http://www.opengl.org/sdk/docs/man/xhtml/glBegin.xml>

# OgInfo: OpenGL enumerations

## List of all OpenGL core and extension enumerations.

The following information about each enumeration is provided:

- Decimal value
- Hexadecimal value
- Corresponding OpenGL version or extension

The screenshot shows the 'OgInfo: OpenGL Information Center' application window. The 'General info' tab is selected, and the 'GL enums' category is chosen from the left sidebar. The main area displays a table of 3960 OpenGL enumerations. The table has columns for '#', 'Enumeration', 'Value (Dez.)', 'Value (Hex.)', and 'OGL/Ext'. The row for 'GL\_COMPRESSED\_RGB\_ARB' is highlighted in blue. Below the table, a detailed view for the selected enumeration is shown, including its value in decimal (34029) and hexadecimal (84ED), and the corresponding OGL/Ext string (GL\_ARB\_texture\_compression). A reference link is also provided at the bottom.

#	Enumeration	Value (Dez.)	Value (Hex.)	OGL/Ext
570	GL_COMPRESSED_RED	33317	8225	GL_VERSION_3_0
571	GL_COMPRESSED_RED_GREEN_RGTC2_EXT	36285	8DBD	GL_EXT_texture_compression_rgtc
572	GL_COMPRESSED_RED_RGTC1	36283	8DBB	GL_ARB_texture_compression_rgtc
573	GL_COMPRESSED_RED_RGTC1_EXT	36283	8DBB	GL_EXT_texture_compression_rgtc
574	GL_COMPRESSED_RG	33318	8226	GL_VERSION_3_0
575	GL_COMPRESSED_RGB	34029	84ED	GL_VERSION_1_3
576	GL_COMPRESSED_RGBA	34030	84EE	GL_VERSION_1_3
577	GL_COMPRESSED_RGBA_ARB	34030	84EE	GL_ARB_texture_compression
578	GL_COMPRESSED_RGBA_BPTC_UNORM_ARB	36492	8E8C	GL_ARB_texture_compression_bptc
579	GL_COMPRESSED_RGBA_FXT1_3DFX	34481	86B1	GL_3DFX_texture_compression_FXT1
580	GL_COMPRESSED_RGBA_S3TC_DXT1_EXT	33777	83F1	GL_EXT_texture_compression_dxt1
581	GL_COMPRESSED_RGBA_S3TC_DXT3_EXT	33778	83F2	GL_EXT_texture_compression_s3tc
582	GL_COMPRESSED_RGBA_S3TC_DXT5_EXT	33779	83F3	GL_EXT_texture_compression_s3tc
583	GL_COMPRESSED_RGB_ARB	34029	84ED	GL_ARB_texture_compression
584	GL_COMPRESSED_RGB_BPTC_SIGNED_FLOAT_ARB	36494	8E8E	GL_ARB_texture_compression_bptc
585	GL_COMPRESSED_RGB_BPTC_UNSIGNED_FLOAT_ARB	36495	8E8F	GL_ARB_texture_compression_bptc
586	GL_COMPRESSED_RGB_FXT1_3DFX	34480	86B0	GL_3DFX_texture_compression_FXT1
587	GL_COMPRESSED_RGB_S3TC_DXT1_EXT	33776	83F0	GL_EXT_texture_compression_dxt1
588	GL_COMPRESSED_RG_RGTC2	36285	8DBD	GL_ARB_texture_compression_rgtc
589	GL_COMPRESSED_SIGNED_LUMINANCE_ALPHA_LATC1_EXT	35055	8C73	GL_EXT_texture_compression_latc

Enumeration: GL\_COMPRESSED\_RGB\_ARB  
Value (Dez.): 34029  
Value (Hex.): 84ED  
OGL/Ext: GL\_ARB\_texture\_compression  
Reference link: [http://www.opengl.org/registry/specs/ARB/texture\\_compression.txt](http://www.opengl.org/registry/specs/ARB/texture_compression.txt)

# OgInfo: OpenGL versions

## List of all OpenGL versions and extensions.

The following information about each version/extension is provided:

- List of corresponding functions
- List of corresponding enumerations

The screenshot shows the 'OgInfo: OpenGL Information Center' application. The search bar contains 'History: GL\_ARB\_vertex\_shader'. The 'Version infos' tab is active, displaying a list of OpenGL extensions on the left and a table of commands for 'GL\_ARB\_vertex\_shader' on the right. Below the table, there is a section for 'Enums of GL\_ARB\_vertex\_shader' with another table. At the bottom, a detailed view for the command 'glGetAttribLocationARB' is shown.

#	Command	Avail	OGL/Ext	Deprecated	Signature
1	glBindAttribLocationARB	1	GL_ARB_vertex_shader	0.0	void glBindAttribLocationARB (GLhandleARB programObj, GLuint index, const GLcharARB* name)
2	glGetActiveAttribARB	1	GL_ARB_vertex_shader	0.0	void glGetActiveAttribARB (GLhandleARB programObj, GLuint index, GLsizei maxNameLength, GLsizei maxInfoLength, GLcharARB* name, GLenum dataType, GLint* size)
3	glGetAttribLocationARB	1	GL_ARB_vertex_shader	0.0	GLint glGetAttribLocationARB (GLhandleARB programObj, const GLcharARB* name)

#	Enumeration	Value (Dez.)	Value (Hex.)	OGL/Ext
1	GL_ARB_vertex_shader	1	1	GL_ARB_vertex_shader
2	GL_MAX_COMBINED_TEXTURE_IMAGE_UNITS_ARB	35661	8B4D	GL_ARB_vertex_shader
3	GL_MAX_VARYING_FLOATS_ARB	35659	8B4B	GL_ARB_vertex_shader
4	GL_MAX_VERTEX_TEXTURE_IMAGE_UNITS_ARB	35660	8B4C	GL_ARB_vertex_shader
5	GL_MAX_VERTEX_UNIFORM_COMPONENTS_ARB	35658	8B4A	GL_ARB_vertex_shader
6	GL_OBJECT_ACTIVE_ATTRIBUTES_ARB	35721	8B89	GL_ARB_vertex_shader

Command: glGetAttribLocationARB  
Avail: 1  
OGL/Ext: GL\_ARB\_vertex\_shader  
Deprecated: 0.0  
Signature: GLint glGetAttribLocationARB (GLhandleARB programObj, const GLcharARB\* name)  
Reference link: [http://www.opengl.org/registry/specs/ARB/vertex\\_shader.txt](http://www.opengl.org/registry/specs/ARB/vertex_shader.txt)

# OgInfo: Export functionality

All tables can be exported as CSV files for further inspection with a spreadsheet program.

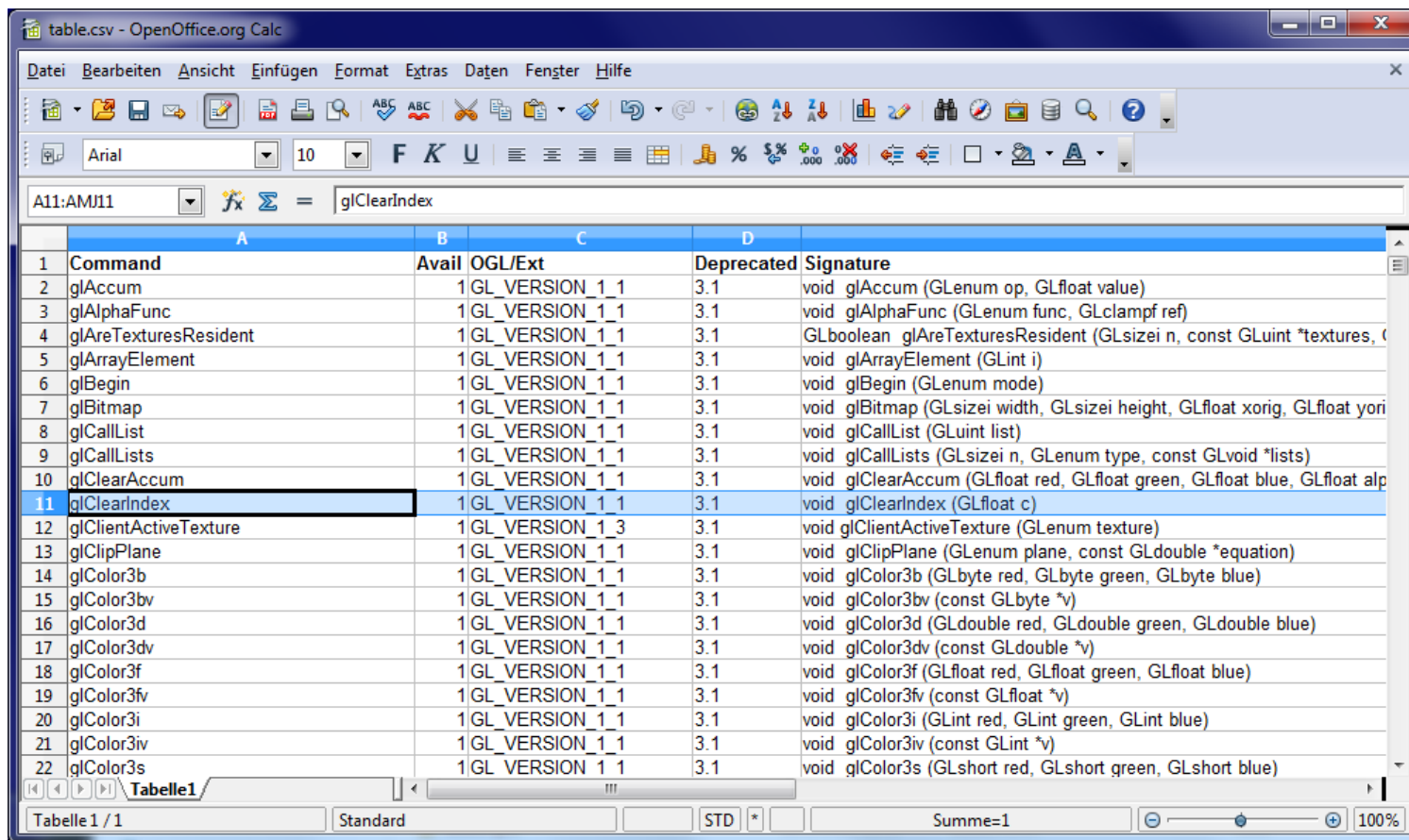
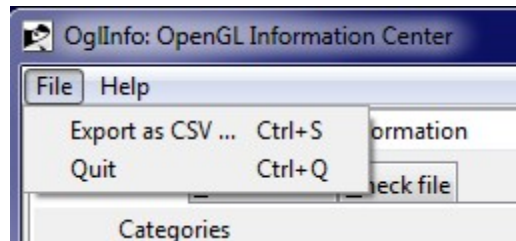


table.csv - OpenOffice.org Calc

Datei Bearbeiten Ansicht Einfügen Format Extras Daten Fenster Hilfe

A11:AMJ11 = glClearColor

	A	B	C	D	E
1	Command	Avail	OpenGL/Ext	Deprecated	Signature
2	glAccum	1	GL_VERSION_1_1	3.1	void glAccum (GLenum op, GLfloat value)
3	glAlphaFunc	1	GL_VERSION_1_1	3.1	void glAlphaFunc (GLenum func, GLclampf ref)
4	glAreTexturesResident	1	GL_VERSION_1_1	3.1	GLboolean glAreTexturesResident (GLsizei n, const GLuint *textures, GLboolean *residences)
5	glArrayElement	1	GL_VERSION_1_1	3.1	void glArrayElement (GLint i)
6	glBegin	1	GL_VERSION_1_1	3.1	void glBegin (GLenum mode)
7	glBitmap	1	GL_VERSION_1_1	3.1	void glBitmap (GLsizei width, GLsizei height, GLfloat xorig, GLfloat yorig, GLint xdest, GLint ydest)
8	glCallList	1	GL_VERSION_1_1	3.1	void glCallList (GLuint list)
9	glCallLists	1	GL_VERSION_1_1	3.1	void glCallLists (GLsizei n, GLenum type, const GLvoid *lists)
10	glClearAccum	1	GL_VERSION_1_1	3.1	void glClearAccum (GLfloat red, GLfloat green, GLfloat blue, GLfloat alpha)
11	glClearColor	1	GL_VERSION_1_1	3.1	void glClearColor (GLfloat c)
12	glClientActiveTexture	1	GL_VERSION_1_3	3.1	void glClientActiveTexture (GLenum texture)
13	glClipPlane	1	GL_VERSION_1_1	3.1	void glClipPlane (GLenum plane, const GLdouble *equation)
14	glColor3b	1	GL_VERSION_1_1	3.1	void glColor3b (GLbyte red, GLbyte green, GLbyte blue)
15	glColor3bv	1	GL_VERSION_1_1	3.1	void glColor3bv (const GLbyte *v)
16	glColor3d	1	GL_VERSION_1_1	3.1	void glColor3d (GLdouble red, GLdouble green, GLdouble blue)
17	glColor3dv	1	GL_VERSION_1_1	3.1	void glColor3dv (const GLdouble *v)
18	glColor3f	1	GL_VERSION_1_1	3.1	void glColor3f (GLfloat red, GLfloat green, GLfloat blue)
19	glColor3fv	1	GL_VERSION_1_1	3.1	void glColor3fv (const GLfloat *v)
20	glColor3i	1	GL_VERSION_1_1	3.1	void glColor3i (GLint red, GLint green, GLint blue)
21	glColor3iv	1	GL_VERSION_1_1	3.1	void glColor3iv (const GLint *v)
22	glColor3s	1	GL_VERSION_1_1	3.1	void glColor3s (GLshort red, GLshort green, GLshort blue)

Tabelle1 / 1 Standard STD \* Summe=1 100%

# OgInfo: History

All visited tables are held in a history for easy re-access.

The screenshot shows the OgInfo: OpenGL Information Center window. The 'History' list on the left contains the following entries:

- GL\_SUN\_slice\_accum
- GL\_SUN\_global\_alpha
- GL\_SUN\_mesh\_array
- GL\_SUN\_triangle\_list
- GL\_VERSION\_2\_0
- GL\_VERSION\_4\_0
- GL\_VERSION\_3\_3
- GL\_VERSION\_3\_2
- GL\_VERSION\_3\_1
- GL\_VERSION\_3\_0
- GL\_VERSION\_1\_2
- GL\_VERSION\_1\_3
- GL\_VERSION\_1\_4
- GL\_VERSION\_1\_5
- GL\_VERSION\_2\_1
- GL\_VERSION\_3\_1
- GL\_VERSION\_3\_2
- GL\_VERSION\_3\_3
- GL\_VERSION\_4\_0
- GL\_WIN\_phong\_shading
- GL\_WIN\_specular\_fog
- GL\_WIN\_swap\_hint

The main content area displays the 'Commands of GL\_SUN\_slice\_accum (0 of 0 available)' table, which is currently empty. Below it, the 'Enums of GL\_SUN\_slice\_accum (2 enumerations)' table is shown:

#	Enumeration	Value (Dez.)	Value (Hex.)	OGL/Ext
1	GL_SLICE_ACCUM_SUN	34252	85CC	GL_SUN_slice_accum
2	GL_SUN_slice_accum	1	1	GL_SUN_slice_accum

At the bottom of the window, there are input fields for the following information:

- Enumeration
- Value (Dez.)
- Value (Hex.)
- OGL/Ext
- Reference link

# OgInfo: Deprecation check (1)

OpenGL source files can be loaded into a text widget.

The following information about the file is provided:

- List of corresponding functions
- List of corresponding enumerations

Search: History: GL\_SUN\_slice\_accum

General infos | Version infos | Check file

t/tcl3d/demos/TutorialsAndBooks/NeHe/Lesson24/Lesson24.t ✓ Open ... Check

Commands of Lesson24.tcl (31 of 31 available)

#	Command	Avail	OGL/Ext	Deprecated	Signature
7	glGenLists	1	GL_VERSION_1_1	3.1	GLuint glGenLists(GLsizei n, GLuint* lists)
8	glListBase	1	GL_VERSION_1_1	3.1	void glListBase(GLint list, GLint first, GLsizei numLists)
9	glLoadIdentity	1	GL_VERSION_1_1	3.1	void glLoadIdentity(void)
10	glMatrixMode	1	GL_VERSION_1_1	3.1	void glMatrixMode(GLenum mode)
11	glNewList	1	GL_VERSION_1_1	3.1	void glNewList(GLint list, GLenum mode)
12	glOrtho	1	GL_VERSION_1_1	3.1	void glOrtho(GLdouble left, GLdouble right, GLdouble bottom, GLdouble top, GLdouble front, GLdouble back)
13	glScalef	1	GL_VERSION_1_1	3.1	void glScalef(GLfloat x, GLfloat y, GLfloat z)
14	glShadeModel	1	GL_VERSION_1_1	3.1	void glShadeModel(GLenum mode)
15	glTexCoord2f	1	GL_VERSION_1_1	3.1	void glTexCoord2f(GLfloat s, GLfloat t)
16	glTranslated	1	GL_VERSION_1_1	3.1	void glTranslated(GLdouble x, GLdouble y, GLdouble z)
17	glVertex2d	1	GL_VERSION_1_1	3.1	void glVertex2d(GLdouble x, GLdouble y)
18	glVertex2i	1	GL_VERSION_1_1	3.1	void glVertex2i(GLint x, GLint y)
19	glBindTexture	1	GL_VERSION_1_1	0.0	void glBindTexture(GLenum target, GLuint texture)
20	glClear	1	GL_VERSION_1_1	0.0	void glClear(GLbitfield mask)

Enums of Lesson24.tcl (15 enumerations)

#	Enumeration	Value (Dec.)	Value (Hex.)	OGL/Ext
1	GL_COLOR_BUFFER_BIT	16384	4000	GL_VERSION_1_1

Command: glScalef  
Avail: 1  
OGL/Ext: GL\_VERSION\_1\_1  
Deprecated: 3.1  
Signature: void glScalef (GLfloat x, GLfloat y, GLfloat z)  
Reference link: <http://www.opengl.org/sdk/docs/man/xhtml/glScale.xml>

# OgInfo: Deprecation check (2)

The checked files can be Tcl or C/C++ files.

Search: History: GL\_SUN\_slice\_accum

General infos Version infos Check file

t/tcl3d/demos/TutorialsAndBooks/Nopper/Example10/main.c ✓ Open ... Check

Commands of main.c (27 of 27 available)

#	Command	Avail	OGL/Ext	Deprecate
1	glBindBuffer	1	GL_VERSION_1_5	0.0
2	glBindFragDataLocation	1	GL_VERSION_3_0	0.0
3	glBindTexture	1	GL_VERSION_1_1	0.0
4	glBindVertexArray	1	GL_ARB_vertex_array_object	0.0
5	glBufferData	1	GL_VERSION_1_5	0.0
6	glClear	1	GL_VERSION_1_1	0.0
7	glClearColor	1	GL_VERSION_1_1	0.0
8	glClearDepth	1	GL_VERSION_1_1	0.0
9	glDeleteBuffers	1	GL_VERSION_1_5	0.0

Enums of main.c (9 enumerations)

#	Enumeration	Value (Dez.)	Value (Hex.)	OGL/Ext
1	GL_COLOR_BUFFER_BIT	16384	4000	GL_VERSION_1_1
2	GL_CULL_FACE	2884	B44	GL_VERSION_1_1
3	GL_DEPTH_BUFFER_BIT	256	100	GL_VERSION_1_1
4	GL_DEPTH_TEST	2929	B71	GL_VERSION_1_1
5	GL_LINEAR	9729	2601	GL_VERSION_1_1
6	GL_REPEAT	10497	2901	GL_VERSION_1_1

Command: glClearColor  
Avail: 1  
OGL/Ext: GL\_VERSION\_1\_1  
Deprecated: 0.0  
Signature: void glClearColor(GLclampf red, GLclampf green, GLclampf blue, GLclampf alpha)  
Reference link: <http://www.opengl.org/sdk/docs/man/xhtml/glClearColor.xml>

# OpenGL improvements: Summary

Wrapped OpenGL version is up-to-date: 3.3 and 4.0.

Usage of modern OpenGL (i.e. using no deprecated functions) is possible due to replacement functions and has been shown with some OpenGL 3.2 demos.

Advanced OpenGL information is available as library procedures and as a standalone Tcl application.

A new version of Tcl3D will be available in the near future.

This version will require at least Tcl/Tk 8.5, due to the usage of dicts and ttk widgets.