

No More Reinventing the Virtual Wheel: Middleware for Computer Games and Interactive Computer Graphics

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The lists below present a partial survey of Open Source and easily accessible middleware available for interactive graphics and games that we have found to be particularly useful for games and graphics education.

1. Graphics Middleware

1.1. Rendering Context

	platform	bindings	restrictions	licence
GLUT	many (incl. Linux, Windows)	C/C++, Fortran, ADA	-	Free
GLFW	Windows, Linux, Mac OS X, FreeBSD	C/C++, D, Delphi, Lua, Visual Basic, MASM32	-	Open Source
SDL	many (incl. Linux, Windows)	many (incl. C/C++, C#, Java)	-	Open Source / Other

1.2. Graphical User Interfaces

1.2.1. Native GUIs

	platform	bindings	restrictions	licence
GTK+	Windows, Linux, Mac OS X	many (incl. C/C++, C#, Java)	requires separate extension for 3D rendering context	Open Source
FLTK	Windows, Linux, Mac OS X	many (incl. Lua, C/C++, Python)	-	Open Source
wxWidgets	Windows, Linux, Mac OS X	many (incl. C/C++, Python)	-	Open Source
QT	many (incl. Linux, Windows)	many (incl. C/C++, C#, Java)	-	Open Source / Other

1.2.2. In-Application GUIs

	platform	bindings	restrictions	licence
CEGUI	Windows, Linux, Mac OS	C/C++, C#	requires separate input library	Open Source (LGPL / MIT)
GiGi	Windows, Linux	C/C++	OpenGL only	Open Source

1.3. Image Loading

	platform	bindings	restrictions	licence
DevIL	Windows, Linux, Mac OS X	C/C++, Delphi, Visual Basic	-	Open Source
FreeImage	Windows, Linux, Mac OS X	C, C++, C#	-	Open Source
ImageMagick	Windows, Linux, Mac OS X	many (incl. C, C++, C#, Java)	-	Open Source

1.4. 3D Model Loader

	platform	bindings	restrictions	licence
Assimp	Windows, Linux	C/C++, D, BLITZMAX, others planned	-	Open Source

1.5. High-Level Graphics and Visualisation

1.5.1. Scene Graphs

	platform	bindings	restrictions	licence
OSG	many (incl. Linux, Windows)	C/C++, Java, Lua, Python	-	Open Source
Visualization Library	Windows, Linux, Mac OS X	C/C++	-	Open Source / Other

1.5.2. Game Rendering Engines

	platform	bindings	restrictions	licence
OGRE	Windows, Linux, Mac OS X	C/C++, Java, Python, C#	-	Open Source / Other (LGPL/MIT)
Horde3D	Windows, Linux, Mac OS X	C/C++, C#, D, Lua, Python	requires OpenGL 2 or better	Open Source

2. Games Specific Middleware

2.1. Physics

	platform	bindings	restrictions	licence
ODE	many (incl. Linux, Windows, Mac OS X)	C/C++	-	Open Source (BSD/LGPL)
Newton Game Dynamics	Windows, Linux, Mac OS X, iPhone	C/C++	-	Proprietary
Bullet	many (incl. Linux, Windows)	C/C++	-	Open Source (ZLib)
Havok	Windows	C/C++		Free (non-commercial use) / Other

2.2. Sound

	platform	bindings	restrictions	licence
FMOD	many (incl. Linux, Windows)	C/C++	-	Free (non-commercial use) / Other
BASS	Windows, Linux, Mac OS X, iPhone	C/C++, Delphi, Visual Basic, C#, MASM32, Java	-	Free (non-commercial use) / Other
OpenAL	many (incl. Linux, Windows)	C/C++	requires separate audio file loader	Open Source / Other

2.3. Scripting

	platform	bindings	restrictions	licence
TinyXML	many (incl. Linux, Windows)	C++	-	Open Source
Lua	many (incl. Linux, Windows)	many (incl. C/C++, Java)	-	Open Source

Python	many (incl. Linux, Windows)	many (incl. C/C++, Java)	-	Open Source
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2.4. Networking

	platform	bindings	restrictions	licence
RakNet	Windows, Linux, Mac OS X, iPhone	C/C++	-	Free (non-commercial use) / Other
ENet	Windows, Linux	C/C++	-	Open Source