

Virtools™ 4



Comprehensive *Life Platform* for Creating Highly Interactive 3D Applications

Virtools™ 4: Dedicated 3D for All Platform



The Virtools™ 4 Life Platform ushers in a unique solution for pervasively developing and deploying 3D experiences on personal computers, game consoles, Intranets and the web, demonstrating Dassault Systèmes' commitment to bringing the power of 3D to all user communities.

The open-ended architecture of Virtools 4 supports a wide variety of 3D formats. 3D Content Capture plugins support most commonly used DCC software formats (3ds Max®, Maya®, XSI®, Lightwave®, Collada®) for importing/exporting 3D XML files, making real-time 3D technology easily available.

Now based on the new Product-Context-Scenario (PCS) paradigm, Virtools 4 allows users to imagine, share and experience highly interactive 3D content. This new paradigm represents a highly intuitive means of capturing the 3D experience and easily mapping product behavior, along with contextual environment scenarios. With PCS, the Virtools 4 Life Platform enables easy development of virtual experiences such as driving, shopping, product use, maintenance and marketing tests. Virtools 4 also

extends the range of target environments for deploying 3D experiences: Microsoft™ Windows® and Apple™ MacOS® computers, Microsoft™ Xbox® and Sony™ PSP® game consoles, Intranets via 3D Office and 3D XE Players, Internet via the 3D Life Player, as well as immersive environments via the VR Library. This broad scope highlights the diversity of potential deployment options and provides a large range of communities with a powerful solution to create and experience life content.

Cutting-Edge Technology at Your Fingertips

Virtools' unique and proven development system considers 3D objects as individual components, independent of the data associated with them. The resulting architecture is extremely flexible, allowing developers to attribute modular behaviors to objects and manage them easily and efficiently.

Developers drag and drop behaviors in an intuitive graphical user interface to create complex applications with the high-quality graphics and interactivity found in top-selling games. For high-end developers, the Software Development Kit (SDK) and the Virtools Scripting Language (VSL) available with Virtools 4 lets them create custom behaviors and access the API.

With Virtools, a single graphical user interface opens the door to specific advanced add-on modules such as sophisticated Physics, Artificial Intelligence, and advanced Multiuser capacities, not to mention integration and use of 3rd party technologies.

Virtools 4 integrates a powerful render engine that lets developers make the most of stunning visual effects and advanced rendering techniques (Shaders 3.0, HLSL and CgFX, DX 9.c and OpenGL 2.0).

Key Features

- Programming system based on separation of objects, data and behaviors, and applications created by assembling objects to behaviors
- Intuitive user interface with real time visualization window and graphical programming
- Cutting-edge rendering with Programmable Vertex and Pixel Shaders
- Highly intuitive PCS model for creating highly interactive life-like experience
- Multi-tiered programming with Virtools Scripting Language or the Virtools C++ SDK for easy implementation of customized functions, custom devices, custom 2D and 3D formats and 3rd party technologies

Ensured Time-To-Market, Higher ROI And Reduced Development Risks

By separating objects from the data and behaviors applied to them, developers using Virtools 4 can more economically develop various application modules simultaneously, further shortening time-to-market. Development time is further reduced thanks to Virtools' library of over 450 reusable behavior building blocks.

Virtools' multi-tiered access (graphical user interface, VSL, SDK) enables both non-technical designers and high-end programmers to assemble the sophisticated behaviors needed to create rich interactivity. Applications grow more complex while scripts remain easy to manage. What previously required over a year of development time can now be accomplished in a matter of months.

By using Virtools 4, companies can now bring together a balanced team of designers and hard-core programmers, all working with Virtools 4 as a single hub to create high-powered technical applications that deliver compelling interactive content. By dramatically optimizing the development of interactive 3D applications with Virtools 4, our clients clearly minimize their production costs.

With Virtools 4, corporate developers, game studios, web agencies and system integrators also reduce development risks usually associated with creating 3D highly interactive applications. Virtools' iterative development process lets production teams move forward together. Usability can be tested throughout the development process and the reusability of Virtools building blocks means developers can optimize workflow for future projects.



Virtools 4

Virtools 4 includes five key components: the Graphical User Interface to develop sophisticated applications by visually assembling objects and behaviors, the Behavior Engine to run interactive applications, the Render Engine to render graphics in real-time, the Virtools Scripting Language to create low level specific functions without any C++ line and the SDK to create custom behaviors.

The User Interface

The Virtools 4 graphical user interface is used throughout every stage of development. It includes:

- A 3D Layout to display content in a real-time environment.
- Graphical tools for navigating, creating, editing, selecting and manipulating 3D objects, lights, cameras and curves.
- Creating and editing lights, cameras, materials, textures, grids and paths.
- Translation, rotation, scaling of 3D entities and navigation within the virtual environment.
- Drag-and-drop of behaviors onto 2D and 3D objects.
- Creation of new, reusable behaviors by graphically combining existing ones.
- A Schematic View to graphically assemble and fine-tune behavior building blocks for creation of interactive content.
- A Script Debugger to fine-tune applications.
- Entity Setup Tools to edit the parameters of any object that has associated behaviors.
- An Attribute Manager for quick visualization and modification of attribute values for multiple objects.
- An Action Manager to create scripts for frequently used functions, which performs a predefined task on a selection or parameter and accesses them in just a few keystrokes.
- A Hierarchy Manager to display a tree view of all the objects present in any level.

Virtools Scripting Language (VSL)

The Virtools Scripting Language is a powerful scripting language that complements the Virtools 4 Schematic editor and the Virtools SDK with an intelligent coloring system, context-sensitive completion and function arguments display. VSL scripts can be processed at run-time or in Author mode.

VSL offers full debugging mode with breakpoint support, variables with value editing that can be monitored, and step by step debugging (also step into/out support).

The Behavior Engine

The behavior engine runs both custom and out-of-the-box behaviors. Virtools 4 includes standard behaviors in the following categories: Cameras, Characters, Collisions, Controllers, Grids, Interface, Lights, Logics, Materials-Textures, Mesh modifications, Narratives, Optimizations, Particles, Sounds, Shaders, Visuals, Web, World Environments and more.

The Virtools Behavior Library can be extended with custom behaviors developed with the SDK, with the Behavior Pack or with third-party behaviors created by the Virtools user community.

The Render Engine

The render engine provides high-quality, real-time rendering of 3D images and animations. It includes the following features:

- Support for key industry standards: DirectX and OpenGL.
- Support for programmable Vertex and Pixel Shaders (DX9.c, OpenGL 2.0, HLSL, CgFX, Shader Model 3)
- Support for 3D modeling objects and animation from 3ds Max®, Maya®, XSI®, Lightwave® and Collada®.
- Optional access to render engine source code.

The Software Development Kit (SDK)

The Virtools SDK is a suite of development tools (libraries, DLLs, header files) that provide access to all the low-level functionality used by Virtools software. Developers can write the following application components:

- Custom application executables using the Virtools engines as underlying technology.
- Extensions to the Virtools engines such as Behaviors, Media Importer, Manager, Render Engines Plugins, Rasterizers and Extension Plugins (specific Parameter Types).

Open Architecture

Virtools offers an open and flexible architecture that is compatible with the following standard technology formats:

- 3D files: 3D XML, 3ds Max®, Maya®, XSI®, Lightwave®, Collada®.
- Images: JPG, PNG, TIFF, TGA, BMP, PCX.
- Sounds: MP3, WMA, WAV, MIDI.

Technical Requirements

Hardware

- Pentium III or equivalent
- 1Gigabyte (GB) of RAM
- DVD ROM drive
- Monitor capable of displaying 1024 by 768 in 16 bit color (65536 color/Hi-color)
- Pointing device (mouse, trackball...)
- Direct3D or OpenGL compatible 3D graphic card with 128 MB of RAM
- DirectSound compatible sound card (not a requirement but recommended)
- You should ensure you have the latest official drivers for your graphics card

Software

- Microsoft Windows (2000, XP)
- Microsoft DirectX 9.0C for DirectX compatible 3D graphic accelerator cards
- For OpenGL, an OpenGL 2.0 compatible graphics card and driver
- Microsoft Internet Explorer 6.0 (for the Online Reference)