Rhino 6 Features

Overview

Rhino can create, edit, analyze, document, render, animate, and translate NURBS* curves, surfaces, and solids, point clouds, and polygon meshes. There are no limits on complexity, degree, or size beyond those of your hardware.

Special features include:

- **Uninhibited** free-form 3D modeling tools like those found only in products costing 20 to 50 times more. Model any shape you can imagine.
- **Accuracy** needed to design, prototype, engineer, analyze, and manufacture anything from an airplane to jewelry.
- **Compatibility** with all your other design, drafting, CAM, engineering, analysis, rendering, animation, and illustration software.
- **Read** and **repair** meshes and extremely challenging **IGES** files.
- **Accessible**. So easy to learn and use that you can focus on design and visualization without being distracted by the software.
- **Fast**, even on an ordinary laptop computer. No special hardware is needed.
- **Development platform** for hundreds of specialty 3D products.
- **Affordable**. Ordinary hardware. Short learning curve. Affordable purchase price. No maintenance fees.

Rhino for Mac
The world's most versatile 3D modeler is now available for OS X. *Learn more...*

New in Rhino 6
The Rhino 6 development process started with the overriding goal to remove as many of your workflow bottlenecks as possible, in addition to making thousands of large and small improvements. That meant making Rhino faster and able to handle much larger models and project teams.

Thanks to thousands of pre-release users, we were able to field test and refine Rhino 6, making it the fastest and most stable version ever.

More details...

Model Creation Tools

Points: points, point clouds, point grid, extract from objects, mark (intersection, divide, draftangle, ends, closest, foci)

Curves: line, polyline, polyline on mesh, free-form curve, circle, arc, ellipse, rectangle, polygon, helix, spiral, conic, TrueType text, point interpolation, control points (vertices), sketch.

Curves from other objects: through points, through polyline, extend, continue curve, fillet, chamfer, offset, blend, arc blend, from 2 views, tween, cross section profiles, intersection, contour on NURBS surface or mesh, section on NURBS surface or mesh, border, silhouette, extract isoparm, extract curvature graph, projection, pullback, sketch,

wireframe, detach trim, 2D drawings with dimensions and text, flatten developable surfaces.

Surfaces: from 3 or 4 points, from 3 or 4 curves, from planar curves, from network of curves, rectangle, deformable plane, extrude, ribbon, rule, loft with tangency matching, developable, sweep along a path with edge matching, sweep along two rail curves with edge continuity, revolve, rail revolve, tween, blend, patch, drape, point grid, heightfield, fillet, chamfer, offset, plane through points, TrueType text, Unicode (double-byte) text.

Solids: box, sphere, cylinder, tube, pipe, cone, truncated cone, pyramid, truncated pyramid, ellipsoid, torus, extrude planar curve, extrude surface, cap planar holes, join surfaces, region, nonmanifold merge, TrueType text, Unicode (double-byte) text.

Meshes: from NURBS surfaces, from closed polyline, mesh face, plane, box, cylinder, cone, and sphere.

Rhino 6 adds dozens of refinements to existing tools and some new commands.

New in Rhino 6...

Editing

General Tools: delete, delete duplicates, join, merge, trim, untrim, split, explode, extend, fillet, chamfer, object properties, history.

Transform Tools: cut, copy, paste, move, rotate, mirror, scale, stretch, align, array, twist, bend, taper, shear, offset, orient, flow along curve, pull, project, boxedit, smash, squish.

Points and curves: control points, edit points, handlebars, smooth, fair, change degree, add/remove knots, add kinks, rebuild, refit, match, simplify, change weight, make periodic, adjust end bulge, adjust seam, orient to edge, convert to arcs, a polyline, or line segments.

Surfaces: control points, handlebars, change degree, add/remove knots, match, extend, merge, join, untrim, split surface by isoparms, rebuild, shrink, make periodic, Boolean (union, difference, intersection), unroll developable surfaces, array along curve on surface.

Solids: fillet edges, extract surface, shell, Booleans (union, difference, intersection).

Meshes: explode, join, weld, unify normals, apply to surface, reduce polygons.

*Editing complex models in **Rhino 6** is fast and easy.*

New in Rhino 6...

Interface

User interface: coordinate read-out, floating/dockable command area, pop-up recently-used commands, clickable command options, auto-complete command line, customizable pop-up commands, pop-up layer manager, synchronize views, camera-based view manipulation, perspective match image, configurable middle mouse button, customizable icons and user workspace, customizable pop-up toolbar, transparent toolbars, context-sensitive right-click menu, multiple monitor support, Alt key copy and OpenGL hardware support with antialiasing.

Construction aids: unlimited undo and redo, undo and redo multiple, exact numeric input, units including feet and inches and fractions, .x, .y, .z point filters, object snaps with identifying tag, grid snaps, ortho, planar, named construction planes, next and previous construction planes, orient construction plane on curve, layers, layer filtering, groups, background bitmaps, object hide/show, show selected objects, select by layer, select front most, color, object type, last object, and previous selection set, swap hidden objects, object lock/unlock, unlock selected objects, control and edit points on/off, and points off for selected objects.

Rhino for Mac takes advantage of the OS X user interface conventions. *Watch the video...*

New in Rhino 6...

Display

Features include extremely fast 3D graphics, unlimited viewports, shaded, working views, perspective working views, named views, floating views, full-screen display, 3D stereo view modes, draw order support, two-point perspective, clipping planes, and one-to-one scale to view models at full size.

New in Rhino 6...

Rendering

High-quality presentations are critical to most design projects.

Features include: Rhino Render, a raytrace render with textures, bumps, highlights, transparency, spotlights with hotspot, angle and direction control, point lights, directional lights, rectangular lights, linear lights, and shadows, and customizable resolution, real-time render preview, real-time render preview selected objects, turntable, export to many common file formats used by renderers, rendering plug-in support, settings saved in file.

New in Rhino 6...

Drafting

Every type of physical product design relies on technical illustration and 2D drawing to concisely communicate ideas, specifications, and instructions to people in design, development, and fabrication. Our goal for Rhino 6 was to make it easier to create 2D drawings and illustrations for every discipline in every notation system and visual style used around the world.

Annotation objects include: arrows, dots, dimensions (horizontal, vertical, aligned, rotated, radial, diameter, angle), text blocks, leaders, hidden line removal, Unicode (double-byte) support for text, dimensions, and notes. *Dimensions in perspective views are supported.*

New in Rhino 6...

Digital Fabrication and 3D Printing

As you may know, the Rhino development project started nearly 20 years ago to provide marine designers with tools for building computer models that could be used to drive the digitally controlled fabrication equipment used in shipyards.

We continue to focus on the fact that designs are only useful once they are built and in the hands of consumers. With the cost of digital fabrication and 3D printing technology dropping quickly, more and more designers now have direct access to 3D digital fabrication equipment.

While we are not experts on all the many fabrication, manufacturing, or construction processes, we do focus on making sure that Rhino models can be accurate enough for and accessible to all the processes involved in a design becoming a reality.

Mesh Tools

Robust mesh import, export, creation, and editing tools are critical to all phases of design, including:

- Transferring captured 3D data from digitizing and scanning into Rhino as mesh models.
- Exchanging mesh data with many applications such as SketchUp and Modo.
- Exporting meshes for analysis and rendering.
- Exporting meshes for prototyping and fabrication.
- Converting NURBS to meshes for display and rendering.

Both new and enhanced mesh tools, plus support for double-precision meshes, accurately represent and display ground forms such as the 3D topography of a large city.

New in Rhino 6...

3D Capture

Capturing existing 3D data is often one of the first steps in a design project. Rhino has always directly supported both 3D digitizing hardware and 3D scanned point cloud data. Rhino 6 now supports:

- **Large point clouds.** 3D scanners have become faster and cheaper, making huge scan files more common. Rhino's **64-bit** support and enhanced support for **graphic co-processors** has made it possible to work with these large point clouds.
- **LIDAR** captures **3D terrain** data for agriculture, archaeology, conservation, geology, land use planning, surveying, transportation, plus wind farm, solar farm, and cell tower deployment optimization. Rhino 6 for Windows has robust support for plug-ins, such as **RhinoTerrain**, that provide specialty tools for these new Rhino users.

3D digitizing support: MicroScribe, FaroArm, and Romer/Cimcore.

New in Rhino 6...

Analysis

Design realization requires high-quality 3D models in every phase of design, presentation, analysis, and fabrication. Rhino 6 includes **new tools** and **enhancements**to help ensure that the 3D models used throughout your process are the highest possible quality.

Analysis: point, length, distance, angle, radius, bounding box, normal direction, area, area centroid, area moments, volume, volume centroid, volume moments, , hydrostatics, surface curvature, geometric continuity, deviation, nearest point, curvature graph on curves and surfaces, naked edges, working surface analysis viewport modes (draft angle, zebra stripe, environment map with surface color blend, show edges, show naked edges, Gaussian curvature, mean curvature, and minimum or maximum radius of curvature).

New in Rhino 6...

Large Projects

File management tools for managing large projects and teams include: Notes, templates, merge files, export selected objects, save small, incremental save, bitmap file preview, Rhino file preview, export with origin point, worksessions (Windows only), blocks, file compression for meshes and preview image, send file via email.

New in Rhino 6...

Compatibility

Rhino is compatible with hundreds of different CAD, CAM, CAE, rendering, and animation products. The **openNURBS** libraries allow hundreds of other applications to read and write Rhino's native 3DM files.

File formats supported...

Developer Tools

- **The world's most robust 3D development platform** for specialty modeling, rendering, analysis, and fabrication tools across a wide variety of disciplines.
- **More accessible development tools**: RhinoCommon (.NET), Grasshopper,Rhino.Python, RhinoScript, the Zoo license manager for plug-ins, and the Rhino Installer Engine are key ingredients.
- **Comprehensive documentation**
- **An active developer community**
- **Open source** more of the Rhino development tools, including Rhino.Python,RhinoCommon, and the 3DM viewer on iOS.
- **Free-of-charge** developer tools, including technical support, marketing support, and training. All of our development tools are available to everyone with a valid Rhino license. No special program registration, contracts, license agreement, or approval is needed.
- **Localization** and translation services are available. *Details...*

Plug-ins: The Rhino SDK exposes most of the internal workings of Rhino, making it possible for third-party developers to create powerful plug-ins and add-ons. A programmer's I/O tool kit with source code is available on openNURBS web site.

Scripting: RhinoScript (VBScript) and Rhino.Python support exposes most of the internal workings of Rhino, making it possible to develop powerful scripts.

New in Rhino 6...

Grasshopper

Grasshopper is a graphical algorithm editor included with Rhino.

Unlike RhinoScript, Rhino.Python, or other programming languages, Grasshopper requires no knowledge of programming or scripting, but still allows developers and designers to develop form generation algorithms without writing code.

New in Rhino 6...

RhinoScript

Features include:

- Multi-document script editor
- On-line help system
- 70+ new functions
- Documentation and examples

***Note**: While RhinoScript is still widely used and supported on Windows, we recommend that users and developers move to Rhino.Python for both Windows and Mac. See below.*

Rhino.Python

Rhino.Python is a powerful scripting language in Rhino on both Windows and Mac. Rhino.Python is built for flexibility and clear syntax.

If you would like to give Rhino.Python a try, explore some of the links on the**Rhino.Python** site.

RhinoCommon .NET Plug-ins

RhinoCommon

- RhinoCommon is the cross-platform .NET plug-in SDK for Rhino
- Available for Rhino for Windows, Rhino for Mac, Rhino.Python, and Grasshopper
- A true .NET style SDK, well organized, and easy to learn
- Improved documentation *Details...*

C++ Plug-ins

- Microsoft Visual C++ 2017 for 64-bit Rhino 6
- Plug-in wizard creates multi-targeted projects for easy project and platform support
- Dozens of SDK additions and enhancements to help create more powerful plug-ins
- Renderer Development Kit (RDK) now integrated with SDK

- Documentation
- Samples

Renderer Development Kit

The RDK includes a rich set of functionality for renderer developers.

Language support

- Support for C++, RhinoCommon and RhinoScript

Materials

- Define custom material types that fully integrate into the Rhino material editor
- Leave all of the material management, assignment, storage, and viewport representation to Rhino
- Built-in support for HDR, bitmap, and procedural textures
- Automate material creation and assignment

Environments

- Define custom environment types that fully integrate into the Rhino environment editor
- Leave assignment, storage, and viewport representation to Rhino
- Support multiple environment switching
- Automate environment creation and switching

Textures

- Define custom texture types that fully integrate into the Rhino material, environment, and texture editors
- Define procedural textures that can work across multiple renderers
- Use built-in optimized procedural primitives to build complex textures
- Procedural textures are rendered into the viewport using Advanced Texture Preview

Built-in Render Window

- Rhino Render Window complete with tone operators, post-effects, multiple channel support, recall of recent renders, built-in zooming, support for HDR output, and window cloning
- Support for asynchronous modeless rendering
- Customize the render window with additional menus, buttons, and docking containers

Sun system

- Automate the new Rhino sun control
- Full access to the sun position calculation tools for your plug-ins

Custom render meshes

- Plug-in system for defining render-time custom render meshes that can be used by any render plug-in or exported to mesh formats

- Built-in viewport preview

Post-effects

- Plug-in system for defining post-render frame buffer effects that can be used by any render plug-in
- Access is available to any color, alpha, or distance channel after the image is rendered.
- Post-effects work on recalled renders

Many minor renderer tools

- Access to many UI controls, such as the Rhino color button, material drop-down, subnode, and curve graph controls
- Ground plane automation
- Render mesh iterator with automatic support for custom render meshes
- Optional automatic user-interface generation for materials, environments, and textures
- Access to Rhino decals
- Define output types for animation, render window, and so on
- View properties panel customization
- Customize the Rhino UI to fit your render plug-ins capabilities

Rhino Skins

You can completely wrap your plug-in application around Rhino. Here is how using **C++**or **RhinoCommon** (.NET)

Zoo License Management for Plug-ins

The Zoo features:

- Supports third-party Rhino plug-ins
- Runs as a service - automatically restarts when the server reboots
- Uses Standard Internet Protocol Support. Firewall friendly. Now runs across WANs, routers, and VPN
- Troubleshooting tools
- License checkout duration control
- Updated installation and administration details
- Third-party plug-in developer details

The Rhino Installer Engine

The Rhino Installer Engine simplifies distribution, installation, and updating of Rhino plug-ins. The Rhino Installer Engine is compatible with the McNeel Update System - a system that keeps Rhino and Rhino plug-ins current.

openNURBS

The **openNURBS** developer toolkit now supports **Rhino 6** (and earlier) native 3DM files. Other 2-D and 3-D CAD/CAM/CAE and graphic applications can read and write Rhino 3DM files directly. These development tools are free to all software developers.

Localization Services

Our regional office in Europe provides a translation and localization service for third-party developers and anyone else interested in translating their products to French, German, Italian, Spanish, etc. *Details...*

Marketing Support

If you have developed a Rhino add-on that you would like to make available to other Rhino users, food4Rhino is the place to post the details about your plug-ins for Rhino and Grasshopper. ***It is free.*** *Details...*

Administration

The major goal for each new Rhino release is to make it easier for managers and system administrators:

- Ease to share (float) licenses in a workgroup and company using **The Zoo** or **Cloud Zoo** license manager.
- Tools for easy license deployment in larger installations
- Take more advantage of current hardware
- Automatic notification and download of current bug fix service releases
- Provide more training and support options

New for Rhino 6...

System Requirements and Recommendations

Rhino runs on ordinary Windows and Mac desktop and laptop computers. More details....

License Management, Sharing, and Deployment

The Cloud Zoo License Manager benefits include:

- For individual users, use your Rhino accounts login to use Rhino. This means Rhino can be used on any computer.
- For companies and schools Cloud Zoo can simplify license management. Organizations can create a pool of licenses and share the licenses with team members.
- Work online or offline. No need to check out licenses so you should not be caught out on the road without a license.
- Licensing will even work without a constant internet connection.
- License server infrastructure host on the cloud.

The Zoo License Manager (free) features include:

- Hosted on a local in-house Windows system
- Supports third-party Rhino plug-ins
- Runs as a service - automatically restarts when the server reboots

- Uses Standard Internet Protocol Support. Firewall Friendly. Now runs across WANs, Routers, and VPN making it easier to share (float) licenses in a workgroup and company
- License check out duration control
- Installation and administration details

The **License Validation** system makes it easier to recover lost or stolen license keys.

Rhino Options export and import most local user preferences including **advanced display** mode settings.

Plug-in Manager

It is easy to disable plug-ins. This is important for users who are testing new plug-ins or having a problem and suspect the problem is caused by a particular plug-in.

Service Releases Automatically Update

After the first release of every major new version, there are **bug fix releases that download automatically**. The users are prompted to install them.

Note: *Service releases do not **install** automatically. You are prompted to install. The automatic download service can also be turned off.*

Splash and About

The splash screen shows the thumbnails of the most recent files along with details about the Rhino version, event news, and tech tips. It also notifies users when a service release has been downloaded and is ready to be installed.

Training, Support, and Community

Since your team's productivity and frustration are at stake, we want to make sure help is available when you need it.

As with all versions of Rhino, support is included in the purchase price. There are no maintenance or subscription fees.

Support resources for Rhino include:

- Support forums, telephone, and chat worldwide.
- Communities including Rhino, Rhino in Education, Grasshopper, Rhino FabStudio,Generative Jewelry Design, Generative Furniture Design, and food4Rhino
- Live Chat
- Video tutorials and tech tips on Rhino3d.tv, YouTube, Vimeo, etc.
- Blogs, Facebook, Twitter, LinkedIn, etc.
- Live online training classes

Beyond Rhino 6

Serengeti, named after the largest African Savanna, is where Rhino grows.

We like to involve users in every phase of the Rhino development process. As with prior releases, we will be inviting current users to try, test, and provide feedback on the next release while it is still in development.

But now we have something new. You will be able to participate in the development beyond the upcoming release.

Since many development efforts span more than one release, we have set up the Serengeti Project to give users more direct influence on all future Rhino developments.

That means you can always have access to the weekly Work-In-Progress (WIP) builds of everything we are working on no matter when or if it will be released. Rhino WIP builds are where we develop future features including SubD support, Grasshopper 2, a newadvanced rendering engine, and much more.

Serengeti: New in Rhino 6...

Service releases

Rhino **automatically downloads service releases** to your computer and **notifies** you when they are ready to install. You can control when updates are downloaded in *Rhino Options > Updates and Statistics*. *You can also download them from **here***.

For pre-release builds, under *Rhino Options > Updates and Statistics* select:

- **Weekly** to automatically download pre-release builds of Rhino that contain the most recent fixes and enhancements. These builds are tested by the McNeel testing staff for stability and reliability, but **may contain bugs** that we haven't discovered yet.
- **Service Release Candidates** to automatically download pre-release builds that the development team **believes are stable**, reliable, and are ready for broader testing.

Wishlist management and discussion

There is a **Wishlist** category on the Rhino forum to help manage the discussions.

Rhino for Mac

Rhino 6 for Mac is in the works. It is an ongoing process and will be released in phases. During the pre-release phase everyone will be invited to give it a try. Details...

Rhino 7 Development

Rhino 7 pre-release builds are available to Rhino 6 users in phases:

- **Work-in-Progress** (WIP) builds include prototyped new ideas and technologies. WIP builds (often called Alpha releases) are not production ready, and some ideas and technologies may never be released. Rhino 6 users will be invited to get involved. Your feedback at the WIP stage has the most impact on the design of the features and enhancements.
- **Beta**: Once most of the core changes are finished and tested, beta builds are released. The beta builds should be production stable but may not have all the features or user interface finished.

- **Final**: We release a new version only when the beta users tell us it is ready. Beta users are informed when we have stopped development and have released Rhino 7 to production.

Notes

- ***All Rhino 6 users will be invited*** *to participate in the Rhino 7 development process. There is no charge.*
- *Each phase normally takes* ***more than six months****.*
- *Each WIP and beta builds* ***expires every few months****. A newer build is always available before expiration. This ensures that bugs are reported for the latest build, and that we don't receive reports for bugs that are already fixed.*
- ***The final beta release will not expire for at least two months*** *after the new version starts shipping.*