**3D STUDIO MAX**

**Autodesk 3ds Max**, formerly **3D Studio**, then **3D Studio Max** is a professional [3D computer graphics program](https://en.wikipedia.org/wiki/3D_computer_graphics_software) for making 3D animations, models, games and images. It is developed and produced by [Autodesk Media and Entertainment](https://en.wikipedia.org/wiki/Autodesk_Media_and_Entertainment).It has modeling capabilities, a flexible [plugin](https://en.wikipedia.org/wiki/Plug-in_%28computing%29) architecture and can be used on the [Microsoft Windows](https://en.wikipedia.org/wiki/Microsoft_Windows) platform. It is frequently used by [video game developers](https://en.wikipedia.org/wiki/Video_game_developer), many TV commercial studios and architectural visualization studios. It is also used for movie effects and movie pre-visualization. To its modeling and animation tools, the latest version of 3ds Max also features [shaders](https://en.wikipedia.org/wiki/Shaders) (such as [ambient occlusion](https://en.wikipedia.org/wiki/Ambient_occlusion) and [subsurface scattering](https://en.wikipedia.org/wiki/Subsurface_scattering)), [dynamic simulation](https://en.wikipedia.org/wiki/Dynamic_simulation), [particle systems](https://en.wikipedia.org/wiki/Particle_systems), [radiosity](https://en.wikipedia.org/wiki/Radiosity_%283D_computer_graphics%29), [normal map](https://en.wikipedia.org/wiki/Normal_mapping) creation and rendering, [global illumination](https://en.wikipedia.org/wiki/Global_illumination), a customizable [user interface](https://en.wikipedia.org/wiki/User_interface), and its own [scripting language](https://en.wikipedia.org/wiki/Scripting_language).

**Features**

MAXScript

MAXScript is a built-in scripting language that can be used to automate repetitive tasks, combine existing functionality in new ways, develop new tools and user interfaces, and much more. Plugin modules can be created entirely within MAXScript.

Character Studio

Character Studio was a plugin which since version 4 of Max is now integrated in 3D Studio Max, helping users to animate virtual characters. The system works using a character rig or "Biped" skeleton which has stock settings that can be modified and customized to the fit character meshes and animation needs. This tool also includes robust editing tools for IK/FK switching, Pose manipulation, Layers and Keyframing workflows, and sharing of animation data across different Biped skeletons. These "Biped" objects have other useful features that help accelerate the production of [walk cycles](https://en.wikipedia.org/wiki/Walk_Cycle) and movement paths, as well as secondary motion.

Scene Explorer

Scene Explorer, a tool that provides a hierarchical view of scene data and analysis, facilitates working with more complex scenes. Scene Explorer has the ability to sort, filter, and search a scene by any object type or property (including metadata). Added in 3ds Max 2008, it was the first component to facilitate .NET managed code in 3ds Max outside of MAXScript.

DWG import

3ds Max supports both import and linking of DWG files. Improved memory management in 3ds Max 2008 enables larger scenes to be imported with multiple objects.

Texture assignment/editing

3ds Max offers operations for creative texture and planar mapping, including tiling, mirroring, decals, angle, rotate, blur, UV stretching, and relaxation; Remove Distortion; Preserve UV; and UV template image export. The texture workflow includes the ability to combine an unlimited number of textures, a material/map browser with support for drag-and-drop assignment, and hierarchies with thumbnails. UV workflow features include Pelt mapping, which defines custom seams and enables users to unfold UVs according to those seams; copy/paste materials, maps and colors; and access to quick mapping types (box, cylindrical, spherical).

General keyframing

Two keying modes — set key and auto key — offer support for different keyframing workflows.

Fast and intuitive controls for keyframing — including cut, copy, and paste — let the user create animations with ease. Animation trajectories may be viewed and edited directly in the viewport.

Constrained animation

Objects can be animated along curves with controls for alignment, banking, velocity, smoothness, and looping, and along surfaces with controls for alignment. Weight path-controlled animation between multiple curves, and animate the weight. Objects can be constrained to animate with other objects in many ways — including look at, orientation in different coordinate spaces, and linking at different points in time. These constraints also support animated weighting between more than one target.

All resulting constrained animation can be collapsed into standard keyframes for further editing.

Skinning

Either the Skin or Physique modifier may be used to achieve precise control of skeletal deformation, so the character deforms smoothly as joints are moved, even in the most challenging areas, such as shoulders. Skin deformation can be controlled using direct vertex weights, volumes of vertices defined by envelopes, or both.

Capabilities such as weight tables, paintable weights, and saving and loading of weights offer easy editing and proximity-based transfer between models, providing the accuracy and flexibility needed for complicated characters.

The rigid bind skinning option is useful for animating low-polygon models or as a diagnostic tool for regular skeleton animation.

Additional modifiers, such as Skin Wrap and Skin Morph, can be used to drive meshes with other meshes and make targeted weighting adjustments in tricky areas.

Skeletons and [inverse kinematics](https://en.wikipedia.org/wiki/Inverse_kinematics) (IK)

Characters can be rigged with custom skeletons using 3ds Max bones, IK solvers, and rigging tools powered by Motion Capture Data.

All animation tools — including expressions, scripts, list controllers, and wiring — can be used along with a set of utilities specific to bones to build rigs of any structure and with custom controls, so animators see only the UI necessary to get their characters animated.

Four plug-in IK solvers ship with 3ds Max: history-independent solver, history-dependent solver, limb solver, and spline IK solver. These powerful solvers reduce the time it takes to create high-quality character animation. The history-independent solver delivers smooth blending between IK and FK animation and uses preferred angles to give animators more control over the positioning of affected bones.

The history-dependent solver can solve within joint limits and is used for machine-like animation. IK limb is a lightweight two-bone solver, optimized for real-time interactivity, ideal for working with a character arm or leg. Spline IK solver provides a flexible animation system with nodes that can be moved anywhere in 3D space. It allows for efficient animation of skeletal chains, such as a character’s spine or tail, and includes easy-to-use twist and roll controls.

Integrated Cloth solver

In addition to reactor’s cloth modifier, 3ds Max software has an integrated cloth-simulation engine that enables the user to turn almost any 3D object into clothing, or build garments from scratch. Collision solving is fast and accurate even in complex simulations.

Local simulation lets artists drape cloth in real time to set up an initial clothing state before setting animation keys.

Cloth simulations can be used in conjunction with other 3ds Max dynamic forces, such as Space Warps. Multiple independent cloth systems can be animated with their own objects and forces. Cloth deformation data can be cached to the hard drive to allow for nondestructive iterations and to improve playback performance.

Integration with Autodesk Vault

[Autodesk Vault](https://en.wikipedia.org/wiki/Autodesk_Vault) plug-in, which ships with 3ds Max, consolidates users’ 3ds Max assets in a single location, enabling them to automatically track files and manage work in progress. Users can easily and safely share, find, and reuse 3ds Max (and design) assets in a large-scale production or visualization environment.

**Adoption**

Further information: [List of films made with Autodesk 3ds Max](https://en.wikipedia.org/wiki/List_of_films_made_with_Autodesk_3ds_Max)

Many films have made use of 3ds Max, or previous versions of the program under previous names, in CGI animation, such as [*Avatar*](https://en.wikipedia.org/wiki/Avatar_%282009_film%29) and [*2012*](https://en.wikipedia.org/wiki/2012_%28film%29), which contain computer generated graphics from 3ds Max alongside live-action acting. Mudbox was used in the final texturing of the set and characters in Avatar, with 3ds Max and Mudbox being closely related.

3ds Max has been used in the development of [3D computer graphics](https://en.wikipedia.org/wiki/3D_computer_graphics) for a number of [video games](https://en.wikipedia.org/wiki/Video_games).

Architectural and engineering design firms use 3ds Max for developing [concept art](https://en.wikipedia.org/wiki/Concept_art) and [previsualization](https://en.wikipedia.org/w/index.php?title=Previsualization_documents&action=edit&redlink=1). 3ds Max shares a close resemblance with [AutoCAD](https://en.wikipedia.org/wiki/AutoCAD).

Educational programs at [secondary](https://en.wikipedia.org/wiki/Secondary_education) and [tertiary](https://en.wikipedia.org/wiki/Tertiary_education) level use 3ds Max in their courses on [3D computer graphics](https://en.wikipedia.org/wiki/3D_computer_graphics) and [computer animation](https://en.wikipedia.org/wiki/Computer_animation). Students in the [FIRST](https://en.wikipedia.org/wiki/FIRST) competition for 3d animation are known to use 3ds Max.

**Modeling techniques**

**Polygon modeling**

Main article: [Polygon modeling](https://en.wikipedia.org/wiki/Polygon_modeling)

Polygon modeling is more common with game design than any other modeling technique as the very specific control over individual polygons allows for extreme optimization. Usually, the modeler begins with one of the 3ds max primitives, and using such tools as [bevel](https://en.wikipedia.org/wiki/Bevel) and [extrude](https://en.wikipedia.org/wiki/Extrude), adds detail to and refines the model. Versions 4 and up feature the Editable Polygon object, which simplifies most mesh editing operations, and provides subdivision smoothing at customizable levels (see [NURMS](https://en.wikipedia.org/wiki/NURMS)).

Version 7 introduced the *edit poly* modifier, which allows the use of the tools available in the editable polygon object to be used higher in the modifier stack (i.e., on top of other modifications).

**NURBS (Non-Uniform Rational B-Splines)**

An alternative to polygons, it gives a smoothed out surface that eliminates the straight edges of a polygon model. [NURBS](https://en.wikipedia.org/wiki/NURBS) is a mathematically exact representation of freeform surfaces like those used for car bodies and ship hulls, which can be exactly reproduced at any resolution whenever needed. With NURBS, a smooth sphere can be created with only one face.

The non-uniform property of NURBS brings up an important point. Because they are generated mathematically, NURBS objects have a parameter space in addition to the 3D geometric space in which they are displayed. Specifically, an array of values called knots specifies the extent of influence of each control vertex (CV) on the curve or surface. Knots are invisible in 3D space and you can't manipulate them directly, but occasionally their behavior affects the visible appearance of the NURBS object. Parameter space is one-dimensional for curves, which have only a single U dimension topologically, even though they exist geometrically in 3D space. Surfaces have two dimensions in parameter space, called U and V.[[6]](https://en.wikipedia.org/wiki/Autodesk_3ds_Max#cite_note-6)

NURBS curves and surfaces have the important properties of not changing under the standard geometric affine transformations (Transforms), or under perspective projections. The CVs have local control of the object: moving a CV or changing its weight does not affect any part of the object beyond the neighboring CVs. (You can override this property by using the Soft Selection controls.) Also, the control lattice that connects CVs surrounds the surface. This is known as the convex hull property.[[7]](https://en.wikipedia.org/wiki/Autodesk_3ds_Max#cite_note-7)

**Surface tool/editable patch object**

*Surface tool* was originally a 3rd party plugin, but Kinetix acquired and included this feature since version 3.0. The surface tool is for creating common 3ds Max splines, and then applying a modifier called "surface." This modifier makes a surface from every 3 or 4 vertices in a grid. This is often seen as an alternative to "mesh" or "nurbs" modeling, as it enables a user to interpolate curved sections with straight geometry (for example a hole through a box shape). Although the surface tool is a useful way to generate parametrically accurate geometry, it lacks the "surface properties" found in the similar Edit Patch modifier, which enables a user to maintain the original parametric geometry whilst being able to adjust "smoothing groups" between faces

**Advantages of 3DMAX:**

Increase productivity when working with the high-resolution assets required by today’s demanding entertainment and design visualization projects. **3ds Max Entertainment Creation Suite Standard** helps you to:

* **Choose software for more flexible production pipelines** based on project or client requirements.
* **Extend 3ds Max with new geometric objects and modifiers** by creating graphs in a visual environment similar to the Slate material editor.
* **Collaborate more easily across teams and throughout the production pipeline** with new support for non-destructive animation workflows in XRef and improved stability.
* **Represent subdivision surfaces in 3ds Max® using the OpenSubdiv libraries** open-sourced by Pixar. Experience faster in-viewport performance for meshes with high subdivision levels with libraries that incorporate technology from Microsoft Research, and are designed to help take advantage of both parallel CPU and GPU architectures.
* **Access object placement, lighting, rendering, modeling and texturing tools** more easily with new Design Workspace.
* **Accelerate the scene creation process with new on-demand templates** that provide standardized start-up configurations
* **Experience greater creative flexibility and control** with the new Camera Sequencer, which allows you to cut between multiple cameras, trim, and reorder animated clips nondestructively—leaving the original animation data unchanged.
* **Reduce undesirable deformation artifacts with Dual Quaternion Skinning.** As a new option in the Skin modifier, Dual Quaternion lets you paint the amount of influence skinning will have on a surface, so you can use it where you need it and taper off to linear skin weighting where you don’t.
* **Help reduce rendering time and costs by rendering projects online in the cloud,** right from within 3ds Max. Autodesk A360 rendering support is available to customers on Maintenance and Desktop Subscription.
* **Create more photorealistic images and animations** with greater ease using the new Physical Camera. Co-developed with the makers of V-Ray, it provides enhanced controls and additional in-viewport feedback.
* **Model using extensive polygonal, subdivision surface, and NURBS toolsets**within 3ds Max to help create better assets in less time.

### Major differences Between 3D Max & Maya

1.So here are their main features that make them different:

1. Different user interface History/operator stack of both software work quiet similar.
2. Both software tools have all important tools for [modeling](http://www.3d-ace.com/expertise/technical-expertise/modeling), [texturing](http://www.3d-ace.com/expertise/technical-expertise/texturing), [rigging](http://www.3d-ace.com/expertise/technical-expertise/rigging), [animation](http://www.3d-ace.com/expertise/technical-expertise/animation-visual-effects), rendering and dynamics.
3. Some animators agree that Maya can handle higher level of complexity (e.g. high end character-rigs) where 3ds Max tend to get unstable.
4. 3ds Max has got a lot of small tools that make the job done faster.
5. There are some nice plugin renderers available for 3ds Max.
6. Some artists swear by the poly tools in Maya. It fits well for organic modeling, whereas there are more precision tools in 3ds Max.
7. 3ds Max is well optimized for architectural visualization
8. Maya is great with tasks that involve [character rigging](http://www.3d-ace.com/expertise/technical-expertise/rigging) and animation superimposing.
9. Maya has a huge advantage over 3ds Max when it comes to modeling nurbs as it uses different approach and is more user friendly.
10. Many 3D animators consider Maya a better software for creating 3D animation as it has greater capacity for simulating realistic [animations and effects](http://www.3d-ace.com/expertise/technical-expertise/animation-visual-effects).
11. 3D max has strong rendering capabilities, improved interoperability with industry-standard products as well as additional time-saving animation and mapping workflow tools.
12. Maya is widely used for film making and TV production.

**Applications Of 3D Max:**

1. Gaming
2. Graphics Design
3. Animation
4. architectural visualization
5. Modelling
6. Texturing
7. Rigging