



Release Notes 5.0 February 2002

*Houdini 5 is a major release
with drastic improvements in Modelling,
COPs, and Workflow.*

CHANGES IN HOUDINI 5

General Improvements over 4.1

- Existing modeller replaced with an entirely new paradigm – you choose tools within the Viewport using the **[Tab]** key and Houdini prompts you with the steps to complete. As you model in the Viewport, Houdini creates the (still accessible) SOP networks for you.
- New character workflow with emphasis placed on setup in the world view.
- New suite of polygon tools.
- New Compositor, COPs-v2 (still Beta) provides a brand-new architecture (deep float-ing-point rasters), interactive handles, speed, power, much-improved VEX functionality etc.
- New Mantra5 with vast improvements in functionality, speed and quality.
- mPlay replaces iPlay – better, faster, etc.
- Hotkey Manager: **[Shift]** **[Alt]** **[Ctrl]** – allows you to assign hotkeys to most Houdini functions.
- New UV Editor allows interactive editing of Texture UVs within the Viewport.
- New 3D texture map class added to VEX to render volumetric effects 100's of times faster than a traditional ray marcher.
- Totally revamped Demo directory:
\$HFS/demo – check it out!

Important Note for Windows Users!

- You can't install the Houdini 5 License Server until you remove the Houdini4 License Server – please do this *before* installation of Houdini 5.

Modelling Related Improvements

- Interactive handles for all operators.
- Handles can be attached to any numeric parameter via textport commands.
- Many new SOPs relating to Poly modelling and UV Texturing.
- Right-click menu to handle many operations directly in the Viewport.
- Overall focus on the Viewport for working requires little/no need to go to SOPs.
- Much better control over visibility of geometry through Viewport prefs and new Visibility operations.
- New Persistent Handle manager pane-type.
- Construction plane re-written with interactive adjustment handle, right-click menu and other refinements.
- Vertex attributes now available in Geometry Spreadsheet.

Character Related Improvements

- Setup and animation of characters now Viewport-centred.
- New Proximity Capture operation.
- Mirroring of bones.
- Mirroring of captured point weights.
- All Operations, such as creating bones, capturing geometry, editing point weights, painting and mirroring point weights, bone-posing and animation are done directly and interactively in the Viewport.
- Capturing much faster, IK much faster and more robust
- Ability to mix IK and FK in the same chain and switch between them
- Massive improvements to capture weight editing (point weight editing)

Object Viewport Improvements

- new shading modes in the Viewport.
- multiple handles visible simultaneously
- Animating and Scoping of channels directly in the Viewport
- Construction plane re-written with interactive adjustment handle, right-click menu and other refinements.

Rendering

- vmantra is now known as ‘mantra’, and is the default. The old mantra is still available as ‘mantra3’ (aka ‘old Mantra / oMantra’).
- Mantra5 has been used in production for over five months. Many improvements and tweaks have been added to Mantra5 to make it the best solution for users wanting the speed, flexibility and small memory footprint of RenderMan and the benefits of RayTracing.
- Delayed read of geometry from disk (no longer do you need to put all your static geometry into each .ifd) with automatic bounding box calculations.

- Numerous improvements to VEX, better derivative calculations and many other improvements. Please see [\\$HFS/houdini/vex/html](#) for details.
- Rendering of particles or points as single-shade points. Render millions of particles in a relatively small amount of memory.
- Opacity culling so the renderer stops rendering when it hits a threshold
- Subdivision Surface rendering. Send a cage to the renderer and render it as a perfectly smooth SubD. Does not use the Crease attribute (patent issue).
- Rendering of 3D Textures for volumetrics.
- Ability to render arbitrary shader variables to either individual files or to a single deep-raster image.
- Houdini .pic image capabilities expanded to handle deep-raster images from the compositor or Mantra5.
- Ability to have camera transforms separate from geometry transforms for multiple camera angle rendering from a single .ifd file.

VEX Improvements

- Added new context for 3D Texture Maps. Using 3D texture maps and the supplied integration function allows users to render volumetric effects many times faster than using a standard raymarcher to do the integration.
- New VEX profiling, allowing the user to see exactly how many calls to a function are made and how much time each of those functions contributes to a render.

Profiling is also available for SOP/POP/COPs. Please see the help for the `vexprofile` command.

- Many new functions to allow greater control over rendering, as well as new geometry access functions and others. Please see [\\$HFS/houdini/vex/html](#) for details.
- VEX SOPs, POPs and COPs are now fully multi-threaded.

SHOP Improvements

- new Viewport option added "VEX Shaded". This will call the shaders to give a preview OpenGL render in the Viewport. Faster than actually rendering with good feedback.
- a proper viewer is now added to SHOPS that allows you to preview the VEX shaders in real time. Supports all surface, displacement and light shaders. Pretty much everything that shades an object can be used in the SHOP Viewport.
- SHOPS better integrated with a new dedicated view pane, shade mode and many new options.
- New SHOP palette for visually organizing your shaders.
- New OpenGL options in SHOPS to display up to 16 textures using the new Viewport Multi-texture option
- Added Mental Ray support.
- Added menu item to hide Mantra5, PRman and/or MI SHOPS
- Added env variables to also achieve the same
- Many fixes to default shaders, new Multi-layer Surface and Displacement shaders to be used with new Layer SOP.

New Compositor Added: COPs 2

- Allows support for deep rasters
- Intelligent caching
- Intelligent automatic proxy generation
- Interactive handles and Viewport workflow
- automatic lowering of resolution when interactively transforming in the Viewport
- pixel operations are automatically collapsed (gamma, contrast, bright all done as a single operation)
- pixels moved outside the work area are not lost

- new COPs like Rotospline, Noise, Font, much better Composite, and many others
- Much better Viewport zooming/panning etc
- Timeline mode in the Viewport with handles to offset sequences, trim them etc
- Histogram Viewport mode
- Many more display options around the Viewport
- COPs can now be bypassed and (essentially) locked using disk proxies
- Gamma, brightness, contrast, black and white point controls on all COP Viewports
- Image compare feature in COPs Viewport
- Fully multithreaded with almost linear increase in speed vs. # processors
- VEX has been expanded for the Cop2 context to include the ability to have different sized images mixed in a COP, auto or explicit access to deep raster layers, access to pixels in frames at different times and much more.

MS Windows Related

- Much more robust licensing greatly increasing the chances of a successful houdini license install.
- DHCP or no network card will no longer cause licensing problems.
- When using the GVX1 Pro by 3D Labs Inc, it is a known problem that when drawing bone chains using the Bones operation, it can hang the system if the Smooth Lines display option is enabled.

Channel Editor Improvements

- Channel Group list re-united with floating Channel Editor window
- Channel group entries now colour-coded with graph splines
- Ability to disable part or all of a channel in the Dopesheet

- Multi-graph mode, with up to 6 graphs together simultaneously, 1 channel per graph.
- Dopesheet is more robust and predictable.

SOP Improvements

- Added local support for all user defined variables identical to POPs.
- Copy and mirror attributes.
- Footprint flag for Viewport work.
- Handles can be bound to *any* numeric parameter for direct Viewport manipulation including VEX OPs.
- VEX *#pragmas* have been extended to auto-create handles, selector bindings and exporting of parameters to the toolbox (the area above a SOP/Obj Viewport).
- Excellent UV texture editing support through multiple SOPs like UVProject, UVedit, UVTransform, UVUnwrap and the ability in the Viewport to interactively view and edit UV point and vertex coordinates.
- New Polywire SOP that is just incredible, especially when used with Lsystems and Subdivision surfaces.
- New Bake Vex SOP that deforms geometry based on VEX Shop Shaders.
- The Starburst SOP!
- New Network SOP to pass geometry from one Houdini session across a TCP/IP network to another Houdini session in "real time" (limited by network speed and geometry size of course).
- New interactive Paint technology to paint deformations (with or without mirroring) comb normals or arbitrary attributes or apply colour or arbitrary attributes.
- The Cookie SOP (Die, Boolean, die!)
- Can now write IGES format.
- IGES support now includes polygons (read and write).

- Read and write .PLY format (an academic very-high density format).
- Font SOP now can read Truetype fonts.
- New Font manager for Font SOP and new Font COP.
- Many many more.

POP Improvements

- Handles can be bound to any POP parameter, so Wind, Location and others can have handles.
- Work directly in the Viewport here as well, with a Toolbox etc. like in SOPs.
- Source POP can birth from an attribute, used in conjunction with the Measure SOP (which measures the area of primitives) this allows you to have even particle birthing across differently sized surfaces.
- Location POP now births in an ellipsoid manner rather than square as in 4.x
- New SoftLimit POP with "spongy" limit.
- New Sprite POP to display particles as sprites in OpenGL.

CHOP Improvements

- New 3D Audio chops to take Microphone and Sound objects and create true 3D audio.
- New Network Chop to pass data in real time across a TCP/IP network between Houdini sessions..

Output Driver Improvements

- Added new output driver for Mental Ray.
- Ability to filter out render drivers from the displayed list.
- New 3D Texture generator ROP, that calls standalone "i3dgen" (which can be added to a queue).

- .hmv (Houdini Movie) files now generate and play back correctly on Linux and Solaris.
- New Composite2 ROP for COPs2
- COP2 and Mantra5 ROPs have options to output multiple images from deep rasters.

General Interface Enhancements

- Customizable hotkeys with new Hotkey manager (**Alt** **Shift** **Ctrl** or in Dialogs menu).
- The ability to type the name of the operator you want to find and have it found automatically, from the Tab menu.
- File > New (finally!)
- The textport now has Tcshell type up-arrow history and line editing.
- New Splashscreen on all platforms.
- Edit comments and user functions now have a proper mini-text editor.
- Subnets have been fixed and work properly everywhere, now including Objects!
- new command-line utility "hconfig" allows you to complete display your environment like paths, env variables etc. Use *hconfig - for help*.
- new command-line utility "gicon" to convert Houdini .bgeo files into .icon files that can be used with your own operators. Now non-SGI users can make icons!
- Scripted subnets. Simple but powerful.
- Ability to make relative channel references from parameter right-mouse menu.
- Node renaming capability with wildcards.
- Viewport layout, view options etc are saved in the .hip file so you can reload to an (almost) identical layout.
- VEX and scripted subnet .ds files are saved with the .hip file, avoiding the problem of "cannot find operator XXXX" when you load a .hip file on another machine. However, the .vex files are NOT saved with the .hip file.

- Many new textport commands and expressions, too numerous to list here.
- All operators have Delete Scripts, that are used automatically with Bones and the like to delete associated CHOPs, but can be used with any node, for example to delete a shader when an object is deleted.
- All 3D Viewports can load images from disk, or COPs or COPs2. In Texture Map mode (now the preferred way of working) texture map locations can be offset and scaled and will ALWAYS be aligned with the model. No more misaligned BG images.
- Particles can be displayed as lines or Sprites, in conjunction with the Sprite POP
- You can now turn off Specular display in a Shaded Viewport.
- Many more Shade Viewport modes including VEX Shade mode.
- GL Multi-texturing for layered textures.
- iPlay is dead! Long live mPlay! mPlay is essentially the COP2 Viewport as a standalone application. Multiple sequences per mPlay, the ability to delete frames from a sequence, the ability to save sequences etc.
- Viewport Render state now uses Mantra5.

Heading for Retirement

The following will make their final appearance in Houdini 5 – this is the last version that will support these technologies, and they will not appear in Houdini 6:

- Mantra3
- Materials and Textures (TOPs)
- COPs (the 'old' compositor)

Some SOPs are also on the way out:

- Arm SOP
- Boolean SOP
- Joint SOP
- Limb SOP
- Material SOP
- Model SOP
- Skeleton SOP