

Vortex Studio 2019a Release Notes



WHAT'S NEW

Welcome to the first Vortex Studio release of 2019! Every new version of the world's best real-time simulation software makes it more powerful and ever easier to use. Features and improvements have been added, as well as general performance increases.

Vortex Dynamics was renamed Vortex Studio back in 2017, with version numbering replaced by year of release to simplify maintenance. It features a slick, easy-to-use interface, streamlined content design workflow, and built-in functionalities that reduce system integration time.

Vortex Studio Platform

The following is a list of the additions and changes made to the core platform.

General Enhancements

There have been improvements to the general performance and usability of the software:

- The licensing model has been updated to better reflect the way people use Vortex Studio in industry, research, marketing and academia.
 - Vortex Studio products are now available as annual subscriptions, which makes it easier to budget their use across an organization.
 - The available products include:
 - **Academic:** formerly known as Essentials, perfect for students, teachers and researchers. It has been rebranded to better fit its true user base, the academic community.
 - **Create:** the core bundle of Editor and Player for content creation and desktop simulation.
 - **Activate:** an add-on to Create that unlocks simulator-related features such as console and hardware support; intended for internal use (e.g. research, test laboratories, marketing, etc.).
 - **Engage:** an add-on to Create that unlocks simulator-related features, but also includes a publishing license; intended for external use (e.g. simulator production).
 - The previous products are now deprecated: Solo, Team, and Academics Editions.
 - At the time of license renewal, all Vortex Studio users will be contacted by their account manager to streamline the transition process.
- To match the above, a new version of the **CAD Importer** has been created. It will be available as an annual subscription.
 - Based on technology by PiXYZ.
 - Now includes automated de-featuring operations.
 - A selection of common CAD file types is supported at launch; more will be added over time. Please refer to the documentation for details.
- Vortex Studio now supports **Microsoft Visual Studio 2017**.

- **USB devices**, such as mouse or gamepad, are now hot-pluggable. You do not need to restart the Editor or Player after adding a USB device to the computer.
- A **Keyboard** extension is now available in the Setup file's Toolbox, in the Input Devices category.
- It is now possible to add Python scripts, connection containers and VHL interfaces to an **Assembly file**.
 - This is part of an on-going effort to make simulation files more modular and easier to re-use.
 - Note that you do not have to move existing scripts, containers or VHL to the Assembly level unless so desired.
- You can now **remotely access** the VHL of a scene or mechanism for debugging and tuning purposes.
 - *Note: this is a technical preview and not the final version of the feature.*
- The **GSPID Controller** extension is now available in the Dynamics category.
 - This is a scheduled PID controller using a single scheduling parameter.
 - Effective proportional, integral, and differential gains are linearly interpolated within their respective range, based on the value and defined range of the scheduling parameter.
- Three new extensions have been added to the Sensors category.
 - As their names indicate, the **Part Distance Sensor** and **Geometry Distance Sensor** extensions allow you to measure the closest distance between parts or collision geometries, respectively.
 - The **Depth Sensor** allows you to position and orient a camera sensor in the virtual world and returns the distance of each sensor sample as an arbitrary grayscale value in a picture-and-picture view.
 - *Note: this Depth Sensor is a technical preview and not the final version of the extension. User feedback is welcome!*
- A technical preview of the new **Hydraulic Systems** is available in the Toolbox at the Mechanism level.
 - This new feature lets users build real-time hydraulic systems for a machine or vehicle without requiring Python scripting or co-simulation with an external, dedicated hydraulics simulation.
 - Five pre-packaged extensions are available: Transmission, Pump, Actuator, Divider Manifold, and Combiner Manifold.
 - Some components such as relief valves, fluid reservoirs and lines are abstracted; others, like control valves, are directly included into the extensions along with their operating parameters.
 - It is possible to have both Python scripts and hydraulic systems in the same mechanism or scene. Legacy models thus do not have to be adjusted.
 - *Note: this is only a technical preview and not the final version of the feature. User feedback is welcome!*

Dynamics Module Enhancements

There have been improvements made to the Dynamics module:

- We introduced an innovative **parallel solver** in the previous Vortex Studio release (2018c). It allows splitting simulations into smaller ones called partitions, and then efficiently solves these in parallel on separate CPU cores.
 - The parallel solver has seen **further optimization** in release 2019a to reduce its memory and time overhead, for even better dynamic performance. This can produce significant simulation speed-ups, especially in large scenes with many rigid bodies (e.g. port scenes with hundreds of containers).
 - A new **Automatic Solver Groups** extension has joined the existing Solver Groups extension. As the name indicates, it can automate part of the workflow for setting up partitions.
 - Minor accessibility and user interface improvements have been made to the **Solver Analytics Panel**.
- A **visualization tool** has been added to display the collision data structure that is underlying a Terrain object (the UV Grid). It facilitates the tuning process of the UV Grid parameters of a terrain for optimal performance.
 - Badly subdivided regions are indicated in red, while good subdivision is shown in green or blue.
 - This visualization is automatically enabled when editing a Terrain object in the Vortex Studio Editor.
 - It can also be enabled by adding the UV Grid Visualizer extension to a Scene. This allows fine-tuning UV Grid parameters in simulations which create the VxTriangleMeshUVGrid geometry type by code via the API (for example, through a paged terrain producer).
 - The effect of any modifications of the subdivision parameters can be displayed immediately using the “Apply” button to help in the tuning process.

Graphics Module Enhancements

There have been several changes and improvements made to the Graphics module:

- Vortex Studio now includes support for the **NVIDIA RTX 20XX** line of GPU (see the *System Requirements* section, further).
- A new **Vehicle Trace** extension is available for leaving marks on the ground.
 - It can be found in the Graphics category of the Toolbox.
 - It is based on the same technology as the Decal extension and can produce seamless traces on the Terrain model from any moving object.
 - Vehicle Trace works with both wheeled and tracked vehicles.
 - The extension can also be used to leave marks caused by the teeth of an excavator bucket or any other equipment that is scraping the ground, such as a farming implement.
- The way **Halos** are created and managed has been completely redesigned for better performance and ease of use.
 - Lights now come with a built-in Halo child extension; select a halo texture in the Properties panel to enable it.
 - Standalone halos are still available from the Toolbox.
 - The Halo Manager is now hidden and automated; there is no further need to set one up explicitly.
 - Halo controls are now set individually for each light, which allows halos to be added at the Mechanism level and re-used across Scenes without issue or conflict.
 - Instead of requiring a dedicated Graphic Material, the Halo extension now includes a built-in selection of halo textures.
 - It is now possible to set halos to be directional or omni-directional (to simulate a haze-like effect).
- The **Fog** feature has been improved with a new mathematical model.
 - Fog height and fade can now be set independently from distance.
 - *Note: some tuning may be required for existing Scenes using Fog.*
- The **shadow** algorithm has been improved; default values have been adjusted in the Adaptive Feature Controller extension.
 - *Note: some tuning may be required for existing Scenes with shadows.*
- A **Light Probe extension** is now available if you chose to use the Physically-based Rendering technical preview introduced in release 2018c.
 - It can be found in the Graphics category of the Toolbox.
 - If a SkyDome is also used, the light probe automatically inserted in it should be disabled via the Properties panel to avoid lighting conflicts.
 - *Note: like the rest of the PBR workflow, this is a preview and not the final version of the extension.*
- If you chose not to use a light probe, the **SkyDome extension** has been upgraded to allow modification of the color of the sphere's lower half (the "ground").

Vortex Studio Editor

There have been several changes and improvements made to the Vortex Studio Editor.

- If they are installed in the default location, it is now possible to access the **Vortex Studio Samples** directly from the Home page by pressing the corresponding button in the Resources section.
- The **drag & drop** method of interaction is now available on many more types of interface objects and fields.
 - For example, it is now possible to drag and drop extensions directly to a Graphic Material, Role, Configuration or Collision Rule.
 - This greatly speeds up content creation and editing by reducing the number of clicks required for a given operation.
- There have been several improvements to the way the Editor handles **numerical fields**, to make data entry and modification faster and less error-prone.
 - Clicking on a numerical field and moving the mouse no longer cause the "Select All" to be lost.
 - The Escape key (ESC) now reverts to the previous value displayed without having to leave the field.
 - Entering an invalid value now revert the field to the previous valid value.
 - A numerical field no longer displays numerous zeros after the decimal when selecting it for editing.
- It is now possible to save, import, or export the **layout and settings** of the panels in the Vortex Studio user interface.
 - The Editor will save the position, size and status of each panel in the interface.
 - This is useful when updating Vortex Studio to the latest release, as personalized layout and settings from the previous version can be automatically imported.
 - You can reset the layout to factory default at any time via the Options menu on the Home page.
- A new **Save all Child Documents** function is available via the Save icon along the upper edge of the main screen.
 - This automatically opens and saves all child files to the one currently being saved, so that all files will be saved using the same release version of Vortex Studio.
 - This helps keep assets up to date with the latest features and bug fixes.
- A new **Asset Browser** panel is available to make content management easier and faster.
 - Like all panels, you can control whether it appears in the interface via the Panels button at the top-right of the main screen.
 - A built-in browser shows the files available on disk. If compatible with Vortex Studio, they can be drag & dropped to the main viewport.
 - The Search box at the top-right of the panel lets you search for content on the disk(s); a filter is available to further refine the selection.

Cable Systems

Cable Systems have been expanded with these improvements:

- **Mesh cable performance** has been significantly improved.
 - Simulation for this type of cable is up to four times faster than in previous releases (exact improvement depends on specific scene content)
 - This allows longer or more detailed cables

Earthwork Systems

The Earthwork Systems have been expanded with these improvements:

- It is now possible to **disable an earthmoving tool** at run-time.
 - This allows the inactive tool to be used for regular collisions without having to calculate the soil simulation
 - This is useful when more than one tool is present on a mechanism, but only one is active at any given time (for example, using the front bucket of a backhoe as a fulcrum or stabilizer while digging with the rear bucket)

Vortex Marine

Vortex Marine has been expanded with these improvements:

- The following **Triton parameters** are now exposed in the Ocean extension:
 - fft-phillips-constant
 - fft-phillips-constant-jonswap
 - fft-phillips-constant-pierson-moskowitz
 - fft-noise-amplitude
 - fft-noise-distance
 - num-detail-octaves
 - foam-scale
 - foam-blend
- Vortex Marine expert users can use the above to further tune wave heights under different wind conditions.

SYSTEM REQUIREMENTS

Supported Platforms

Vortex Studio 2019a runs on the following platforms:

- Microsoft Windows 10 (x64)
- Linux (Ubuntu 14 LTS, CentOS 7)

Hardware Requirements

Minimum for Vortex Studio Create:

- CPU Intel i7-4700 or equivalent – must support AVX2 instructions set
- RAM 8GB for Vortex Studio Player
16GB for Vortex Studio Editor
- GPU NVIDIA graphics card compatible with supported drivers (see further)

Recommended for Vortex Studio Create:

- CPU Intel i7-4700 or better
- RAM 16GB for Vortex Studio Player
32GB for Vortex Studio Editor
- GPU NVIDIA GeForce GTX 970 (or better) with supported driver

Recommended for Vortex Studio Activate and Engage:

- CPU Intel i7-7700 or better
- RAM 16GB for Vortex Studio Player
- GPU NVIDIA GeForce GTX 1070 (or better) with supported driver

Supported Compiler

Vortex Studio 2019a supports the following C++ compiler:

- Microsoft Visual Studio 2015 (VC14) and above

Note: support for Microsoft Visual Studio Version 2010 (VC10) has been deprecated.

Supported Graphics

Vortex Studio 2019a has been extensively tested with NVIDIA GeForce graphics cards.

- NVIDIA GTX 970 and 1070 are tested with driver 388.59.
- NVIDIA GTX 1070 and RTX 2070 are tested with driver 388.59 and 417.22.

The GTX 1070 and RTX 2070 cards have been explicitly tested for high performance rendering with NVIDIA's 417.22 WHQL driver.

All other graphic cards listed in the release notes of the 417.22 driver should work with Vortex Studio, but some performance or rendering degradation might occur.

- RTX 2080
- GTX 1050, 1060, 1080
- GTX 950, 960, 970, 980
- GTX 750, 760, 770, 780
- Equivalent Notebook GPUs

Note: on computers that have multiple graphics cards (e.g., laptops with both integrated Intel card and dedicated NVIDIA graphics card), the default configuration of these systems is to auto-select the card to run the application, which might prevent Vortex Studio from running (or show a blank viewport). Using the NVIDIA Control Panel, select **Manage 3D Settings** and change the **Preferred graphics processor** to **High-performance NVIDIA processor**.

Supported VR Hardware

Vortex Studio 2019a supports the following VR hardware via the OpenVR protocol:

- HTC Vive
- HTC Vive Pro
- Oculus Rift (DK2)

Python

Python 2.7.13 is supported. The corresponding Anaconda distribution 4.3.0.1 allows for an easy integration of Vortex on various platforms.

Simulink/MATLAB

Simulink/MATLAB 2015 and above, with real-time UDP protocol, are supported.

Licensing

Vortex uses RLM by Reprise Software™ for licensing.

COMPATIBILITY NOTICE

We recommend that you back up your assets before migrating to the latest version. If saved, it will not be possible to open them again in their original version.

From any version of Vortex Studio

Files from these versions should open with no issue in the newest release. We recommend that you use the new “Save All Child Documents” feature to ensure your files are kept up to date.

From Vortex 6.8 and earlier

Files from these versions will not open in the newest release. Please convert them with a supported version first (see further).

Between any Vortex version

Record-and-Playback as well as Keyframe files created with previous versions may not work with Vortex Studio 2019a.

From any version of Vortex Studio Academic (formerly Essentials)

Note that content saved in Vortex Studio Academic cannot be opened with other Vortex Studio licenses such as Create, Activate or Engage. Academic can open and run content created with other licenses, however.

END-OF-LIFE NOTICE

Since Vortex Studio 2017

To import assets created before Vortex Studio 2017a, please convert them with a supported version of Vortex first. Note that Vortex Studio 2018a was the last version to directly support files created with Vortex 6.7 and 6.8.

Since Vortex 6.5

CM Labs recommends that you port your Vortex-based projects from x86 to x64. Vortex 6.5 was the last release with dedicated x86 binaries and installers.

Since Vortex 6.3

VxVehicle and VxCable are no longer supported. If you have been using these APIs, please convert your assets using Vehicle Systems and Cable Systems instead.

Microsoft Visual Studio 2010

Vortex Studio fully supports Microsoft Visual Studio 2015 (VC14) and above. If you are still using VC10, please upgrade now to continue to benefit from the frequent Vortex Studio updates and new features.

FIXED ISSUES

| Summary | Description |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Editing field ignores field changes | Starting simulation no longer ignores changes while editing field. |
| Switching friction mode has no effect | In a constraint, switching the friction mode during simulation now works correctly. |
| Solver Analytics Link Buttons | The Link Buttons in the Solver Analytics panel are now easier to use. |
| No hourglass after selection in Home page | You can now see the hourglass after selection in the Home page. |
| Crash when application name does not match node name | Vortex Studio no longer crashes when the application name in vxsimulator does not match node name in vxc file. |
| Player with Essentials license | Launching the free Player via the shortcut no longer display an error message. |
| Nearly all plugins are classified as utility | All plugins are classified correctly now in the Editor Plugins option tab. |
| Doesn't warn that it cannot find MSI files | Vortex Setup now informs the user that it did not find the required MSI files. |
| Unlocking property field results in reduced clicking options | While selecting an object for a field, unlocking the property field no longer results in the user only being able to click on objects of the field's type. |
| HierarchyView error when loading two assets | There was a HierarchyView error when loading two assets; it could be fixed by loading them in the Editor and then saving them. This is no longer necessary. |
| Material Preview disappear when Properties is detached | The Material Preview panel no longer disappear when the Properties panel is detached and moved. |
| Error when editing vector field in multi-select | Editing vector field in multi-select now works correctly. |
| Shifting texture coordinates on a cable | Texture coordinates are no longer shifting when winching or point spooling a cable. |
| "Apply" button only applies for the current options tab | The Apply button in the Options panel now works for everything. |
| Car Wheel steering position doesn't work second time simulation is run | The Car Wheel constraint's steering position now works correctly whenever a simulation is run. |
| Light intensity affects a halo's color. | A halo's color is now controlled only by the color of its light; the intensity of the light will not affect the halo's color anymore. |

KNOWN ISSUES

| Summary | Description |
|---------|-------------|
| N/A | |

DEPRECATIONS

The followings were deprecated in release 2019a:

- Previous licensing models such as Solo and Team Editions have been replaced by new products. Contact your Vortex Studio account manager for more information.
- The functions of the Halo Manager extension are now handled automatically; the extension is no longer required and has been deprecated.
- Installers and support for Microsoft Visual Studio 2010 (VC10) are no longer provided.