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# Toon Boom Harmony 17 Release Notes



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## Legal Notices

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# Toon Boom Harmony 17.0.4

Here is the list of changes in Harmony 17.0.4, build 17.0.4.17479 (2021-09-23):

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## Improvements

### Master Controllers

## Fixed Issues

The following issues have been fixed in this release of Harmony:

### Drawing Tools

- A hidden preference was added to allow users to lower the drawing precision and simulate the drawing experience from Harmony 14. When the preference is enabled, Harmony will round coordinates of points received from the mouse or drawing tablet, creating bumpier lines.

You can enable this preference by downloading, importing and running the script from the URL below:

[docs.toonboom.com/go/download/ToggleDrawingToolsRoundsCoordinates](https://docs.toonboom.com/go/download/ToggleDrawingToolsRoundsCoordinates)

- A hidden preference was added that can be used to disable smoothing of vectors when using the Perspective tool in Lattice mode.

You can enable this preference by downloading, importing and running the script from the URL below:

[docs.toonboom.com/go/download/ToggleLatticeToolSmoothing](https://docs.toonboom.com/go/download/ToggleLatticeToolSmoothing)

### Renders and Exports

- Rendering to QuickTime or H.264 with two instances of Harmony simultaneously may generate corrupted files.  
*HAR-7625*

- Generating movies in QuickTime or H.264 format does not work when Harmony connects to a database using a shortcuts.conf file. *HAR-7222*
- Harmony on Windows may crash when rendering a specific drawing drawn with brush textures. *HAR-7715*
- Crash when rendering a specific tvg that contains textured brush strokes. *HAR-7049*

## Timeline

- Audio scrubbing offsets and plays audio from the wrong frames. *HAR-7577*

## Master Controllers

- Keyframes that have identical values are not added to the tbState when creating a master controller. *HAR-6551*

## General

- Random crash when performing various drag and drop operations under the latest Windows 10 using an NVIDIA Quadro GPU. *HAR-7491*
- Frames are held and skipped when importing movies with 23.976 frame rate. *HAR-7709*
- Crash when importing Alembic files with out of bound colour values. *HAR-6844*
- The second controller of a Two Points Constraint node cannot be selected when there is a Transformation Gate node under it. *HAR-6770*

## Toon Boom Harmony 17.0.3

Here is the list of changes in Harmony 17.0.3, build 17.0.3.16641 (2020-12-16):



### NOTE

Harmony does not natively support the new Apple M1 chip. On systems using the new Apple M1 chip, Harmony runs through Apple's Rosetta 2. This may cause compatibility issues when running on the new ARM-based macOS systems.

- [New Features and Improvements on page 5](#)
- [Fixes on page 5](#)

## New Features and Improvements

- Improved the Line Thickness rendering option to be resolution independent. There are now three options available to compute the line thickness when rendering:
  - **Scale Dependent:** Line thickness varies based on the scale of drawing elements as well as the camera position.
  - **Scale Independent:** Line thickness is not affected by the scale of the drawing element or the position of the camera. This new option renders lines with the same width no matter the resolution at which the scene is rendered.
  - **Scale Independent (Legacy):** Line thickness is not affected by the scale of the drawing element or the position of the camera. Changing resolution changes the visual thickness when rendering. This option is provided for backward compatibility.
- Final frames, Other Directories and Libraries options can now be unchecked when using the Export to Offline option in Control Center, reducing the size of exported scenes.
- Improved performance when exporting importing scenes through WebCC on Linux and macOS servers.
- *tldbserver* closes tables that remain unused for a short period to free resources on the server.
- It is now possible to list only locks matching a given key by using the *-s* option when using the *dblock* utility.
- The *shortcuts.conf* file can now be placed in the user's home directory in addition to the applications etc folder. Harmony will attempt to read the file from the home folder before the applications etc folder.
- New *maxQp* parameter available in the *WebCCExporter* scripting class to set the level of compression used when generating movies with OpenH264 through scripting.

## Fixes

The following issues have been fixed in this release of Harmony:

## General

- Crash on macOS Big Sur when selecting the Tool Properties tab while the Brush, Pencil or Eraser tool is active.
- Harmony freezes when editing an element's name in layer properties on macOS 10.14 or later.
- Importing a PSD using the Individuals Layers option does not work properly when layer groups contain non alphanumeric characters.
- Importing a PSD as Toon Boom Bitmap or Vector does not work when using the "Individual Layers" option.
- Poor performance when drawing with the Brush tool on some on some Mac systems.
- Temporary files created in the *ToonBoomSessionTempDir*, when importing PSD files or using a script, are not deleted if a Wacom driver is installed on Windows.
- Ignore Parents and Parent's Name options of the Transformation Limit node are ignored if there is a Transformation Switch node.
- Poor performance when rotating a peg that uses curves that are shared with other nodes.
- Interlaced 16-bit per channel PNG are not read properly.
- Random crash when using the Transform tool with an Animated-Matte-Generator.
- Crash when using Solo mode in a scene that contains deformers.
- The Creating Breaking Triangles command has no effect on lines thinner than 4.5.
- Frames are missing from imported video when its frame rate is 23.976.

## Rendering

- Deformations can cause the opacity to lower on random pixels on a deformed drawing.
- Crash when rendering a scene on systems with 64 CPU cores or more.
- Crash when batch rendering a scene with a 3D model and a Transparency node.
- The `-renderThread` option has no effect when batch rendering.

## Database

- Delay when drawing using Pencil Textures when the scene is on a server.
- Drawings can be lost when using the Update Database Scene command if elements were renamed or duplicated.
- Drawing elements are missing when exporting scenes using Control Center, on macOS 10.15 or later, with a remote database.
- The Update Database Scene command sometimes fails with high latency connections.
- Batch rendering crashes when Harmony's preference file cannot be read.

- The Download Database Changes command in Harmony can corrupt scenes and has been removed from the File menu.
- Listing all the palettes in the palette browser is really slow when there is a large number of them.

## WebCC

- WebCC doesn't work with new versions of Firefox, Microsoft Edge and Chrome.
- WebCC sometimes crashes when listing scenes to import if corruption occurred during upload.
- Exporting a scene using WebCC does not work if the scene was never saved in Harmony.
- Random issue causes scenes exported from WebCC to fail to open in Harmony.
- The timestamp used by WebCC when creating temporary folders during an export uses minutes as it is the smallest unit.
- *FixURLHandler.sh* script does not work on Catalina.

## Scripting

- The plugin ScriptingInterfaces doesn't load when rendering in batch, resulting in the render queue to report "Process completed. Composite session returned with an unknown status".
- Harmony crashes when running the *TB\_sceneAboutToClose* script and that no scene is opened.
- Running a script in batch returns an exit code of 100 when there is no database token in the license.
- Control Center does not return anything when running a script through telnet.
- *func.addCtrlPointAfterPath3d* changes the point before the one that it inserted.
- The Pose Copier Paste button has to be clicked multiple times to work with some template.
- *TB\_RecolorDrawings.js* does not work with colour palettes created using the *color\_vectorize* option.



## Toon Boom Harmony 17.0.2

Here is the list of changes in Harmony 17.0.2, build 15414 (2020-01-17):



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### Drawing

Feature	Description	Editions
<p>Reverted to old drawing tool modifier keys and added a new one</p>	<p>In Harmony 17.0.0 and 17.0.1, the modifier keys for drawing straight lines using freehand drawing tools had been changed to match other drawing software and to add the ability to lock the angle of a straight line and redraw over it.</p> <p>As of Harmony 17.0.2, these modifier keys have been reverted to the ones used in Harmony 16. However, it is now possible to use the Spacebar key to lock the angle of a straight line and redraw over it.</p> <p>The new drawing tool modifier keys are as follows:</p> <ul style="list-style-type: none"> <li>• If you press and hold the Shift key before or while drawing, you will draw a straight line in any direction.</li> <li>• If you press and hold the Spacebar while drawing a straight line, it will lock the angle of your line. If you are using a pressure-sensitive tablet, you can then draw over your line to adjust its thickness.</li> <li>• If you press and hold the Shift and Alt keys before or while drawing, you will draw a straight horizontal or vertical line.</li> </ul> <p>If you preferred the modifier keys from Harmony 17.0.1, it is possible to revert to them by toggling a hidden preference which can be done by downloading, importing and running the script at the URL below:</p> <p><a href="https://docs.toonboom.com/go/download/ToggleStraightLineShortcuts">docs.toonboom.com/go/download/ToggleStraightLineShortcuts</a></p> <p>For reference, the drawing tool modifier keys in Harmony 17.0.1 were as follows:</p> <ul style="list-style-type: none"> <li>• If you press and hold the Shift key before or while drawing, your</li> </ul>	<p>All editions</p>

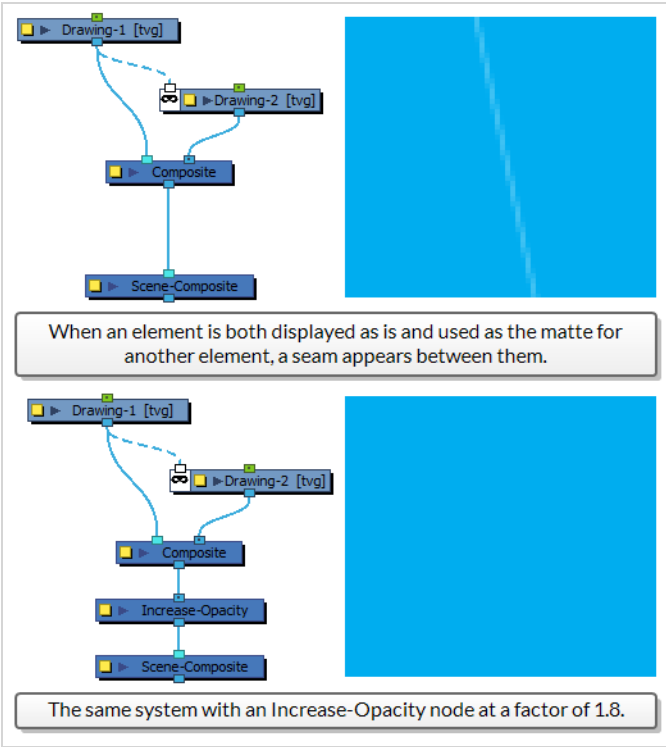
Feature	Description	Editions
	<p>drawing stroke will be a straight horizontal or vertical line.</p> <ul style="list-style-type: none"> <li>• If you press and hold the Shift and the Alt keys before or while drawing, you will start drawing a straight line until you release both the Shift and Alt keys.</li> <li>• When drawing a straight line using the Shift and Alt keys, releasing a single one of either key will lock the angle of your line. If you are using a pressure-sensitive tablet, you can then draw over your line to adjust its thickness.</li> </ul>	

## Digital Animation

Feature	Description	Editions
<p>Keyboard shortcut for Peg Selection mode</p>	<p>It is now possible to create a keyboard shortcut to toggle the  Peg Selection Mode option of the  Transform tool. When this mode is enabled, clicking on a drawing in the Camera view will automatically select the element's parent peg, if it has one.</p> <p>This keyboard shortcut can be found in the <b>General</b> section of the Keyboard Shortcuts dialog.</p>	<p>All editions</p>

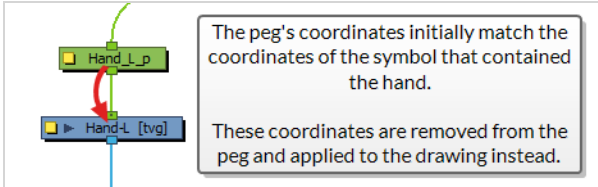
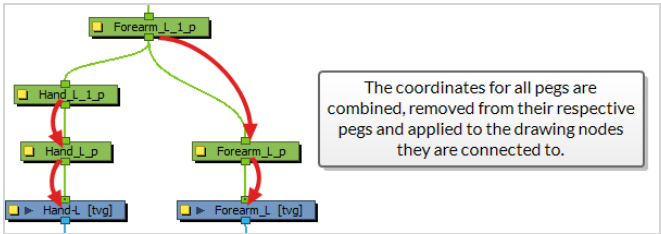
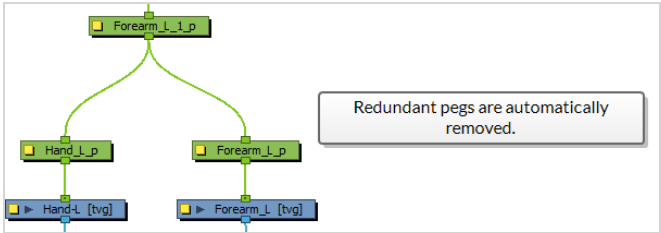
## Effects




Feature	Description	Editions
<p>Increase Opacity node</p>	<p>The new Increase-Opacity node allows you to reduce the transparency for any visual element in your scene. It works by multiplying the opacity of each pixel in the input image by a customizable factor.</p> <p>This can be used to fix a common issue in digital animation when one element is used as the cutter for another element, and both elements are composited together, creating a visible seam between them. A known work-around to this is to connect the problematic parts of the rig several times to the same composite so as to increase the opacity on their edges, but this can negatively impact performance. This node will increase the opacity around the edges of scene elements without causing unnecessary overhead.</p>	<p>Premium</p>


Feature	Description	Editions
	 <p>When an element is both displayed as is and used as the matte for another element, a seam appears between them.</p> <p>The same system with an Increase-Opacity node at a factor of 1.8.</p>	

## Import from Flash / Animate

Feature	Description	Editions
Support for latest versions of Adobe Animate	<p>Previously, the Export to Harmony extension for Adobe Flash / Animate was only supported from Flash CS 5.5 up to Adobe Animate 2015.1. The extension has been significantly modernized, and now only supports Adobe Animate 2018 and later.</p>	All editions
Automatic rig clean-up	<p>When importing a character rig exported from Adobe Animate, the symbol hierarchy is converted to a peg hierarchy.</p> <p>Before, the conversion was straightforward: One peg was created for every symbol, and the position of each peg was offset to correspond to the position of their respective symbol in the Animate scene. In cases of complex symbol hierarchies, this could create an overly complex peg hierarchy. It also made it difficult to “reset” the position of a peg, as it would often not return to the correct position in the character rig.</p> <p>Now, when importing a character rig from Adobe Animate, two clean-up routines are performed on the imported rig to make the</p>	All editions

Feature	Description	Editions
	<p>model easier to edit and animate by making it more simple:</p> <ul style="list-style-type: none"> <li>The value of each peg in the hierarchy is removed from the peg and baked into the drawing layer it connects to. This means that all pegs in the imported rig are at a position of (0, 0), and the drawing layers are offset to preserve their position.</li> </ul>  <p>When multiple pegs are connected in a row, their respective positions are combined and baked into the drawing layer that the chain connects to.</p>  <ul style="list-style-type: none"> <li>If several pegs are connected in a row in the hierarchy without any of them branching to multiple pegs, the superfluous pegs are removed. Only pegs that branch to multiple pegs or to a drawing layer will be preserved.</li> </ul> 	
<p>Support for synchronized layers</p>	<p>It is now possible to import the content of symbols in your Adobe Animate character rigs as synchronized layers in Harmony.</p> <p>For example, when rigging in Animate, it is common to create body parts made of multiple layers that need to remain synchronized—as in changing the drawing for one layer must also change the drawing for other layers—inside symbols. The rigger typically accomplishes this by putting all these layers inside a single symbol. Then they create every possible drawing combination for these layers inside</p>	<p>Advanced &amp; Premium</p>

Feature	Description	Editions
	<p>the symbol's timeline, and the animator only has to change the symbol's current frame.</p> <p>Previously all the layers inside such symbols were imported as separate, independent layers in Harmony. This kept the different layers of the artwork separate but then the animator had to change the exposed drawing separately on each layer to have a valid drawing combination.</p> <p>It is now possible to indicate that layers inside a symbol must be imported as synced layers in Harmony. To do this, in Adobe Animate, simply add the label "Sync" (case-insensitive) to the first frame of the layer containing the symbol which contains the layers that need to remain synced. When the model is exported from Animate and imported into Harmony, all the layers inside this symbol will be synchronized.</p> <div data-bbox="521 840 1250 1197" style="border: 1px solid #4F81BD; padding: 10px; margin-bottom: 10px;">  <p><b>TIP</b></p> <p>This is especially useful if some body parts of your characters are made of a symbol which contains mask layers. The mask layer and the masked layers will be converted to two synced drawing layers connected through a cutter. Afterwards, when you change which drawing is exposed in the masked layer in Harmony, the drawing exposed in the mask layer will be automatically updated to match.</p> </div> <div data-bbox="521 1228 1250 1428" style="border: 1px solid #4CAF50; padding: 10px; margin-bottom: 10px;">  <p><b>NOTE</b></p> <p>If a symbol marked with the "Sync" label contains a layer containing a symbol, that symbol will be "broken apart" and converted to flat drawings.</p> </div> <div data-bbox="521 1459 1250 1627" style="border: 1px solid #C0392B; padding: 10px;">  <p><b>IMPORTANT</b></p> <p>This feature is only supported in Adobe Animate 2020 or later.</p> </div>	
<p>Enhancements to the Swfimport utility</p>	<p>The <b>Swfimport</b> terminal utility, which is used by Harmony when importing character rigs exported from Adobe Animate, has been updated with the following changes:</p> <ul style="list-style-type: none"> <li>The utility is now able to import all drawings contained in a movie clip exported from the Library in Adobe Animate.</li> </ul>	<p>All editions</p>

Feature	Description	Editions
	<ul style="list-style-type: none"> <li>The new <b>-ignore_position</b> parameter will ignore the position information in the target SWF file. This causes all coordinates in the SWF file to be imported as they are into Harmony.</li> </ul> <div data-bbox="602 443 1252 709" style="border: 1px solid #c8e6c9; padding: 10px; margin: 10px 0;">  <p><b>NOTE</b> This generally results in the top-left corner of the drawing being positioned in the centre of the scene, as point (0, 0) in Animate represents the top-left corner of the stage, whereas it points to the centre of the stage in Harmony.</p> </div> <ul style="list-style-type: none"> <li>The new <b>-resolution &lt;width&gt; &lt;height&gt;</b> parameter will ignore the resolution of the SWF file and allow you to input a custom resolution instead.</li> </ul>	

## GNU/Linux Installation





Feature	Description	Editions
<p>CSH environment script</p>	<p>In Harmony 14 and earlier releases, the install script for GNU/Linux generated two environment scripts: One for Bash, named <b>usa_profile</b>, and one for CSH, named <b>usa_cshrc</b>. Depending on your shell environment, you could use either script to set some environment variables used by Harmony.</p> <p>When the installer was refactored for Harmony 15, the Bash environment script was also refactored and renamed <b>tba_profile</b>, but the CSH environment script was removed.</p> <p>As of Harmony 17.0.2, the installer also generates a CSH environment script, named <b>tba_cshrc</b>. This script does the same thing as the Bash environment script, except it uses CSH syntax.</p> <p>To include the Harmony environment script in your shell, type in the following command in a terminal:</p> <ul style="list-style-type: none"> <li>For Bash: <pre>\$ . /usr/local/ToonBoomAnimation/harmony [Edition]_17/etc/tba_profile</pre> </li> <li>For CSH: <pre>\$ source /usr/local/ToonBoomAnimation/harmony [Edition]_17/etc/tba_cshrc</pre> </li> </ul>	<p>Advanced &amp; Premium</p>

## Enhancements

- The distance for the pen stabilizer in the Pen Settings toolbar is now set to 20 by default.
- When importing an image as a Toon Boom bitmap, the canvas for the bitmap layer will be at least as big as the canvas for a new bitmap layer, providing sufficient space to edit the image.

## Fixed Issues






### Performance and Stability

- Memory leak and crash could occur when rendering QuickTime movies on macOS.
- Playback could slow down drastically when playing a scene multiple times without making changes.
- Crash occurred when using a keyboard shortcut to create a node while holding and dragging a cable in the Node View.
- Crash occurred when rendering a scene containing a Genarts Sapphire plug-in in batch mode.
- Crash occurred when attempting to paint on a bitmap layer with a colour that has an opacity of 0.
- Crash occurred when rendering a scene containing a 3D model with a directional blur effect applied to it in batch mode.
- Crash could occur when holding the T key to temporarily select the  Cutter tool and cut out an intersected pencil line while the  Pencil Editor tool is selected.
- Rare crash could occur when using the  Select tool with the  Snap to Contour tool mode enabled.


### Security

- On macOS 10.13 (High Sierra) and later, launching Harmony would trigger a prompt to allow Harmony to accept incoming connections if the firewall was enabled.

### Drawing

- If the **Brush Size Cursor** preference was enabled, the brush size cursor would disappear when drawing a stroke.
- When drawing a closed shape with the  Pencil tool by holding the Ctrl (Windows/Linux) or  (macOS) key, the line that closes the shape would sometimes disappear.
- If the user held the Shift key while drawing with the  Pencil tool to create a straight line, and then released and held the Shift key quickly to create another straight line, the lines would not be joined together and could be selected independently.
- When artwork was selected with the  Select tool with the  Permanent Selection tool mode enabled, selecting a different frame would not cause the selection to update if the Drawing view was not in the workspace.

## Digital Animation

- When rotating or scaling a layer using the  Transform tool, keyframes would be created for its scale and rotation functions, but not for its position functions.

## Effects

- Light rectangles appeared over the rendered image if a pass through composite was connected to a Dither node, which was connected to a Highlight node, which was connected to a bitmap composite.

## 3D

- When running the script `TB_MayaXmlToHarmony.js` on a 3D model that had not been rotated, its scale value on the z-axis would be reset to 1.

## Audio

- The waveform of sound effects displayed in the Timeline and Xsheet views was offset by a single frame on macOS.

## Rendering

- Rendering a scene with a Multi-Layer-Write node created TGA files by default when its default format is supposed to be PSD.
- When images were rendered in PNG format, at 16-bit/channel with alpha, the colour values were premultiplied with black. PNG images do not support premultiplication.
- Movies exported at 23.976 FPS on macOS played at 24 FPS in video editing software.

## Compositing

- Large PNG images with a 16-bit/channel colour depth would use twice the amount of RAM they actually need when imported as original bitmap files in Harmony.
- Large PNG images with a 16-bit/channel colour depth would sometimes not fully load when imported as original bitmap files in Harmony.
- In bitmap images that are premultiplied with black, pixels that had an alpha value of 0 or less but which had positive colour values were not composited into the rendered image.

## Import from Flash / Animate

- Tiled textures in Animate that were created with an image in any format but JPEG were not tiled when imported in Harmony.
- If a mask layer contained several symbols in different keyframes, some of the symbols would not be imported into the corresponding drawing layer in Harmony.
- If an image imported in Animate was broken apart and its rectangle was transformed with perspective using the Free Transform tool, its texture would not be imported to Harmony.



## Scripting

- The `node.removeDynamicAttr()` method sometimes returned a random boolean value when used to remove attributes from a Subnode-Animation node. If the random value was false, the Timeline view would not refresh even if an attribute was removed.
- The `Palette.acquire()` method always failed to move the target colour to the palette.

## Terminal

- Attempting to launch Control Center, Scan or Play via the terminal failed on macOS.

## Cosmetic




- When pressing the Centre on Selection keyboard shortcut (O) in the Timeline view, the layers list would not display properly.
- The ► expand and ▼ collapse arrows in the Library view and the 3D Graph view always appeared collapsed on macOS.

## Toon Boom Harmony 17.0.1

Here is the list of changes in Harmony 17.0.1, build 15085 (2019-09-05):

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### Rig Cache

Feature	Description	Editions
Accurate parallax rendering of layers	<p>In Harmony 17.0.0, when character models are cached, they were rendered from an arbitrary point of view right in front of them. In most cases, this did not cause any issue. However, if a cached rig had elements that were placed at different positions on the z-axis, the cached preview image would be inaccurate due to the parallax effect.</p> <p>As of Harmony 17.0.1, all cached rigs are rendered from the point of view of the scene's camera.</p> <p>As such, the  Bypass Problematic Nodes and  Hide Problematic Nodes options have been removed from the toolbar at the bottom of the Camera view. These options were added specifically to deal with character rigs containing elements that are too far apart on the z-axis, and are no longer useful.</p>	Premium only
Onion Skin support	When  Onion Skin is enabled, drawing layers in cached rigs will also appear in the Onion Skin preview.	Premium only
Keyboard shortcut	The <b>OpenGL Node Caching</b> command was added to the Keyboard Shortcuts dialog. When assigned to a keyboard shortcut, it toggles node caching on or off.	Premium only
Top View and Side View support	<p>The following changes have been made:</p> <ul style="list-style-type: none"> <li>• Cached rigs now appear as flat green hairlines in the Top</li> </ul>	Premium only

Feature	Description	Editions
	<p>View and Side View. Those lines represent the amount of lateral space the cached preview image occupies in the OpenGL preview.</p> <ul style="list-style-type: none"> <li>• Cached rigs appear as a single, flattened thumbnail in the list of element thumbnails on the side of these views.</li> </ul>	

## Drawing

Feature	Description	Edition
<p>Better control when drawing a straight line with a freehand tool</p>	<p>In Harmony 17.0.0, the key combination for drawing straight lines with a freehand drawing tool changed to Alt + Shift. The behaviour was also changed: When moving your tablet pen or mouse in the opposite direction as the line, the angle of the line locked, allowing you to draw over it to adjust its thickness.</p> <p>As of Harmony 17.0.1, you can keep adjust the angle and length of your line as long as you're holding both the Alt and Shift keys, regardless of the direction you pull your pen or mouse. You can lock the angle of your line by releasing one of either the Shift or Alt keys, after which you can redraw over your line. If you release both keys, you will resume drawing freehand.</p>	<p>All</p>
<p>Locking a drawing guide's angle</p>	<p>If you press and hold the Alt key while using drawing guides, the angle of the guide lines will stop following your mouse cursor and lock in position until you release the Alt key, allowing you to keep the guide lines at the right angle.</p> <p>By using this feature, you can rework the thickness or length of lines that you are drawing with a guide. It's also useful if you want to draw a dotted line along an axis.</p>	<p>All</p>
<p>Hidden preference to enable legacy drawing keyboard modifiers</p>	<p>A hidden preference was added to allow users who preferred the drawing key modifiers for Harmony 16 and earlier to restore those modifiers. Enabling this preference does the following:</p> <ul style="list-style-type: none"> <li>• Holding Shift will make your freehand drawing tool draw a straight line in any angle.</li> <li>• Holding Shift + Alt will make your freehand drawing tool draw a straight horizontal or vertical line.</li> <li>• There is no way to lock your line's angle and draw over it.</li> </ul> <p>You can toggle this preference by downloading, importing and running</p>	<p>All</p>

Feature	Description	Edition
	<p>the script at the URL below:</p> <p><a href="https://docs.toonboom.com/go/download/ToggleStraightLineShortcuts">docs.toonboom.com/go/download/ToggleStraightLineShortcuts</a></p>	

## Export

Feature	Description	Edition
Export in H.264/MPEG-4 with audio	<p>It is now possible to export movies in H.264/MPEG-4 format with audio.</p> <p>In order to support this, exports made with the H.264/MPEG-4 codec will now use the QuickTime Movie (.mov) extension instead of the MPEG-4 (.mp4) extension. This is because, when using this codec, Harmony can only export sound in uncompressed audio (PCM), which is not supported by the MPEG-4 container.</p> <p>Hence, the option in the Export Movie dialog and the Write Node layer properties has been renamed <b>H.264/MPEG-4 (*.mov)</b>. It is still different from <b>QuickTime Movie (*.mov)</b> in that it is created by Harmony and does not depend on Apple QuickTime.</p>	All

## Node View


Feature	Description	Edition
Follow Node View hierarchy instead of Timeline view hierarchy when navigating nodes	<p>The keyboard shortcuts, <b>Select Parent Skipping Effects</b> (B) and <b>Select Child Skipping Effects</b> (Shift + B) are often used to quickly navigate the hierarchy of a scene. However, in certain cases, the hierarchy may appear different in the Timeline and in the Node views. Up until now, these keyboard shortcuts only followed the hierarchy in the Timeline view.</p> <p>A new option, <b>Follow Node View Parenting for Node Navigation</b>, was added to the <b>Advanced</b> tab of the <b>Preferences</b> dialog. When enabled, these keyboard shortcuts will allow you to navigate the scene's hierarchy as represented in the Node View, rather than in the Timeline view.</p>	Premium only

## Preferences

Feature	Description	Edition
User interface language	<p>It is now possible to select your preferred user interface language in the Preferences dialog.</p> <p>Harmony currently supports English, Chinese (Simplified), Japanese and Spanish. In previous versions, Harmony would always launch in the language of your operating system if supported, or in English otherwise. By setting this preference, you can make Harmony launch in a specific supported language regardless of the language of your operating system.</p> <p>You can change this preference in the <b>General</b> tab of the Preferences dialog.</p>	All

## Utilities



Feature	Description	Edition
Import image to line art or color art with utransform	<p><b>utransform</b> has the following new parameters:</p> <ul style="list-style-type: none"> <li>• <b>-addlineart &lt;file&gt;</b>: Import an image as the drawing's line art layer.</li> <li>• <b>-uselayer &lt;art layer&gt;</b>: When importing a Toon Boom Vector Drawing as the target drawing's line art layer, select which of the source drawing's art layers to import.</li> <li>• <b>-addcolorart &lt;file&gt;</b>: Import an image as the drawing's color art layer.</li> <li>• <b>-usecolorartlayer &lt;art layer&gt;</b>: When importing a Toon Boom Vector Drawing as the target drawing's color art layer, select which of the source drawing's art layers to import.</li> </ul> <p>These new parameters work exactly like the already existing <b>-addoverlay</b>, <b>-useoverlaylayer</b>, <b>-addunderlay</b> and <b>-useunderlayerlayer</b>, except you can now perform the same tasks on the target drawing's line art and color art layers.</p>	All
Preserve artwork transformations when replacing bitmap artwork	<p><b>utransform</b> now has the <b>-keep_bitmap_transform</b> parameter. When using this parameter in conjunction with the <b>-addlineart</b>, <b>-addcolorart</b>, <b>-addoverlay</b> or <b>-addunderlay</b> art layers, if the target art layer is a bitmap layer, Harmony will replace the artwork in this bitmap layer without resetting the geometrical transformations</p>	All











Feature	Description	Edition
	that were done to it with the  Select tool.	



















## Scripting

Feature	Description	Edition
Convert 3D Path functions to Separate functions	<p>The new <b>convertToSeparate ()</b> method of the <b>func</b> class allows you to convert a 3D path function into an array of three Bezier functions representing its x, y and z axes.</p> <p>The conversion must be approximate. Hence, it allows you to use one of two approximation algorithms: one that prioritizes the accuracy of the spline's shape, which may cause some keyframes to be offset in time, and one that prioritizes the position of its keyframes in time, which may affect the shape of the spline a bit.</p>	All
Get tension of an ease function	The <b>tensionEase ()</b> method was added to the <b>func</b> class. It will return the tension of the ease function that is passed as its parameter.	All
Specify colour IDs when checking for used colours	The <b>containsUsedColors ()</b> method of the <b>Palette</b> class now requires a list of colour IDs as a parameter, to check whether specific colours in the palette are used.	All
Export to SVG	The <b>TB_ExportSVG.js</b> script has been enhanced to be easy to use. Comments have been added at the beginning of the script to explain how to use it.	All

## Fixed Issues

- When opening a scene on Windows, Harmony sometimes fails to initialize the audio device, preventing audio playback.
- WebCC fails to launch on GNU/Linux.
- Harmony crashes when attempting to delete a control point when using the  Centerline Editor.
- Harmony may crash when pressing a keyboard shortcut to temporarily use the  Centerline Editor tool and a keyboard shortcut to temporarily use another tool simultaneously.
- Harmony occasionally crashes when working in the Camera or Drawing view with multiple OpenGL views opened on macOS.

- Harmony crashes when attempting to undo after copying and pasting animation keyframes on a layer's parameters in the Timeline view.
- Harmony may hang when a Two-Points-Constraint node has a parent peg with a scale of 0.
- Harmony crashes when connecting an Image-Switch node that has no input image to a Composite node.
- Harmony hangs indefinitely when using the  Contour Editor with the  Snap to Contour and  Apply to Line and Colour Art tool modes enabled.
- Harmony may crash when enabling caching on several nodes.
- Memory leak may occur when playing a scene that has multiple cached rigs in high resolution.
- When a scene created in Harmony Premium and which contains cached rigs is opened in Harmony Advanced or Harmony Essentials, then saved, caching gets disabled for all rigs in the scene.
- Changing drawings in a cached rig using the Drawing Substitutions view will not make the cached preview image update.
- Switching between the  Rigging tool and another tool will not make the cached preview image update.
- Selecting an element in a cached rig does not disable its cache if the rig is connected twice to its composite.
- The first playback of a scene with cached rigs is slower than if there was no cached rigs.
- Manipulating the  Transform tool control box on an element in a cached rig is slower.
- Cached preview images may appear in the exported images when exporting Open GL frames.
- Cached elements may appear cropped when moving them in the Top or Side views. HAR-5358
- The  Toggle Node's Cache button is not greyed out when no element is selected.
- The  Load Grid Preset button of the  Grid Wizard opens an Open dialog, then displays an error message.
- No error message appears when attempting to create a Master Controller with the Grid Wizard or the Slider Wizard where all the source poses are the same.
- When creating a Master Controller in a Harmony Server scene and creating the poses database (`.tbstate`) file at the job or the environment level, Harmony will not create the `scripts` folder in which to store the Master Controller, causing it to fail to create the file.
- Error message appears when saving a grid preset in the Grid Wizard dialog.
- The left column of the Timeline view does not scroll along when holding Spacebar and clicking and dragging on it.
- View specific toolbars may disappear after restarting Harmony.
- Timeline view does not remain centred on mouse cursor when using the keyboard shortcuts to zoom in or out.
- Library view toolbar is not present in the default workspace.
- Preview of drawing stroke does not appear when drawing with the  Pencil tool while holding a modifier key if the  Draw Behind option is enabled

- When starting a drawing stroke with a drawing guide, the start of the stroke may shift a bit as Harmony determines which one of the guide's axes to lock onto.
- The  Stamp tool draws an extra line when drawing a stroke with the  Draw Behind tool mode and the  Current Drawing On Top switch enabled.
- Preview of drawing stroke does not appear when drawing with the  Brush or  Pencil tools and a drawing guide if the  Draw Behind tool mode is enabled.
- When the  Apply to Visible Drawing Layers tool mode is enabled, it is not possible to select several strokes with the  Select tool by holding Shift and clicking on each of them.
- The Alt modifier key has no effect when using a keyboard shortcut to temporarily override the current tool.
- When drawing with the  Brush tool using a textured brush, if there is a minimum amount of pressure set in the Pen Pressure Feel dialog, the vector envelope of the brush stroke may be too small and clip the texture inside it.
- When drawing with the  Pencil tool using a fixed thickness preset, if there is a minimum amount of pressure set in the Pen Pressure Feel dialog, pencil lines are drawn even when not putting the minimum amount of pressure to draw a stroke.
- If the user presses and releases Shift while drawing with a guide, the drawing stroke may end up different from what was drawn.
- Visual artifacts appear when drawing a straight line with the Stroke tool by holding the Shift and Alt keys on macOS.
- Control box of the  Transform tool's is extremely small when selecting an element that contains an empty drawing
- Control box of the  Transform tool is wrong when selecting a peg containing several elements and one of them contains an empty drawing.
- The bounding box of the  Transform tool does not adjust to new position of peg when pasting a keyframe on the selected peg layer.
- Bounding box of selected drawing does not update when undoing a transformation with the  Transform tool in  Animate Off mode, if the selected drawing is animated with a 3D path function.
- Bounding box of selected drawing does not update when undoing a transformation with the  Transform tool in  Animate Off mode, if the selected drawing is animated with a 3D path function.
- Attempting to select an element in the Camera view sometimes fails after zooming in or out when in  Render View mode.
- Copying and pasting a keyframe on a parameter in the Timeline view does not update the value displayed for the current frame.
- Some drawings are discarded when importing a template containing synced layers.
- If the user syncs two layers, undoes, then copies and pastes one of the formerly synced layers using Paste Special, the resulting copied layer will appear to be synced.




- When a layer that is a clone or a duplicate of a synced layer is selected, the synced layer indicator appears for that layer in the Node view and the Xsheet view.
- The names of every layer listed in the **Convert to Synced Drawing Layer** dialog are prefixed with **Top/**.
- If the **Default Pass Through Composite** preference is enabled, composite nodes created with the **Group Selection with Composite** command are not Pass Through.
- Using the Select Child Skipping Effects keyboard shortcut (Shift + B) does not work if the child layer is connected under a deformation group containing a Transformation-Switch node.



#### NOTE

Attempting to select a child node through a group that contains a Transformation-Switch node will only work if the **Follow Node View Parenting for Node Navigation** preference is enabled. This preference can be enabled in the **Advanced** tab of the Preferences dialog.

- When rendering a scene in double-precision (16-bit / channel) PNG format (ie: **PNGDP3** and **PNGDP4**), pixels with negative colour values (ie: pixels rendered through by a Shadow node) are rendered as solid red.
- Cannot remove Subnode-Animation attributes that have been created dynamically with a script.
- If the user sets a custom keyboard shortcut, switches to a different shortcut set, then clicks Cancel, the new custom keyboard shortcut is saved.
- WebCC crashes when attempting to render a preview movie if the Cisco OpenH264 codec is not installed.
- Error when attempting to download the Cisco OpenH264 codec on GNU/Linux.
- In Harmony Server, if a palette stored in a job or environment that is locked for editing by another user is selected while  Edit Palette mode is enabled, its colour swatches will not load in the Colour view.
- When uploading changes to a scene on WebCC, the content of the scene's **frames** folder on the database server gets deleted.
- When loading a skin on certain gaming character rigs, the exposure of some of the drawings in the affected layers is reduced to one frame.
- The Harmony SDK does not compile on macOS without explicitly adding its subdirectories to the INCLUDEPATH variable.

## Toon Boom Harmony 17.0.0

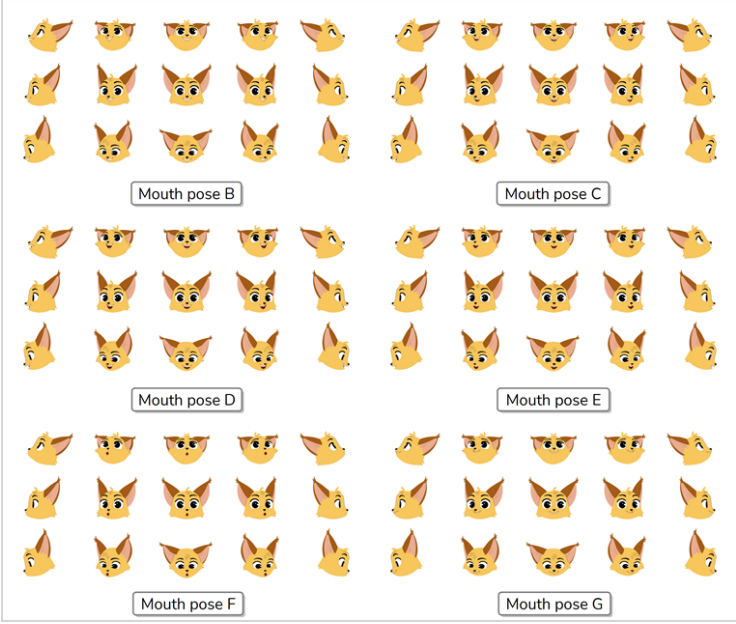

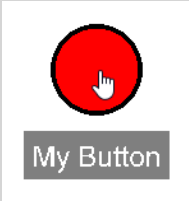

Here is the list of changes in Harmony 17.0.0, build 14765 (2019-06-07):

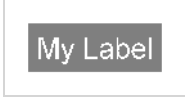

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### Master Controller

Feature	Description	Edition
Stack Wizard	A new Master Controller wizard, the Stack Wizard, allows you to create a Master Controller that combines a 2D point widget and a slider widget. It works similarly to the Grid Wizard, except that it allows you to combine several grids of poses. The 2D point allows you to pose your character based on the current grid of poses, and the slider allows you to switch between grids.	Premium only


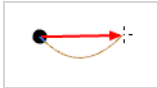

Feature	Description	Edition
	<div data-bbox="516 275 1198 642" data-label="Image"> </div> <p data-bbox="516 674 1230 915">                     A good example of how this can be used is by creating a 2D point widget that sets the angle your character's head is facing, and a slider that sets its mouth pose. By creating a grid of the character's head looking in every direction, then creating alternate versions of this grid for each mouth pose, you can use the Stack Wizard to generate a Master Controller that controls both aspects of your character.                 </p> <div data-bbox="516 940 1253 1310" data-label="Image"> </div>	

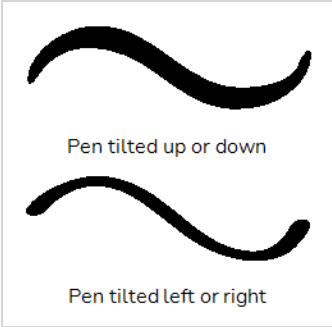
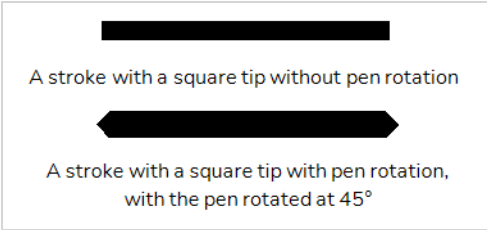
Feature	Description	Edition
	 <p>To use this wizard, create a grid of poses in a scene like you would for the Grid Wizard, then all the variations needed for that grid of poses. Then, in the Master Controller toolbar, click on the  Stack Wizard button.</p>	
<p>New widgets</p>	<p>The following new Master Controller widgets can be created in Harmony:</p> <ul style="list-style-type: none"> <li> <p><b>Button:</b> This widget can be scripted to fire an action when clicked on.</p>  </li> <li> <p><b>Checkbox:</b> This widget is like a button, except that it toggles on and off. It can be scripted to fire different actions depending on whether it's switched on or off.</p>  </li> </ul>	<p>Premium only</p>

Feature	Description	Edition
	<ul style="list-style-type: none"> <li>• <b>Label:</b> This widget creates a simple text label inside a rectangle. It cannot be interacted with, but it can help make other widgets easier to identify.</li> </ul>  <p>For more information, refer to the scripting API documentation.</p>	
Editing Master Controllers	<p>The new Unroll Wizard allows you to "unroll" the original character poses of a Master Controller into the current scene, and makes changes to them.</p> <p>For example, if you have a character with a Master Controller that controls the direction in which it is looking, you can use the Unroll Wizard to recreate the poses of your character looking in every direction that were used to generate this Master Controller, into the current scene.</p> <p>Unrolling a Master Controller can be useful if you wish to make changes to an existing Master Controller. By unrolling its poses into a scene, you get to make changes to the poses, then create a new Master Controller that uses the modified poses.</p> <p>To use the Unroll Wizard, select a Master Controller in your scene. Then, in the Master Controller toolbar, click on the  Unroll Wizard button.</p>	Premium only
Stepped Slider	<p>When creating a Slider-type Master Controller with the Slider Wizard, you now have the option to make the slider "stepped". This means that, when you manipulate the slider, instead of interpolating between the different poses that were used to create the Master Controller, it will set the character to one of these poses, with no interpolation.</p> <p>This can be useful if you wish to create a slider to select between a set of poses that are not meant to interpolate between one another, such as mouth poses..</p> <p>To use this option, simply uncheck the <b>Interpolate Between Poses</b> option when using the Slider Wizard.</p>	Premium only
Pose database storage	<p>When creating a Master Controller in Harmony Server using the Stack Wizard, the Grid Wizard or the Slider Wizard, you will be prompted to select at which level (scene, job, environment or global) you want the Master Controller's poses database to be</p>	Premium only

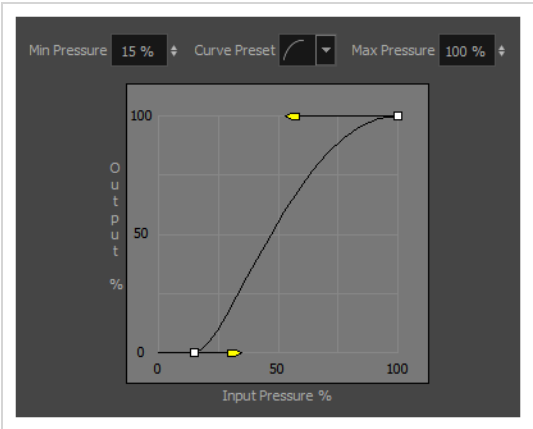




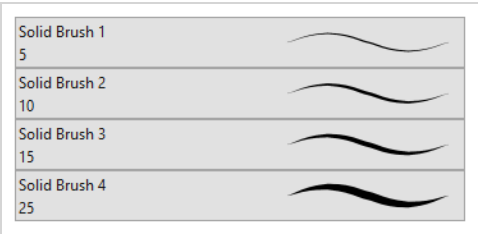
Feature	Description	Edition
	stored.	
Show Master Controllers button	A new button in the <b>Master Controller</b> toolbar,  Show Master Controllers, allows you to pull a list of Master Controllers in the selected group, and select which ones to display or hide.	Premium only
Nudging Master Controller widgets	It is now possible to select a Master Controller widget and nudge it in any direction by pressing the arrow keys.	Premium only
Persistent Wizard state	When you close the Grid Wizard or the Stack Wizard, the current configuration of its grid or grid stack is saved to your preferences, and will be reloaded the next time you open that wizard.	Premium only
Jumping to selected frame	In the Grid Wizard and the Stack wizard, when you associate a point in the grid to a frame, the current frame in the Harmony user interface is automatically set to that frame.	Premium only
Labels	<p>In addition to the Label widget, the following Master Controller widgets can be configured to have labels by setting some of their properties:</p> <ul style="list-style-type: none"> <li>• 2D Point</li> <li>• Slider</li> <li>• Button</li> <li>• Checkbox</li> </ul> <p>This can be done by setting the widget's <b>label</b> property, as well as other related properties, when creating the widget. For more information, refer to the scripting API documentation .</p>	Premium only
Customization	It is now possible to make the 2D point widget appear either as circle, a square, a triangle or a diamond. This can be done by setting the widget's <b>point_style</b> property when creating it. For more information, refer to the scripting API documentation	Premium only


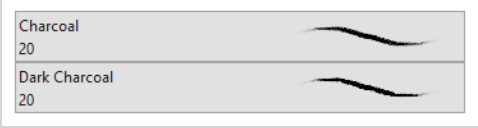





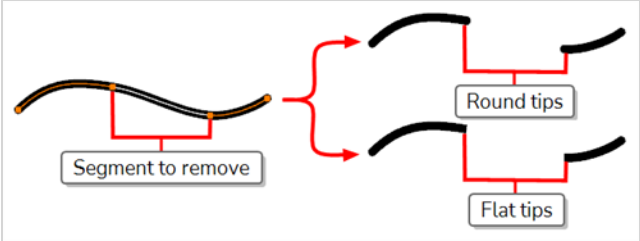




## Drawing Tools

Feature	Description	Editions
<p>Pen stabilizer</p>	<p>The new pen stabilizer can help you draw smooth, stable lines by stabilizing your drawing strokes as you draw, without having to smooth them afterwards. It works by letting you draw a stroke without generating a line immediately, instead it starts generating a line that trails behind your mouse cursor or tablet pen once it reaches a certain length. By trailing behind your stroke, it can smooth out the flaws in your drawing gesture and generate a smooth stroke.</p> <p>There are two different stabilizing method methods:</p> <ul style="list-style-type: none"> <li> <p><b>Average:</b> Harmony calculates the average direction of all of your mouse or pen gestures between the end of the actual drawing stroke and the current position of your mouse cursor or pen tip, and extends the stroke in this average direction, effectively evening out jitter and rounding sharp turns.</p>  </li> <li> <p><b>Pulled String:</b> When you start drawing a stroke, Harmony positions the drawing tool where your stroke starts. As you move the mouse or tablet pen, the drawing tool remains in that position, but a "string" appears, linking your drawing tool to your mouse cursor or pen tip.</p>  <p>Once a certain maximum length is reached, the string pulls the drawing tool in the direction of your mouse cursor or tablet pen.</p>  </li> </ul> <p>The distance between your mouse cursor or tablet pen and the stroke can be customized.</p> <p>This feature can be enabled by adding the <b>Pen Settings</b> toolbar to your workspace, and selecting either <b>Average</b> or <b>Pulled String</b> in the toolbar's drop-down menu.</p>	<p>All</p>
<p>Pen tilt support</p>	<p>If you have a tablet and pen that support reading the tilt angle of</p>	<p>All</p>

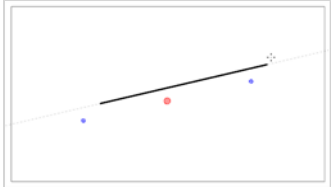
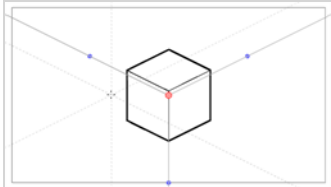
Feature	Description	Editions
	<p>your pen, you can configure the Brush tool to use this information and draw with a tilted tip. A tilted tip will be stretched or projected at the angle in which you tip your tablet pen, simulating the effect of drawing with a tilted pencil or felt pen.</p>  <p>This feature can be used by adjusting the <b>Pen Tilt Sensitivity</b> parameter in the <b>Brush Properties</b> dialog.</p>	
Pen rotation	<p>If you have a tablet and pen that supports reading the rotation angle of your pen, you can configure the Brush tool to use this information so that the rotation of your brush tip is based on how you rotate your tablet pen.</p>  <p>This feature can be used by enabling the <b>Use Pen Rotation</b> property in the <b>Brush Properties</b> dialog.</p>	All
Pen pressure feel editor	<p>Harmony now allows you to configure the curve by which it processes the amount of pressure you put on your pen tablet to calculate the thickness, flow or opacity of your brush or pencil lines.</p>	All

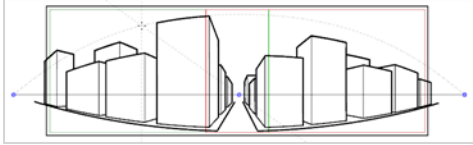
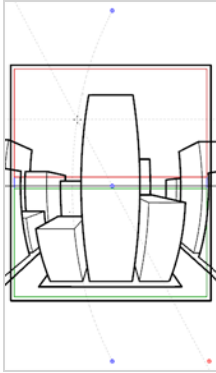


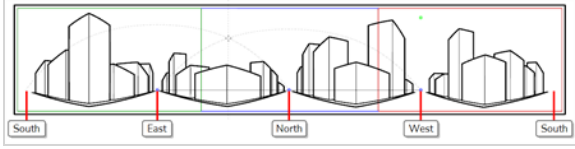
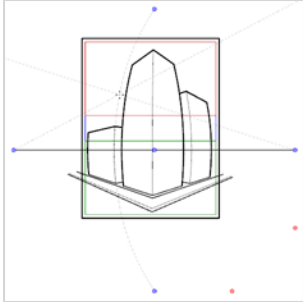
Feature	Description	Editions
	 <p>The Pen Pressure Feel dialog can be accessed by adding the <b>Pen Settings</b> toolbar to your workspace, then clicking on the  Pen Pressure Feel button.</p>	
<p>Adjust thickness when drawing straight lines</p>	<p>When drawing straight lines with the  Brush or  Pencil tool using a pressure sensitive pen tablet, you can drag your pen back over your stroke to adjust or increase its thickness, as if you were drawing with a pressure-sensitive pen against a ruler. There are two different approaches to this:</p> <ul style="list-style-type: none"> <li>• If you draw while pressing and holding the Shift key, you will draw a horizontal or a vertical line.</li> <li>• If you draw while pressing and holding both the Alt and Shift keys, you will draw a straight line in any direction. If you drag your pen in the opposite direction of your line, the angle of your line will lock and you will be able to draw over it.</li> </ul>	<p>All</p>
<p>New &amp; updated brushes</p>	<p>The brush presets for the  Brush tool have been updated.</p> <ul style="list-style-type: none"> <li>• Solid vector brushes are now sorted by size, starting from 5 and going to 25.</li> </ul>  <ul style="list-style-type: none"> <li>• <b>Fine Pencil</b>, <b>Tilting Pencil</b> and <b>Chisel Tip</b> brushes have been added.</li> </ul>	<p>Advanced &amp; Premium</p>

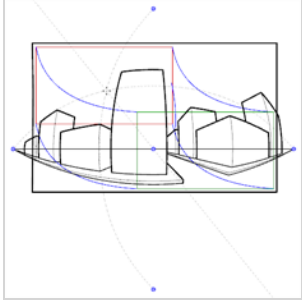
Feature	Description	Editions
	 <ul style="list-style-type: none"> <li>• <b>Charcoal</b> has been updated, and its alternative, <b>Charcoal Pencil</b>, has been replaced with <b>Dark Charcoal</b>.</li> </ul> 	
Stroke tool smoothing	The  Stroke tool now creates smoother lines with less unnecessary control points.	All
Keyboard shortcut for Draw Behind	It is now possible to assign a keyboard shortcut to toggle the  Draw Behind tool property. This shortcut is listed as <b>Draw Behind</b> under the <b>Drawing Mode</b> section of the keyboard shortcuts list, and has no default assignment.	All
Tip Style option for the Contour Editor tool	<p>The  Contour Editor tool now has a  Tip Style option in the Tool Properties view. This option allows you to select which style of tips should the extremities of pencil lines be left with when you select and delete a pencil line segment with the  Contour Editor tool.</p> 	Advanced & Premium
Default Tip Style	When you set the  Tip Style for the  Cutter,  Eraser or  Ink tool in the <b>Tool Properties</b> view, it is now saved in your preferences, separately for each tool.	Advanced & Premium
Synchronize Brush and Eraser size	It is now possible to synchronize the size of the Brush and Eraser tools. To do this, open the <b>Preferences</b> dialog and, in the <b>Drawing</b> tab, check <b>Synchronize Eraser and Brush</b> .	Advanced & Premium

## Drawing Guides

Feature	Description	Editions
<p>New drawing guides</p>	<p>Several new drawing guides have been added:</p> <ul style="list-style-type: none"> <li>• The <b>Ruler</b> allows you to position and rotate a simple straight axis, and then draw a line along that axis, like a regular ruler.</li> </ul>  <ul style="list-style-type: none"> <li>• The <b>Isometric Perspective</b> guide helps you draw lines that are parallel to one of three axes: The x-axis, the y-axis and the z-axis. The angle of each axis can be customized as needed.</li> </ul> <p>This type of pseudo-perspective, also referred to as parallel projection, is often used in 2D games, computer graphics and schematics to depict 3D objects and environments without using any actual perspective, foreshortening or 3D rendering. In 2D animation, it is often used to draw long panning backgrounds from a low or high angle.</p>  <ul style="list-style-type: none"> <li>• The <b>3-Point Perspective (Horizontal Pan)</b> guide helps you draw horizontally panoramic backgrounds, with curvilinear horizontal lines. A vanishing point is placed in the middle of the horizon line, to help draw lines on the z-axis, and two vanishing points are placed on the horizon line outside of the camera field, to define the curve of horizontal lines. Vertical lines are made perpendicular to the horizon line.</li> </ul> <p>This is useful for drawing backgrounds meant to be panned over horizontally. Panning the camera horizontally over a background drawn with a 3-Point Perspective (Horizontal Pan) guide will simulate a rotation of the camera on the y-axis.</p>	<p>All</p>

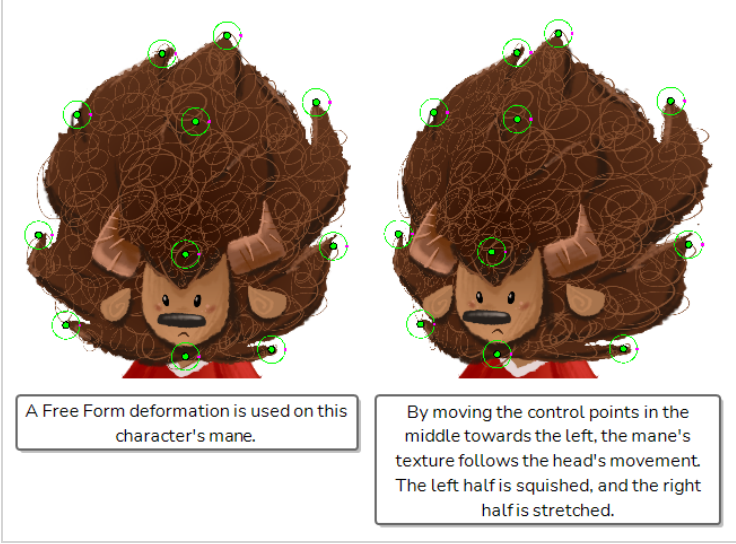



Feature	Description	Editions
	 <ul style="list-style-type: none"> <li> <p>The <b>3-Point Perspective (Vertical Pan)</b> guide helps you draw vertically panoramic backgrounds, with curvilinear vertical lines. A vanishing point is placed in the middle of the horizon line, to help draw lines on the z-axis, and two vanishing points are placed above and below the horizon line, outside of the camera field, to define the curve of vertical lines. Horizontal lines are made parallel to the horizon line.</p> <p>This is useful for drawing backgrounds meant to be panned over vertically. Panning the camera vertically over a background drawn with a 3-Point Perspective (Vertical Pan) guide will simulate a vertical rotation of the camera on the x-axis.</p>  </li> <li> <p>The <b>4-Point Continuous Perspective</b> guide is very similar to the 3 Point Perspective (Horizontal Pan) guide, except that it is designed to help draw full 360° panoramic backgrounds.</p> <p>This guide uses 5 vanishing points. When drawing a horizontal line, it is curved by arching over one of the vanishing points and reaching down to the two surrounding vanishing points. This creates a perspective effect where each vanishing point represents one of the cardinal points, except that the leftmost and the rightmost points represent the same cardinal point, effectively creating a looping background. Backgrounds made with the 4-Point Continuous Perspective guide can be looped horizontally to simulate a full rotation of the camera on the y-axis.</p> </li> </ul>	

Feature	Description	Editions
	 <ul style="list-style-type: none"> <li>• The <b>4-Point Perspective (Vertical Pan)</b> is a lot like the 2-Point Perspective guide, except that its vertical lines are curvilinear, so it can be used to make vertically panning backgrounds. Two vanishing points are on the horizon line, outside of the camera field, to help draw lines on the x-axis and the z-axis, and two vanishing points are placed above and below the camera field to define the curve of the vertical lines.</li> </ul> <p>This is useful for drawing backgrounds meant to be panned over vertically, in which cuboid objects are seen from an angle.</p>  <ul style="list-style-type: none"> <li>• The <b>5-Point Perspective (Fish Eye)</b> guide helps you draw backgrounds that are curvilinear on both the x-axis and the y-axis. It has one central vanishing point on the horizon line, from which lines on the z-axis are drawn, two vanishing points at the extremities of its horizon line, to define the curve of horizontal lines, and two vanishing points above and below the horizon line, to define the curve of the vertical lines.</li> </ul> <p>This guide can be used to draw backgrounds with a fisheye-style wide angle lens effect. It can also be used to draw backgrounds that are meant to be panned in various directions.</p>	





Feature	Description	Editions
	 <p>Each guide is available in the <b>+</b> Add Guide pop-up menu of the <b>Guides</b> view.</p>	
Locking the guide angle	<p>If you press and hold the Alt key while using drawing guides, the angle of the guide lines will stop following your mouse cursor and lock in position until you release the Alt key, allowing you to keep the guide lines at the right angle.</p> <p>By using this feature, you can rework the thickness or length of lines that you are drawing with a guide. It's also useful if you want to draw a dotted line along an axis.</p>	All
Guide angle display	<p>When you rotate a guide, its exact angle is displayed in the top-left corner of the Camera view.</p>	All
Rotating guides from centre	<p>Some guides can be rotated by moving one of the two points on their horizon line, which rotates them around the opposite point. If you press and hold the Alt key while moving one of their points, it will rotate the guide around its centre instead. This works for the following guides:</p> <ul style="list-style-type: none"> <li>• Ruler</li> <li>• 2-Point Perspective</li> <li>• 3-Point Perspective (Bird's-Eye View)</li> <li>• 3-Point Perspective (Worm's-Eye View)</li> </ul>	All



## Deformations

Feature	Description	Editions
Free Form Deformation	<p>The new Free Form Deformation is a type of deformer that can be used to deform textures. It works by creating points anywhere inside</p>	Premium only

Feature	Description	Editions
	<p>an element, then manipulating these points to deform the element in a way similar to pulling on different parts of a piece of cloth.</p>  <p>To create a Free Form Deformation, select the Rigging tool in the Deformation toolbar. Then, in the Tool Properties view, select  Free Form Mode. Select the element you want to deform, and click where you want to create deformation points.</p>	
<p>Show deformations without hiding others</p>	<p>A  Show Selected Deformers button was added to the Deformation toolbar. Contrary to the existing  Show Selected Deformation Chains and Hide All Others button, this button displays the deformation chain for the selected element without hiding others.</p>	<p>All</p>


## Digital Animation

Feature	Description	Editions
<p>Alignment guides in the Camera view</p>	<p>It is now possible to add horizontal and vertical guides to the Camera view. Alignment guides are visible when the  Transform tool is selected, and can be used to help you align elements to specific areas of the stage.</p> <ul style="list-style-type: none"> <li>You can add guides using the  New Horizontal Alignment Guide and  New Vertical Alignment Guide buttons in the toolbar above the <b>Camera</b> view.</li> <li>You can manipulate alignment guides using the </li> </ul>	<p>All</p>

Feature	Description	Editions
	<p>Transform tool.</p> <ul style="list-style-type: none"> <li>You can hide or display guides by toggling the  Show Alignment Guides button in the toolbar below the <b>Camera</b> view.</li> <li>You can lock or remove alignment guides using the menu commands available when selecting <b>View &gt; Alignment Guides</b> in the top menu.</li> <li>You can make elements snap to alignment guides by enabling the  Snap to Alignment Guides option of the Transform tool in the Tool Properties view.</li> </ul>	
Frame markers	<p>It is now possible to add coloured markers to frames in the Timeline view. Frame markers differ from drawing markers in that they are not tied to a drawing, but to a frame. They can be added to any frame, whether or not it contains a drawing. They also differ from scene markers as they are added to specific layers rather than the entire scene, and only mark a single frame.</p> <p>To add a frame marker, right-click on a frame in the <b>Timeline</b> view and select <b>Mark Frame</b>, then select the desired colour to mark the frame with.</p> <p>It is possible to assign keyboard shortcuts to quickly navigate between frame markers, whether of any colour or of a specific colour. Those keyboard shortcuts can be set in the <b>Timeline</b> section of the <b>Keyboard Shortcuts</b> dialog.</p>	All
Exclude layers in Pose Copier	<p>The Pose Copier dialog now allows you to select layers in your rig to exclude from the pose copying process. This can be useful if you have a template containing many full character poses, but you only want to paste certain parts of these poses on your character.</p> <p>To use this feature, first, select every layer you want to exclude in the Timeline view. Then, right-click on them and select <b>Tag &gt; Timeline Tag</b>. Then, once in the Pose Copier dialog, check the checkbox next to the <b>Exclude Layers</b> button, then click on this button.</p>	Advanced & Premium




## Node View

Feature	Description	Editions
Preference for pass through composite as default	<p>There is now a preference to make new Composite nodes in Pass Through mode by default.</p> <p>This preference, named <b>Default Pass Through Composite</b>, is available in the <b>General</b> section of the <b>Preferences</b> dialog.</p>	Premium only
Rip & insert composite	<p>It is now possible to insert a composite in the middle of a connection cable by holding the Alt key and moving it over the cable.</p> <p>It is also possible to rip a composite from a connection by holding the Alt key and moving it out of its cables.</p> <p>Up until Harmony, this was possible with every node that has at least one input and one output port, except for the Composite node.</p>	Premium only
Straight cable display	<p>It is now possible to display cables in the Node view as straight lines going directly from one port to the other. This can be useful if your node network uses a lot of waypoints, as connections between waypoints display as straight lines.</p>	Premium only
Set composite mode on several composites	<p>Using the Set Properties on Many Layers dialog, you can change the mode of all composite nodes in the selection to either As Bitmap or Pass Through.</p> <p>To access this dialog, click on the  Set Properties on Many Layers button in the Node View toolbar.</p>	Premium only

## Effects

Feature	Description	Editions
New Motion Blur effect	<p>A new Motion-Blur effect was added to Harmony. This effect has four significant enhancements over the legacy Motion-Blur node:</p> <ul style="list-style-type: none"> <li>• It can blur animations on the angle and scale of elements, whereas the legacy Motion-Blur effect only blurred translations.</li> <li>• It can be connected to a peg that will dictate the direction of the blurring effect, if desired. Otherwise, it will use the direction of its input image, like with the legacy Motion-Blur node.</li> </ul>	Premium only


Feature	Description	Editions
	<ul style="list-style-type: none"> <li>• It has a Preroll Motion option that allows you to simulate that the motion started before the first frame of the scene, making the motion blur already in effect in the first frame.</li> <li>• The motion blur effect continues even after its input element has exited the camera field.</li> </ul> <div data-bbox="521 499 1250 674" style="border: 1px solid green; padding: 5px; margin-top: 10px;">  <p><b>NOTE</b> The legacy Motion-Blur node was renamed <b>Motion-Blur-Legacy</b>.</p> </div>	
New Chroma Keying effect	<p>A new chroma keying effect, the RGB-Difference-Keyer node, was added to Harmony. It has the following enhancements over the legacy Chroma-Keying node:</p> <ul style="list-style-type: none"> <li>• It has a lot more parameters, allowing you to customize properly how to select which pixels in the input image to key out.</li> <li>• It is able to <i>despill</i> the borders of the output image without blurring it.</li> <li>• It can be used to apply the keyed matte to another image that the image used to generate the matte.</li> </ul>	Premium only

## Performance

Feature	Description	Editions
Node & Rig Caching	<p>It is now possible to make Harmony cache the output image of nodes and composites for the OpenGL preview of the Camera view:</p> <ul style="list-style-type: none"> <li>• Each node that outputs an image has a <b>Cached</b> option. When enabled on a node, Harmony generates the OpenGL preview of that node once, stores it in a cache, and uses the cached image to display in the Camera view.</li> <li>• More importantly, if this option is enabled on a Composite node, the composite will store each of its input images into separate caches.</li> </ul> <p>This can significantly improve the performance of Harmony when working on heavy scenes with several character rigs. For example, by enabling the <b>Cached</b> parameter on a Composite node to which several character rigs are connected, the preview image of each of</p>	Premium only

Feature	Description	Editions
	<p>these character rigs becomes cached.</p> <p>Since a character rig that is cached cannot be manipulated, it is possible to temporarily uncache a cached node or rig simply by clicking on it. Then, if you click on another cached node or rig in the scene, the previously active node or rig becomes cached again, and the newly selected node or rig becomes uncached.</p> <p>To enable cache on a node or composite, open its layer properties and, in the top-right corner, check the <b>Cached</b> checkbox.</p> <p>You can also add the <b>Node Caching</b> toolbar to your workspace, with which you can enable or disable caching on selected nodes and control how caching is temporarily disabled and re-enabled.</p> <p>The ⚡ OpenGL Node Caching Enabled button in the toolbar below the Camera view allows you to toggle caching on and off, control what happens when a cached rig has elements that are too far apart on the z-axis, and adjust the resolution of cached images.</p>	

## Export

Feature	Description	Editions
Export as MP4	<p>It is now possible to export a movie in MPEG-4 (.mp4) format.</p> <p>To export an MP4 movie, select <b>File &gt; Export &gt; Movie</b> from the top menu. Then, in the <b>Video Format</b> drop-down, select <b>H.264/MPEG-4 (*.mp4)</b>.</p> <div data-bbox="521 1325 1248 1497" style="border: 1px solid green; padding: 5px; margin-top: 10px;"> <p> <b>NOTE</b> Movies export in MP4 format from Harmony use the H.264 video codec and have no audio.</p> </div>	All
New QuickTime movie interface for macOS	<p>On macOS, Harmony now uses the Apple AVFoundation framework that is built into macOS to export movies in QuickTime Movie (.mov) format, instead of the QuickTime application.</p> <p>This allows Harmony to encode video using the <b>H.264</b>, <b>Apple ProRes 442</b> and or <b>Apple ProRes 4444</b> codecs built into AVFoundation.</p>	All

## Import

Feature	Description	Editions
Import MP4/M4V	It is now possible to import MP4 or M4V movies into your scene. To import an MP4 or M4V file, select <b>File &gt; Import &gt; Movie</b> from the top menu.	All

## Preferences

Feature	Description	Editions
Keyboard Shortcuts dialog	<p>The Shortcuts tab of the Preferences dialog is now its own dialog, the Keyboard Shortcuts dialog.</p> <p>To access this dialog box, in the top menu, select <b>Edit (Windows/Linux) or Harmony [Edition] (macOS) &gt; Keyboard Shortcuts</b>.</p>	All
Create, export, import and switch between keyboard shortcuts sets	<p>It is now possible to create your own keyboard shortcut sets. You can also export your keyboard shortcut sets as XML files and use them as backups or share them with project collaborators.</p> <p>You can create, export and import keyboard shortcut sets using the <b>New, Load...</b> and <b>Save...</b> buttons at the top of the <b>Keyboard Shortcuts</b> dialog.</p>	All
Export and import preferences	<p>It is now possible to export your preferences as XML files, and use them as backups or share them with project collaborators.</p> <p>You can export and import preferences using the new <b>Load...</b> and <b>Save...</b> buttons at the top of the <b>Preferences</b> dialog.</p>	All
Default preference sets	<p>Harmony now comes preloaded with five different sets of default preferences, which you can quickly switch between in the Preferences dialog.</p> <p>Most of the preferences in these sets are the same, except for key workflow preferences such as</p> <p><b>Focus on Mouse Enter, Default Separate Position for Pegs, Stop-Motion Keyframes, Support Overlay Arts and Underlay Arts, Advanced Palette List</b> and others. For more information, refer to the Preferences guide.</p>	All
Default preference overrides	You can use a specific preference set as the default preferences for	All

Feature	Description	Editions
	Harmony users. To do this, save this preference set as the file <b>prefs_override.xml</b> in the <b>resources</b> sub-folder of the Harmony installation folder.	

## Installation

Feature	Description	Editions
Single application on macOS	<p>The Harmony package for macOS now only contains a single application.</p> <p>You can launch any of the side applications bundled with Harmony, such as <b>License Wizard</b>, Control Center and Configuration Assistant, by first launching Harmony, then selecting <b>Harmony [Edition] &gt; Harmony Tools</b> from the top menu.</p>	All
Easy authorization on macOS	<p>The way Harmony is packaged for macOS no longer triggers the operating system's security mechanisms. Hence, it is no longer required to right-click on Harmony, select Open and authorize the application as a user with administrative privileges to be able to run Harmony and its side applications. You will be able to launch Harmony as soon as it is copied to your Applications folder.</p>	All

## Harmony Server

Feature	Description	Editions
Scene locking mode	<p>It is now possible to customize the way Harmony Server locks a scene when it is opened by a user.</p> <p>By default, when a Harmony Server scene is opened, it is locked so that no one else can open it. It can also not be opened more than once by the same user. The database server daemon, dbserver, now has a <b>-logical-lock</b> parameter which can be specified to modify this behavior. The parameter supports the following modes:</p> <ul style="list-style-type: none"> <li>• <b>individual</b>: The default behaviour. A scene cannot be opened more than once, whether by the same or by several users.</li> <li>• <b>disabled</b>: A single scene can be opened any amount of times by any amount of users.</li> </ul>	Advanced & Premium





Feature	Description	Editions
	<ul style="list-style-type: none"> <li>• <b>host:</b> A single user can open a scene several times, but others users cannot open a scene until that user closes the scene.</li> </ul> <p>To learn how to specify command line parameters when launching the database server, please contact support.</p>	

## Scripting

Feature	Description	Editions
Running script in batch without saving	<p>It is possible to run scripts on Harmony scenes from the command line by running Harmony with the <b>-batch</b> parameter. However, since scripts are typically used to make changes to a scene, this saves the scene by default.</p> <p>When running a script in command line on a Harmony Server scene, it is possible to make Harmony execute the script without saving the target scene. To do this, simply add the <b>-readonly</b> parameter to the command.</p>	All
Get coordinates of a view	<p>The <b>viewPosition()</b> method was added to the view class. It returns a <b>QPoint</b> object containing the position of the top-left corner of the specified view, in pixels. The individual coordinates can be obtained by using the <b>x()</b> and <b>y()</b> methods of the returned <b>QPoint</b> object.</p> <pre>var myView = view.currentView(); var myViewPosition = view.viewPosition(myView); var myViewX = myViewPosition.x(); var myViewY = myViewPosition.y();</pre>	All
Getting and setting Quaternion-type attributes	<p>The <b>setValue()</b>, <b>setValueAt()</b>, <b>getValue()</b> and <b>getValueAt()</b> methods of the <b>Attribute</b> class can now work with <b>Quaternion</b> functions:</p> <ul style="list-style-type: none"> <li>• The "set" methods can now take Quaternion objects as their parameter</li> <li>• The "get" methods will return a Quaternion object when ran on a Quaternion function.</li> </ul>	All
Apply selected colour to selected artwork	<p>The new <b>applyColorSelection()</b> method of the <b>PaletteManager</b> class will apply the selected colour in the Colour</p>	All






Feature	Description	Editions
	view to the selected artwork in the Camera or Drawing view.	





## Enhancements

- When drawing, the preview of the stroke now refreshes four times as fast, making it feel smoother and more responsive.
- The way Harmony initializes the DirectSound interface on Windows has been modernized, which may increase the stability and reliability of audio playback as well as prevent issues.
- The version of the Cisco OpenH264 library used by Harmony was upgraded to 1.8.
- The Draw Circle and Draw Square options for the  Ellipsis and  Rectangle tools are now togglable icon buttons in the **Tool Properties** view.
- The **Centerline Smoothing** slider has been removed from the **Tool Properties** view for the  Brush and  Eraser tool. It is now only available in the **Brush Properties** and **Eraser Properties** dialogs.
- The **Apply Parent Modifier's Transformation** property of Curve nodes has been renamed **Apply Parent Transformation**.

## Fixed Issues

The following issues have been fixed in this release:

- Crash when attempting to view the layer properties of an Element node created when the **Preserve Line Thickness By Default** preference is enabled.
- Rare crash when using curve or envelope deformations on a drawing with pencil lines.
- Rare crash when undoing a modification with the  Contour Editor.
- Crash on certain macOS workstations when moving artwork with the  Select tool while both the Drawing and the Camera views are visible.
- Crash on certain macOS workstations when selecting a Drawing node that has the **Adjust Pencil Line Thickness** property enabled with the  Transform tool if there is a floating Camera view in  Render View mode.
- Crash when generating colour art from artwork that was created while the **Pixel Density Proportional to Camera** preference is enabled and the camera zoom is not at 12F.
- Possible crash when attempting to move the Playback toolbar on macOS.
- Crash when selecting artwork from multiple art layers and multiple drawing layers at the same time, then copying and pasting it into a different layer.
- Crash when selecting **Top** in the **Monitored Attributes** list of a Master Controller wizard, then clicking on the  Search button.

- Crash when manipulating a 3D Rotation widget in a Master Controller node.
- Crash when attempting to rename a newly created template while the Library view is in Detailed display mode on Windows in Stand Alone mode.
- Crash when copying and pasting Master Controller nodes using the **copyPaste** scripting object.
- Crash when dragging and dropping a vector or bitmap image from the Library view to a cell in the Xsheet view.
- Crash when deleting a composite node inside a group if the composite node is connected to multiple input images going from the Multi-Port-In node and some of its cables are crossed.
- Hang when opening the  View menu of the Drawing Substitutions view if no layer is selected.
- Performance of scenes with Pass Through composites is unnecessarily impacted by disconnected drawing nodes that are not displayed in the Camera view.
- Harmony computes the bounding box of selected elements multiple times when refreshing the Camera view, impacting performance.
- The Camera view takes longer to refresh in  Render View mode each time it has to refresh if the scene has deformations.
- Output image of composite node does not appear in rendered image if the composite is connected both an element that is at a position higher than 0 on the z-axis and a node such as the Line Art, Color Art, Underlay, Overlay, Image Switch or Layer Selector node and which has no input image.
- Drawing slowly using a pen tablet on a bitmap layer on macOS results in shaky lines.
- On Windows, when drawing a very long brush stroke with a pen tablet, then immediately drawing another stroke, the second stroke starts off with a straight line segment.
- Some Brush tool tips that were packaged with earlier versions of Harmony were not packaged with Harmony 16.0.0 and Harmony 16.0.1.
- When using the  Stamp tool with the  Draw Behind tool mode, the different strokes in the stamp's artwork are laid on the canvas in their reverse order.
- Random effect of Quake node, Shake node and Lens Flare node renders differently on Windows, macOS and GNU/Linux.














**NOTE**




To avoid affecting existing scenes, this fix only applies to Shake, Quake and Lens Flare Nodes created in Harmony 17 or later. To use the new, platform-independent random effect on a node created in an older version, open its layer properties and set the **Version** property to **2**.

- Rendering of 3D models through Maya using Renderman does not work with Renderman 22.0 or later.
- Attempting to use Unicode characters in a scene or layer name does not work on certain GNU/Linux machines.



- In Harmony Server, when inserting a template that contains a Master Controller from a different job, the Master Controller's pose database files do not get copied over.
- Elements connected to a Pixelate node are invisible in the OpenGL preview of the Camera view.
- After having synced a layer with another layer, then unsyncing it, it is impossible to sync it with a different layer.
- Using the  Reposition All Drawings tool in the Drawing view offsets a drawing multiple times if it is exposed multiple times.
- Copying and pasting text with rich text formatting into any of the script fields of the Layer Properties for a Master Controller or Script node may result in illegible or scrambled text.
- Exporting a QuickTime movie via the scripting interface fails when passing -1 as the horizontal and vertical resolution. Using -1 is supposed to make it use the default preview resolution instead.
- When pasting layers using Paste Special, with the **Palettes** option set to **Copy and create new palette files in element folder**, the palette files get copied to their origin folder and renamed.
- Empty Group layer gets locked and cannot be unlocked when collapsed in the Timeline view.
- Many translation issues across the user interface.
- The Play application always launches in Stand Alone mode in Japanese.
- No option to import 3D models in trial mode in Japanese.
- Error message when clicking on the  Save Grid Preset button in the Grid Wizard.
- The  Load Grid Preset button of the Grid Wizard opens an Open File dialog, then displays an error message.
- Layer properties of Master Controller or Script node do not have a scroll bar when they exceed the available display space.
- When using a Master Controller wizard on GNU/Linux, the `.tbState` extension is not automatically added to the pose databases file generated for the Master Controller.
- Seams may appear where different colour zones meet when looking at a drawing with the Backlight mode enabled, at certain zoom levels, in the Drawing view.
- Pencil icon next to modified drawings in Xsheet view is not properly centred on macOS that use a Retina display.
- Some  Brush tool tips that were packaged with earlier versions of Harmony were not packaged with Harmony 16.
- Progress bar window appears at the top of the screen when movie file on macOS.
- Up & down buttons right of decimal number input fields appeared only on Windows and GNU/Linux, and only when using dark style.
- Cannot select a node by clicking on its debug information, when Debug mode is enabled.
- Empty item in Undo/Redo list after using the Rename Transformation button of the Deformation toolbar.
- Tool tips of Game Skinning toolbar are not translated in other languages.

- Buttons to flip a stamp horizontally or vertically in the Tool Properties view appear too small when using a Retina display on macOS.
- When customizing certain toolbars such as Master Controller, Deformation, Shift and Trace, Mini Playback, Game Skinning and Master Controller, clicking on **Default** will remove all the buttons from the toolbar.
- When nudging a deformation point with the keyboard while in  Animate Off mode, the deformation point moves too far.
- If the toolbar for a specific view is hidden, it reappears after switching to another view, then back to that view.
- Impossible to select a point with the  Contour Editor using a tablet pen.
- Some frames may be corrupted when exporting a Windows Media Video (.wmv) file at 100% quality.
- When copying and pasting artwork from multiple art layers, with the  Apply to Line Art and Colour Art tool property enabled, all of the artwork ends up only on the current art layer.
- Content of Grid Wizard dialog shifts when selecting or deselecting a grid point on macOS.
- Exporting layout images in **PSDDP4** format results in 8-bit/channel PSD images, whereas they should be 16-bit/channel.
- Many preferences are not restored to their default value by the **Restore All Defaults** button.
- When using drawing guides, using the arrow keys to switch between axes also changes the current Stamp tool drawing.
- Using the [ and ] keyboard shortcuts to substitute the current drawing does not work in the Timeline view, the Node view or the Library view.
- Keyframe is created when modifying a deformation point with the  Rigging tool.
- Imported layers are not properly scaled when importing a multi-layer PSD file as individual layers with the alignment rule set to Project Resolution.
- The custom configuration of some toolbars is not preserved after closing Harmony.
- When changing the icons for scripts added to the Scripting toolbar, they do not get updated until Harmony is relaunched.
- Harmony cannot load SDK plugins unless their path is specified in the **TOONBOOM\_PLUGINPATH** environment variable on GNU/Linux.
- Some synced layers are ignored when using the Pose Copier dialog with a template that has synced layers.
- Some drawings are discarded when importing a template containing synced layers.
- Drawings offset with the  Shift and Trace tool appear offset when using Mini Playback.
- Selected preset for the  Pencil tool and the  Eraser tool are swapped each time Harmony is launched.
- Changing the scene's length from the Timeline view while it is fully zoomed-in positions the end-of-scene handle one frame off the actual end of the scene.

- Errors in the script samples of the Master Controller widgets provided in the scripting documentation.
- Bounding box of element selected with the  Transform tool is inaccurate if the element is selected while the Camera view is rotated, then the Camera view is reset to its default angle.
- Render Preview node does not update when selecting a frame in the Timeline view if the **Enable Interactive Camera View Cache** preference is enabled.
- Error messages appear when cancelling any operation while creating a Master Controller using one of the Master Controller wizards.
- View-specific toolbars are not listed in the context menu when right-clicking on the toolbar area of a view.
- Using the **Lock All** or **Lock All Others** commands lock group layers in the Timeline view.
- Opening the Layer Properties dialog for a locked layer locks all of its children in the Timeline view.
- Using the Configuration Assistant to add the path to the Harmony executables to the \$PATH environment variable on macOS does not always work.
- If two Harmony Server scenes with the same name but different environments are open at the same time, the Database Lock Manager will always display the locks for both scenes when trying to view the locks for only one of them.
- The drawing key object returned by the **Drawing.Key ()** method does not have a **layer** property if it is created from a synced layer.
- The **-adjustpencil** parameter of the **utransform** does not work.
- The  Perspective tool performs excessive smoothing on short vector lines in the selected artwork.
- The **Line Art** options in the **Nodes ViewLayer** tab of the Preferences dialog are inverted.
- Options for the  Centerline Editor tool are labeled "Contour Editor Options" in the Tool Properties view.
- Wrong translation of the word "name" is used in the Welcome dialog in Japanese.
- Name of some tool properties may not appear translated when using Harmony in a language other than English.
- The **FixURLHandler.sh** shell script packaged with the macOS edition does not work when run from any directory but its own directory.
- Scripts designed to duplicate the timing of Xsheet columns for paperless workflows (**TB\_PL\_LOKEY**, **TB\_PL\_KEYMC** and **TB\_PL\_MCIB**) renumber the drawings incrementally instead of copying their numbers.
- In the Japanese workflow mode, when using the Create Repeating Cycle dialog in Insert mode, the drawing in the selected cells and all the affected cells will be replaced with the drawing in the first selected cell.
- In the Japanese workflow mode, in the Create Repeating Cycle dialog, it is possible to set the number of cycles to 0, which causes unexpected changes in the Xsheet.
- Blank cells are added after the exposure when extending the exposure of a repeat cycle in Japanese workflow mode.

- Blank cells are left behind when reducing the exposure of a repeat cycle in Japanese workflow mode.