



Harmony

Toon Boom Harmony 16.0 Release Notes



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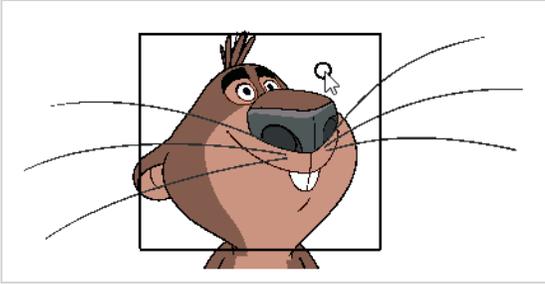
Toon Boom Harmony 16.0.1

Here is a list of changes in Harmony 16.0.1, build 14405.

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Features

Master Controller

Feature	Description	Editions
<p>Bounding box for Interpolation Grid</p>	<p>Master Controllers created with the Interpolation Grid wizard in Harmony 16.0.1 or later will display a rectangle around the space in which you can move the 2D point widget, allowing you to see where the point is positioned relative to its boundaries.</p> 	<p>Premium</p>
<p>Increased performance</p>	<p>Master Controllers created in Harmony 16.0.1 or later will have significantly better performance. Manipulating these Master Controllers will update your character rig much faster, and displaying these Master Controller's controls will have a much smaller impact on application performance and playback speed.</p>	<p>Premium</p>

Drawing

Feature	Description	Editions
Modifier keys for Stamp and Bitmap Brush tools	<p>The following modifier keys, which could be used when drawing with the  Brush tool and  Pencil tool on a vector layer, can now be used when drawing with the  Stamp tool, as well as when drawing with the Brush tool on a bitmap layer:</p> <ul style="list-style-type: none"> • If you press and hold the Shift key <i>before</i> you start drawing, your stroke will be a straight line. • If you press and hold the Shift key while you're drawing, the part of your stroke from that point on will be a straight line until you release the Shift key. • If you press and hold the Shift and the Alt keys before drawing, your stroke will be a straight line in an angle that is a multiple of 15 degrees. • If you press and hold the Ctrl (Windows/Linux) or  (macOS)Ctrl (Windows) or  (macOS) key while drawing, your stroke will be a closed shape. • If you press and hold the Alt key, your tool will snap in a straight line to the nearest existing shape. 	Essentials, Advanced, Premium
Cut on several layers	You can now use the  Cutter tool on all visible layers simultaneously by holding the Ctrl (Windows/Linux) or  (macOS) key.	Essentials, Advanced, Premium
Use the Perspective tool on several layers	You can now use the  Perspective tool on several layers simultaneously by selecting all the layers you want to work with in the Timeline view, then selecting the artwork you want to edit with the Perspective tool.	Essentials, Advanced, Premium
Use the Envelope tool on several layers	You can now use the  Envelope tool on several layers simultaneously by selecting all the layers you want to work with in the Timeline view, then selecting the artwork you want to edit with the Envelope tool.	Essentials, Advanced, Premium

Performance

Feature	Description	Editions
Audio playback	Audio playback performance has been significantly enhanced to prevent it from slowing down scene playback.	Essentials, Advanced, Premium

Feature	Description	Editions
Interactive Camera View Cache	<p>A new preference, Enable Interactive Camera View Cache (Beta), has been added to the OpenGL tab of the Preferences dialog. When enabled, the Camera view will cache its preview image and reload parts of it when moving the mouse cursor around or when manipulating control boxes and control points.</p> <p>To enable this feature, check the Enable Interactive Camera View Cache (Beta) preference in the OpenGL tab of the Preferences dialog.</p>	Advanced, Premium

Scripting

Feature	Description	Editions
Script permissions	The File list of the Script Editor view now has a Permissions column, which indicates whether each script in the list can be edited or not.	Essentials, Advanced, Premium
Importing scripts and related files	When importing a script, any user interface (.ui) or icon (.png) file that is in the same directory as the script and has the same file name will be automatically imported along with it.	Essentials, Advanced, Premium
Testing scripts from global scope	<p>It is now possible to test or debug a script from the global scope rather than through a specific function. This can be useful if you want to test code blurbs before structuring your script in functions.</p> <p>To do this, when setting the target function to test in the Script Editor, select <Nothing> in the functions list.</p>	Essentials, Advanced, Premium
3D Model information	The new Model13d class can be used to obtain information about a 3D model such as its transformation matrix as well as the name and hierarchy of its sub-nodes.	Premium
3D sub-node information	The new SubnodeData class can be used to obtain information about a sub-node in a 3D model.	Premium
Exporting movies in batch mode	It is now possible to use the exporter.exportToQuicktime () method when running a script from a command line interface.	Essentials, Advanced, Premium
Obtaining the full attribute	The new fullKeyword () method of the Attribute class returns the	Essentials,

Feature	Description	Editions
keyword	attribute's full keyword, including the keyword for each of its parents. For example, for the attribute with the keyword OFFSET.Z , the fullKeyword() method returns " OFFSET.Z ", whereas the older keyword() method only returns " Z ".	Advanced, Premium
Get column name of attribute	The new columnName() method of the Attribute class returns the name of the column the attribute is linked to.	Essentials, Advanced, Premium
Higher decimal precision	The node.getTextAttr() and column.getEntry() methods can now return up to four decimals of precision rather than three, which is the amount of precision supported by most input fields in the user interface.	Essentials, Advanced, Premium
Set bitmap and bitmap texture resolution	The new changeDrawingBitmapLayerResolution() and changeDrawingVectorLayerResolution() methods of the DrawingTools class can change the resolution of bitmap drawings as well as the texture resolution of vector drawings, respectively. Additionally, the new setDefaultTexturePixelDensityforBitmapDrawings() and setDefaultTexturePixelDensityforVectorDrawings() methods of the scene class can set the default pixel density for bitmap drawings and textured vector drawings for the current scene.	Advanced, Premium

Enhancements

- Until Harmony 15.0.0, pressing the Spacebar key would reset the angle of the bounding box when manipulating an element with the Transform tool. This behaviour has been restored in Harmony 16.0.1.
- Views in the **Windows** top menu are no longer separated in two lists. They are now all listed together and in alphabetical order.
- When selecting the peg of a camera layer with the  Transform tool, the camera frame now displays in the colour selected in your colour preferences for selecting pegs.



NOTE

To change this preference, in the top menu, select **Edit (Windows/Linux) or Harmony [Edition] (macOS) > Preferences**, then open the **General** tab, click on **Edit Colours** and, in the Colours dialog, open the **Camera** tab. The preferences are named **Peg: Animate Current Frame**, **Peg: Animate Onion Skin Range** and **Peg: Animate Off**.

Fixed Issues

- Harmony fails to connect to the license server when its port and address are specified in the **TOONBOOM_LICENSE_FILE** environment variable in the **port@hostname** format.
- Harmony may crash after customizing the Tools toolbar if the Flat Tools Toolbar preference is enabled.
- Rare crash when exporting a QuickTime movie from a scene with deformations applied to a drawing layer with the Preserve Line Thickness layer property.
- Harmony uses 100% of the available CPU power when downloading scene assets from Harmony Server to the local cache while opening a scene.
- Possible crash when closing a scene containing Master Controllers.
- A blank welcome screen appears when opening a scene directly from Finder on macOS 10.14 (Mojave).
- Glow effects are not rendered when chained with a Cutter effect.
- 3D Path with control point becomes corrupted when moving element in  Animate Off or  Animate Onion Skin Range mode.
- When a Layer-Selector node is connected under a Pass Through Composite, its effect is not visible in the OpenGL preview of the Camera view.
- Black rectangles may appear in the OpenGL preview of the Camera view if the scene has OpenGL-Cache-Lock nodes.
- The user interface of the Onion Skin view is not scaled up when running Harmony on a High DPI/Retina display.
- Several frames are skipped when playing a scene for the first time since opening it on macOS.
- Double-clicking on the icon of a layer in the Timeline view does not open its Layer Properties dialog.
- Duplicating a column in the Xsheet view does not duplicate its Key and Breakdown markers.
- Impossible to use function keys (F1, F2, etc.) in keyboard shortcuts on macOS.
- When a port is selected in the Node view, selecting a node in the Node view does not deselect the port.
- After adding a parent peg to a node, selecting another node and attempting to add a parent peg to it adds the parent peg to the previously selected node instead.
- The  Advanced Onion Skin and  Shift and Trace buttons are not available in the Tools toolbar when the Flat Tools Toolbar preference is enabled.
- The Animation Mode options of the Tools toolbar are still listed in a drop-down instead of as separate buttons when the Flat Tools Toolbar preference is enabled.
- Harmony does not always display error messages when audio playback fails.
- Position and zoom level of Node View sometimes changes when manipulating a Master Controller.
- When manipulating a Master Controller and there are several Camera views in the workspace, the other Camera

views do not update immediately.



NOTE

This issue will only be fixed in Master Controllers created in Harmony 16.0.1 or later. Master Controllers created in prior versions will still have this issue.

- Colour of Colour-Card appears lighter when selecting artwork with the  Select tool if the Enable Rendering Caching of Composite Nodes preference is on.
- When the Select Synced Layers option of the Timeline view menu is enabled, layers that are clones of the current layer also get selected.
- Clicking on a drawing with the  Transform tool with the  Peg Selection Mode tool property enabled does not select its parent peg if the drawing is connected to a deformation that uses a Transformation-Switch.
- When using the  Shift and Trace tool during a camera movement and using Ctrl + click (Windows/Linux) or ⌘ + click (macOS) to select one of the drawings in the Onion Skin, the control box of the Shift and Trace tool is offset from the selected drawing.
- If Onion Skin was enabled when the scene was opened, clicking on the Onion Skin button in the Tools toolbar only opens the drop-down menu, making it impossible to use this button to disable Onion Skin.
- If an Apply-Peg-Transformation node is connected under an OpenGL-Cache-Lock node, the OpenGL preview gets constantly regenerated.
- When importing a template with groups while Publish Attribute Mode is enabled, the Publish to Parent Group option of the imported groups is always enabled.
- The Camera view does not immediately display drawings in their undeformed version when selecting the  Rigging tool.
- Plug-ins that are packaged with Harmony are not loaded when developing plug-ins with the Harmony SDK on macOS.
- If a script in the scene directory has the same name as a script in the user preferences directory, attempting to edit and save the scene script may fail.
- Icons and tool tips for scripts added to the Scripting toolbar cannot be customized.
- 3D Path functions may end up with several keyframes in the same frame, causing their motion path to be corrupted.
- If a drawing is connected to an OpenGL-Cache-Lock node which is connected to an Apply-Peg-Transformation node, manipulating the peg of the Apply-Peg-Transformation node may cause the drawing to flicker around the Camera view.
- When pressing and holding E to use the  Eraser tool, the tip is always square-shaped regardless of which tip shape is currently selected.

- When pressing and holding V to use the  Stroke tool, the  Draw Strokes as Straight Lines and  Connect Line Ends tool properties are ignored.
- The  Auto-Flatten tool option of the  Brush tool does not work when drawing with a semi-transparent colour.
- Switching between the  Perspective and the  Envelope tool while having multiple drawings selected discards the selection and leaves only one drawing selected.
- If the user uses the  Select tool with the  Permanent Selection and the  Apply to All Frames tool properties enabled, then clicks on the  Create Colour Art from Line Art button in the Tool Properties view, the colour art will be generated on all drawings in the current drawing layer, but only for the artwork inside the permanent selection. However, the way the permanent selection is applied to drawings in other frames does not take in account the offset from the drawing layer's parent peg.
- Pasting artwork with the  Perspective or  Envelope tool does not work if the  Apply to All Frames tool property is enabled.
- Animating in  Animate Onion Skin Range mode does create keyframes on all of the element's functions when the Set Keyframes on all Functions with the Transform Tool preference is enabled.
- The Generate Auto-Matte command does not work if the  Select tool's  Apply to Visible Drawing Layers tool property is enabled.
- The Reduce Drawing Texture Resolution command is applied to all visible drawing layers if the  Select tool's  Apply to Visible Drawing Layers tool property is enabled.
- When using any drawing tool with the  Apply to Synced Drawing Layers tool property enabled on a drawing layer that has been cloned, the tool affects the current layer and its clone layers, even if the drawings exposed on either layers are different.
- When the  Eraser tool is used with the  Apply to Synced Layers tool property enabled, the offset of the parent peg of the synced layer is not applied to the position of the eraser.
- When using the  Reposition All Drawings tool with the  Apply to Synced Drawing Layers tool property enabled and the  Light Table mode on, layers that are synced with the current layer appear semi-transparent, whereas layers that are affected by the current tool should always appear opaque.
- When using the  Stroke tool with the  Apply to Synced Layers tool property enabled and the  Light Table mode on, the layers that are synced with the current layer appear semi-transparent, whereas layers that are affected by the current tool should always appear opaque.
- Using the  Eraser tool on a bitmap layer with the  Apply to Synced Drawing Layers tool property enabled only erases on the currently selected drawing layer.
- Using the  Eraser tool on a bitmap layer with the  Apply to Line Art and Colour Art tool property enabled only erases on the current art layer.
- The Set Target dialog of the Script Editor view lists script in Harmony's **Plugins** directory, which cannot be edited in the Script Editor.

- The `scene.checkoutLock()`, `scene.checkOutDate()` and `scene.checkOutUser()` methods always return the default value.
- When renaming a drawing layer, its name does not update in the Drawing Substitutions view.
- The OK and Cancel buttons of the Add Frames dialog are in the wrong order on macOS.
- The movie file types `mov`, `mp4`, `mkv` and `wmv` are listed in the File Type drop-down of the Export Images dialog in Harmony Essentials and Harmony Advanced. Attempting to export in one of these file types from the Export Images dialog did not do anything.
- Both JPG and JPEG are listed in the File Type drop-down of the Export Images dialog in Harmony Advanced.
- The Select Tool is Lasso preference is still present in the Preferences dialog of Paint. Since Harmony 16.0.0, this preference is updated by selecting either Lasso or Marquee in the Tool Properties view.

Toon Boom Harmony 16.0.0

Here is a list of changes in Harmony 16.0.0, build 14155.

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Features

Harmony Server

Feature	Description	Editions
Local Caching	When opening a scene in a Harmony Server database, you can choose to cache the scene's drawings locally as you open the scene. Harmony will load the drawings from the cache on your computer instead of over	Advanced, Premium

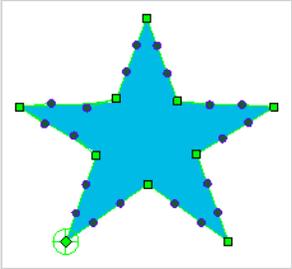
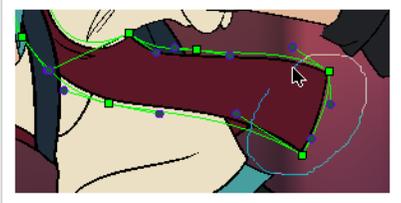
Feature	Description	Editions
	<p>the network, which will increase its performance and stability when working on heavy scenes.</p> <p>If you make changes to the drawings in your scene, Harmony will automatically upload the updated drawings back to the database when you save, so you do not have to worry about doing it yourself.</p> <p>To use the local cache, check the Cache scene assets locally checkbox at the bottom of the Database Selector dialog when browsing for a scene to open.</p>	

Master Controller

Feature	Description	Editions
<p>Interpolation Slider Wizard</p>	<p>The new Interpolation Slider wizard allows you to create a slider widget which can be used to pose a character, or part of a character, based on a series of linear poses.</p>  <p>You can launch the Interpolation Slider Wizard by clicking on the  Interpolation Slider button in the Master Controller toolbar or by selecting Animation > Master Controller > Launch Interpolation Slider Wizard from the top menu.</p>	<p>Premium</p>
<p>Master Controller Toolbar</p>	<p>The new Master Controller toolbar includes buttons to access the Interpolation Grid wizard and the Interpolation Slider wizard.</p>	<p>Premium</p>

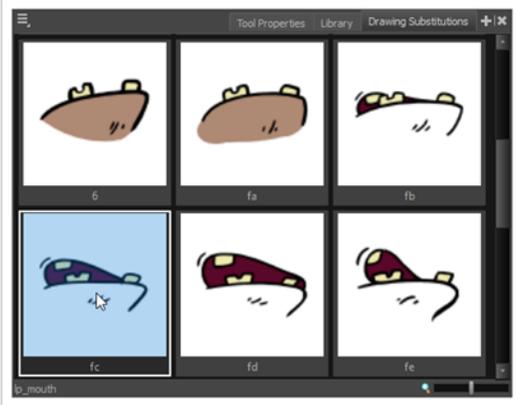
Feature	Description	Editions
Master Controller View	The new Master Controller view can help you quickly find, select and display Master Controllers in your scene, so that you do not have to navigate your scene's node system to select and display Master Controllers.	Premium
Widget Keyframes	New Master Controllers generated with one of the Master Controller wizards will store the position of their widget in keyframes when you manipulate them. Hence, Harmony will remember where the widget was positioned at every frame where it was manipulated. This will allow animators to easily tweak the position of the character from where they last set it.	Premium
Performance Enhancements	Master Controller are now faster at reading and updating node attributes, making their manipulation smoother and less resource-intensive.	Premium
Automatic Extra Files Set-Up	When creating a Master Controller with the Interpolation Grid Wizard or the Interpolation Slider Wizard, the Master Controller node will automatically have a list of files it requires in its Extra Files parameter, so you do not have to add them manually.	Premium
Monitor Attributes of Collapsed Layers	When you select a layer with collapsed children layers in the Timeline view and run one of the Master Controller wizards, the attributes for the selected layer and all of its children will be added to the list of monitored attributes. Hence, you no longer need to individually select all the layers which you want the Master Controller to control. Just collapsing your layers and selecting the top peg or the top group of your rig will be enough.	Premium
Add/Remove Attributes	When creating a Master Controller with the Interpolation Grid or Interpolation Slider Wizard, you can add or remove nodes or attributes on the fly: <ul style="list-style-type: none"> To add a node's attributes, select it in the Timeline or Node view, then click on the Add Selected Nodes button in the wizard. To remove a node's attributes, select its attributes in the Monitored Attributes list and click on the  Remove attributes button. 	Premium
2D Point Widget Size	The size of 2D Point Widget no longer changes when zooming in or out of the scene, allowing you to zoom in to see any detail it obstructs, and to easily select it even when zoomed out.	Premium

Deformations

Feature	Description	Editions
Envelope Creator	<p>The Envelope Creator dialog box allows you to quickly generate an Envelope or Curve deformation chain based on the shape of your artwork.</p>  <p>To use the Envelope Creator, select a drawing, then select Animation > Envelope Creator > Create Envelope in the top menu.</p>	Premium
Multiple Deformation Point Manipulation	<p>By enabling the  Control Selection Mode option of the Transform tool in the Tool Properties view, you can now select several points in a Curve or Envelope deformation chain by drawing a lasso around them, then manipulate all those points simultaneously.</p> 	Premium
Nudge Deformation Points	<p>When one or several Curve or Envelope deformation points are selected, you can now nudge them using the arrow keys on your keyboard.</p>	Premium

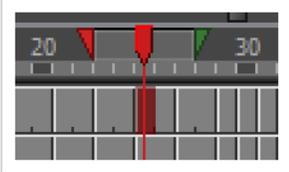
Digital Animation

Feature	Description	Editions
Drawing Substitutions View	<p>The new Drawing Substitutions view displays all of the drawings contained in the selected layer as thumbnails, and allows you to quickly swap which drawing is exposed at the current frame simply by clicking on it.</p>	Essentials, Advanced, Premium

Feature	Description	Editions
		
<p>Animate Onion Skin Range</p>	<p>With the Animate Onion Skin Range mode, you can animate a layer or peg on every frame in the Onion Skin range simultaneously. This can allow you to offset the position of a layer or peg in several keyframes simultaneously. It can also work with any range of frames, even if it does not have keyframes, as this mode creates keyframes at the beginning and end of the Onion Skin range if needed.</p> <p>To use the Animate Onion Skin Range mode, double-click on the  Animate Current Frame button in the Tools toolbar and, in the pop-up menu, select  Animate Onion Skin Range.</p>	<p>Essentials, Advanced, Premium</p>
<p>Hide Pivot for Advanced Animation Tools</p>	<p>You can now hide the pivot of the selected layer when using the  Translate,  Rotate,  Scale and  Skew tools. This can be useful if you want to avoid accidentally moving the pivot point, which, when done with one of these tools, causes the selected layer to be offset in all of its existing animation keyframes. To do this, click on the  Disable Pivot Manipulator button in the Tool Properties view.</p>	<p>Essentials, Advanced, Premium</p>

Paperless Animation

Feature	Description	Editions
<p>Shift and Trace Tool</p>	<p>The new Shift and Trace tool allows you to temporarily move, rotate and scale drawings, then trace over them in other drawings directly in the Camera view.</p> <p>To use the Shift and Trace tool, add the Shift and Trace toolbar to your workspace, then select the  Shift and Trace tool button. Controls for the Shift and Trace tool are in the Shift and Trace toolbar as well as in the Tool Properties view.</p>	<p>Advanced, Premium</p>

Feature	Description	Editions
Advanced Onion Skin	<p>Advanced Onion Skin allows you to include or exclude any of the 10 drawings before and after the current frame, as well as to set the individual opacity of each drawing.</p> <p>To use Advanced Onion Skin, in the Tools toolbar, double-click on the Show Onion Skin button and select Show Advanced Onion Skin. Then, add the Onion Skin view to your workspace so you can configure which drawings are displayed as well as their opacity.</p>	Advanced, Premium
Better Onion Skin Handles	<p>When Onion Skin is enabled, the handles around the Timeline playhead, with which you can set the amount of frames before and after the current frame to display in the Onion Skin, have been made significantly easier to see and to use.</p> 	Essentials, Advanced, Premium

Drawing

Feature	Description	Editions
Stamp Tool	<p>The new Stamp tool can be used to stamp one or several drawings into your artwork. It can be used to stamp drawings one at a time or to draw strokes with it. The behaviour of the stamp tool when drawing strokes can be customized in many ways.</p>  <p>To use the Stamp tool, simply select the 📌 Stamp tool in the Tools toolbar.</p> <div style="border: 1px solid green; padding: 5px; margin-top: 10px;"> <p> NOTE</p> <p>The Stamp tool replaces the Dynamic Brush option of the Brush tool in Harmony 15.0 and earlier.</p> </div>	Essentials, Advanced, Premium

Feature	Description	Editions
<p>Apply to All Drawings / Drawings in Onion Skin Range</p>	<p>You can now use the  Select,  Cutter and  Paint tool on multiple drawings simultaneously. By enabling the  Apply to Onion Skin Range tool mode in the Tool Properties, the Select, Cutter and Paint tool can be used on every drawing displayed in the Onion Skin simultaneously. The  Apply to Onion Skin Range option is available in a pop-up menu that you can open by double-clicking on the  Apply to All Drawings button in the Tool Properties view.</p> <p>It is also easier to use these tools on all drawings in the current layer. Previously, to do this, you had to enable the Permanent Selection and Apply to Multiple Drawings tool modes at the same time. Now, you can just enable the  Apply to All Drawings tool mode and, as long as it is enabled, the tool will work on all drawings in the current layer simultaneously.</p>	<p>Essentials, Advanced, Premium</p>
<p>Apply to Selected Layers / All Layers</p>	<p>You can now use the  Select,  Cutter,  Edit Texture/Gradient,  Pencil Editor and  Paint tools on multiple layers simultaneously. There are three approaches to editing multiple layers:</p> <ul style="list-style-type: none"> • If you select multiple layers, these tools will work on all the selected layers simultaneously. • If you enable the  Apply to Visible Drawing Layers tool mode, these tools will work on all the visible layers simultaneously. • If you enable the  Apply to Synced Drawing Layers tool mode, these tools will work on the current layer and all layers that are synced to it simultaneously. The  Apply to Synced Drawing Layers is available in a pop-up menu that you can open by double-clicking on the  Apply to Visible Drawing Layers button in the Tool Properties view. 	<p>Essentials, Advanced, Premium</p>
<p>Relative Brush Size</p>	<p>The new Proportional to Camera option of the Brush and Pencil tool will adjust the size of your brush or pencil relative to the zoom level of the camera. This allows you to preserve your line thickness through camera zoom-ins and zoom-outs in paperless animation productions.</p> <p>To enable this option, click on the  Show Extended Properties button in the Tool Properties view and, in the Brush or Pencil Tool Properties dialog, check the Proportional to Camera checkbox.</p>	<p>Essentials, Advanced, Premium</p>
<p>Easy Drag</p>	<p>The  Select,  Cutter and  Reposition All Drawings now have an Easy Drag tool mode. When enabled, you can click anywhere inside the selection control box to drag the selection. By default, you have to click inside the artwork, which may be difficult when manipulating line art.</p>	<p>Essentials, Advanced, Premium</p>

Feature	Description	Editions
	<p>To enable Easy Drag mode, click on the  Easy Drag button in the Tool Properties view.</p>	
Mirror View	<p>You can now temporarily flip the contents of the Camera and Drawing views horizontally by enabling Mirror View.</p> <p>To enable Mirror View, click on the  Mirror View button in the Camera or Drawing view toolbar, or select View > Mirror View from the top menu.</p>	Essentials, Advanced, Premium
Lasso/Marquee Selection Mode	<p>In the Tool Properties view, if you set the selection mode for the current tool to either  Lasso or  Marquee, the mode will be automatically saved in your preferences and will persist after you close and relaunch Harmony.</p> <div data-bbox="522 831 1289 1108" style="border: 1px solid #c8e6c9; padding: 10px; margin: 10px 0;"> <p> NOTE</p> <p>The selection mode can be set when using the  Transform,  Select,  Cutter,  Contour Editor,  Pencil Editor,  Perspective or  Envelope tools. Setting the selection mode for any of these tools will change the selection mode for all of these tools.</p> </div>	

Colour

Feature	Description	Editions
Consolidate Colours into a Palette	<p>Using the Create Palette from Selection dialog box, you can now instantly generate a palette containing all of the colours in the selected artwork.</p> <p>To use the Create Palette from Selection dialog box, select all the layers for which you want to create a palette. Then, in the Colour View, click on the  Menu button and select Palettes > New Palette from Selected Drawings.</p>	Advanced, Premium

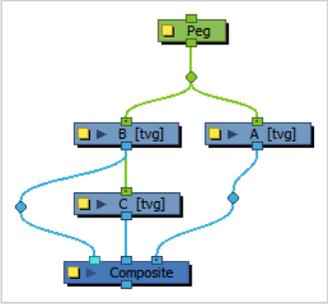
Effects

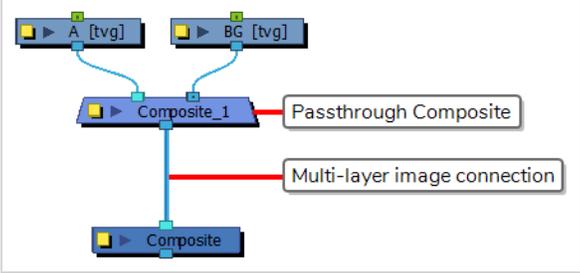
Feature	Description	Editions
Shake Node	The new Shake node will apply an earthquake like motion to any node rigged under it. It is an improvement on the Quake node, with a more realistic and erratic-looking shaking motion, as well as more parameters than the Quake node.	Premium
Transform-Loop Node	<p>The new Transform-Loop node will take the animation from its parent peg and loop it for the entire duration of the scene. This can be used to animate the motion of a looping background only once, and let the Transform-Loop node take care of repeating this animation. When repeating the animation, it skips the first frame, as it is typical for the first and last frame of a looping background to look exactly the same.</p> <p>The default behavior of the Transform-Loop is to loop the animation forward. By setting its Loop Type property to Ping-Pong, the Transform-Loop node will alternate between looping the animation forward and backward. By setting its Loop Type to Repeat and Offset, it will accumulate the effect of the animation each time it repeats it, offsetting the drawing rigged under it more and more each time the animation is repeated.</p>	Premium

3D

Feature	Description	Editions
Render 3D Model as 2D Layer	<p>You can now import a 3D model as a pre-rendered 2D bitmap layer. This can be useful if you need to use a 3D model as a reference to draw backgrounds, characters or other assets.</p> <p>To import a 3D model as a pre-rendered 2D image, select File > Import > 3D Models from the top menu. Then, in the Import 3D Model dialog, check the Convert to 2D option. You will be prompted to position the 3D model before rendering it in another dialog.</p>	Premium
Scale Factor	<p>You can now apply a scale factor to your 3D models. This allows you to scale your 3D models up or down without actually changing the value of their scale coordinate, hence changing their default size in your scene. You can also set a default scale factor for when you import 3D models into your scene.</p> <p>To apply a scale factor to a 3D Model, locate it in the 3D Models library of the Library view, right-click on it and select Set Scale Factor.</p>	Premium

Node View

Feature	Description	Editions
Waypoints	<p>It is now possible to organize the connection cables in the Node view with the use of waypoints. A waypoint can have two purposes:</p> <ul style="list-style-type: none"> • It allows you to modify the trajectory of the cable. A cable will follow every waypoint created on it. • If the cable is connected to several nodes, it allows you to decide where the cable splits to connect to each node.  <p>You can create a waypoint on a cable by clicking and dragging on the circle in the middle of a cable in the Node View. You can also right-click on a cable and select Create Waypoint. To connect a waypoint to another node, hold the Shift key, then click and drag on it to create a new cable that can be connected to a node.</p>	Premium
Connecting Composites	<p>If you select several nodes and create a composite, this composite will be instantly connected to all of the selected nodes.</p>	Premium
Keyboard Navigation	<p>You can now navigate the Node view using keyboard keys. To do this, you must select a node's port, then use the arrow keys to navigate from port to port or from node to node, as well as the Enter/Return key to enter or exit groups.</p>	Premium
Snapping Nodes	<p>When you move nodes in the Node view, their horizontal position will snap to make their connection cables straight, and their vertical position will snap to align to other nodes. This will make it easier to make clean-looking organized node systems.</p>	Premium
Nudging Nodes	<p>You can now nudge the position of nodes by selecting them and pressing the arrow keys on your keyboard.</p>	Premium
Pass Through Cables	<p>Node view cables that carry several layers of image information—typically output cables of pass through composites—now appear</p>	Premium

Feature	Description	Editions
	<p>thicker, to differentiate them from cables that carry single layers of image information.</p> 	

Playback

Feature	Description	Editions
Mini Playback	The new Mini Playback toolbar allows you to quickly play a short span of animation before and after the current frame. This can be useful for previewing the part of your scene's animation that you're working on.	Essentials, Advanced, Premium
Persistent Start and Stop frames	The Start and Stop frames set in the Playback toolbar are now saved in the scene. They will persist after closing and reopening the scene.	Essentials, Advanced, Premium

Staging

Feature	Description	Editions
Tiled Bitmap Backgrounds	<p>Images imported as original bitmaps can be made to tile infinitely beyond its boundaries. Bitmap images can either be tiled horizontally, vertically or both. This can be used to make looping backgrounds.</p> <p>To tile bitmap images, open the Layer Properties dialog for the layer and, in the Drawing tab, under Bitmap File option, check the Tile Horizontally or Tile Vertically checkboxes—see Element / Drawing Node.</p> <div style="border: 1px solid green; padding: 10px; margin-top: 10px;"> <p> NOTE This only works images imported as original bitmap images, not Toon Boom bitmap drawings.</p> </div>	Advanced, Premium

Scene Settings

Feature	Description	Editions
Decimal Frame Rate	Harmony now supports setting the scene's frame rate to a decimal number. This can accommodate pipelines that use 23.976 frames per second or 29.970 frames per second as their frame rate for compatibility with legacy standard displays.	Essentials, Advanced, Premium

Import / Export

Feature	Description	Editions
Import PSD with Groups and Blending Modes	<p>You can now import Photoshop Document (.psd) files in Harmony and preserve their group and layer structure as well as the blending modes of layers and groups.</p> <p>The old way of importing multi-layer PSDs into Harmony, which is still available, imported each group in the PSD file as a layer, and each layer in the each group as a drawing in its respective layer. This new method simply imports each layer as a layer, each group as a group, and if any layer or group has a specific blending mode, it will be attached to a Blending node with the same blending mode, so as to replicate the look of the Photoshop Document as accurately as possible.</p> <p>To import multi-layer PSDs and preserve their group, layer and blending mode structure, select File > Import > Images in the top menu and select your PSD file for import. Then, the Multilayer Image Import Settings dialog will appear. In the Create drop-down, select Individual Layers.</p> <p>To import multi-layer PSDs and convert groups to layers with multiple drawings, select Groups as Layers in the Create drop-down instead.</p>	Advanced, Premium
Export Animated GIF	<p>You can now export a scene, or part of your scene, as an animated GIF image.</p> <p>To export an animated GIF, select File > Export > Animated GIF from the top menu—see .</p>	Essentials, Advanced, Premium

Preferences

Feature	Description	Editions
Automatic Bitmap Pixel Density	If the new Pixel Density Proportional to Camera preference is enabled,	Advanced,

Feature	Description	Editions
	<p>new drawings will have their pixel density adjusted to the camera's current zoom level.</p> <p>This preference is available at the bottom of the Drawing tab in the Preferences dialog.</p>	Premium
Default 3D Model Scale Factor	The Default Scale Factor preference allows you to set the default scale factor for 3D models you import into your scene. You can set this option in the General tab of the Preferences dialog.	Premium
Render View Image Cache	You can now set the maximum cache size of the render preview as a percentage of your machine's RAM instead of a set amount of RAM. You can also enable or disable caching on the disk. Both preferences can be found in the Render tab of the Preferences dialog, in the Render View Image Cache section.	Advanced, Premium

Gaming

Feature	Description	Editions
Timeline Markers in Harmony Essentials	Timeline Markers, a feature previously exclusive to Harmony Advanced and Harmony Premium, are now available in Harmony Essentials to accommodate the creation of gaming rigs.	Essentials

Scripting

Feature	Description	Editions
Smart Script Management	<p>In the past, scripts packaged with Harmony were all automatically copied to your preferences folder, in the same location as your custom scripts. Now, scripts packaged with Harmony are only copied to your preferences if you make modifications to them. Otherwise, they are stored and executed from the Harmony installation folder.</p> <p>This solves several problems:</p> <ul style="list-style-type: none"> The scripts folder in your user preferences is now reserved for your custom scripts and are no longer cluttered with Harmony scripts. In previous versions, when installing a patch update, Harmony would not overwrite the scripts in your user preferences with the updated scripts, as this would risk overwriting one of your user scripts. This is no longer a 	Essentials, Advanced, Premium

Feature	Description	Editions
	<p>problem, except in the rare case where you happen to have edited a script packaged with Harmony which was updated in a patch update.</p> <ul style="list-style-type: none"> You can now easily restore the original version of a packaged Harmony script after having made changes to it. 	
Custom Script Folder	<p>You can now set a custom location in which to store scripts. To do this, you must set the TOONBOOM_GLOBAL_SCRIPT_LOCATION environment variable to the location where you want to store scripts. The scripts in this location will be available in the Script Editor alongside scripts that are packaged with Harmony and scripts in your user preferences.</p>	Essentials, Advanced, Premium
Show Attribute Information	<p>By enabling the Show Attribute Information option in the Node View, a button is added next to each attribute in the Layer Properties dialog and view. Clicking on this button will display information on how to access this attribute in the Harmony scripting interface, as well as a sample script to store the attribute's value in a variable.</p> <p>You can enable this option by clicking on the  Menu button in the Node View and selecting View > Show Attribute Information.</p>	Premium
User Interface Responders	<p>The scripting interface now provides you with a list of responders from the Harmony user interface. You can obtain this list with the getResponderList() method. You can obtain the list of actions for a given responder with the getActionList() method.</p>	Essentials, Advanced, Premium
Scene Modification Callbacks	<p>It is now possible to bind callbacks to scene modifications using the SceneChangeNotifier class. This class contains several signals that are triggered when different kinds of changes are done to the scene, and which can be bound to functions.</p>	Essentials, Advanced, Premium
Perform actions on specific nodes	<p>It is now possible to perform actions on specific nodes by specifying their absolute path in the Node view. Previously, the Action.perform() method would only take two parameters: The action to execute and its target responder, and would always work on the selected nodes only. You can now optionally specify the target node or nodes as its third parameter.</p>	Essentials, Advanced, Premium
Documentation of widgets	<p>Examples of how to create and configure user interface widgets has been added to the Harmony scripting interface documentation.</p>	Essentials, Advanced, Premium
Documentation of the node class	<p>Examples of how to use the node class have been added to the Harmony scripting interface documentation.</p>	Essentials, Advanced,

Feature	Description	Editions
		Premium
Documentation of the Attribute class	Examples of how to use the Attribute class have been added to the Harmony scripting interface documentation.	Essentials, Advanced, Premium
Set the value of an attribute at any frame	The new setValueAt method of the Attribute class can set the value of the attribute at a specific frame rather than at the current frame.	Essentials, Advanced, Premium
Obtain an attribute's sub-attributes	The new getSubAttributes () method of the Attribute class will now return the list of the attribute's sub-attributes.	Essentials, Advanced, Premium
Convert a coordinate for single axis between fields and OpenGL coordinates	The following methods were added to the scene class to convert the coordinate for a single axis from field coordinates to OpenGL coordinates, and from OpenGL to field coordinates: toOGLX () , toOGLY () , toOGLZ () , fromOGLX () , fromOGLY () and fromOGLZ () .	Essentials, Advanced, Premium
Get individual version numbers	The new getMajorVersion () , getMinorVersion () , getPatchVersion () and getBuildNumber () methods of the about class will provide their respective values from the currently installed version of Harmony.	Essentials, Advanced, Premium
Waypoints	The waypoint class was added to allow you to create and manipulate waypoints in the Node View.	Premium
Scriptable Toolbars and Views	<p>It is now possible to create toolbars and views using the Harmony scripting interface, by creating packages containing their functionalities, user interface and assets.</p> <p>You can find an example of a package containing a toolbar and a view created through the scripting interface in the Plugins/ScriptingInterfaces/Resources/packages/MasterController directory inside the Harmony installation directory:</p> <ul style="list-style-type: none"> • Windows: C:\Program Files (x86)\Toon Boom Animation\Toon Boom Harmony 16.0 [Edition] • macOS (Stand Alone): /Applications/Toon Boom Harmony 16.0 [Edition]/tba • macOS (Server): /Applications/Toon Boom Harmony 16.0 [Edition] Network/tba 	Essentials, Advanced, Premium

Feature	Description	Editions
	<ul style="list-style-type: none"> • GNU/Linux: <code>/usr/local/ToonBoomAnimation/harmony[Edition]_16.0</code> <p>You can create user packages in the packages sub-directory of the 1600-scripts directory of your user preferences. This directory is the following location:</p> <ul style="list-style-type: none"> • Windows: <code>C:\Users\[username]\AppData\Roaming\Toon Boom Animation\Toon Boom Harmony[Edition]\1600-scripts</code> • macOS: <code>/Users/[username]/Library/Preferences/Toon Boom Animation/Toon Boom Harmony[Edition]/1600-scripts</code> • GNU/Linux: <code>/home/[username]/Toon Boom Animation/Toon Boom Harmony[Edition]/1600-scripts</code> 	
Slider widget coordinates in fields	<p>It is now possible to set the position of a Slider widget in true field coordinates.</p> <p>To do this, you must create a Point2D widget, set its position, and set this Point2D widget as the position property of your SliderWidget. This will set the position of your Slider widget on a true fields coordinate system. You can also use the screen_space property of the SliderWidget class to decide if its position is relative to the screen rather than the scene.</p>	Premium
Set the Extra Files attribute of a Master Controller or Script Node	<p>It is now possible to set the Extra Files attribute of a Master Controller node or Script Node using the scripting interface. This is used by the Interpolation Grid and Interpolation Slider wizards to set the Extra Files attribute of the new Master Controller nodes they generate to include every file these Master Controllers depend on.</p> <p>Here is an example of how to set this attribute to "scripts/" for a MasterController node at the root of the scene:</p> <pre data-bbox="431 1356 1305 1520">var colName = column.generateAnonymousName(); column.add(colName, "FILE_LIBRARY"); node.linkAttr("Top/MasterController", "files", colName); column.setEntry(colName, 1, 1, "scripts/");</pre>	Premium
Multiply Quaternions	<p>The multiply method was added to the Quaternion class. It allows you to multiply the quaternion with another quaternion.</p>	

Enhancements

- It is no longer possible to make any changes to a layer's exposure or keyframes in the Timeline view when that layer is locked.

- The Layer Properties dialog now displays the type of node in its title bar. Likewise, the Layer Properties view displays the type of node in the **Type** field, just under the Enable/Disable checkbox and above the Name field.
- The  Control Selection Mode of the Transform tool can now be toggled on or off with a keyboard shortcut. There is no default shortcut for this command, but a shortcut can be assigned to it in the **Shortcuts** tab of the Preferences dialog, under **General**.
- Complex operations, such as pasting a character pose using the Pose Copier, now store their Undo/Redo data in a disk cache instead of in the RAM. This will prevent such operations from taking too much RAM in the Undo history.
- Performance when using the Render Preview mode of the Camera view has been improved.
- Performance when rendering images imported as original bitmaps has been improved.
- Performance when using Master Controllers in long scenes with a lot of keyframes has been improved.
- Users must now double-click on a layer's name in the Timeline view to rename them, to avoid making the rename field appear by accident when selecting the layer.
- When creating a new Harmony Server database, the sample resolution.conf file is now automatically copied to the resolution sub-folder of the database.

Bug Fixes

- Fixed memory leak when selecting an Alembic 3D model with vertex colours.
- Fixed a rare crash when moving a Master Controller 2D Point widget.
- Fixed slow rendering of drawings with deformations in the Top and Side views.
- Fixed issue causing OpenGL Cache nodes to influence the rendered image.
- Fixed issue where setting a workspace with Unicode characters in its name as the current workspace would make Harmony load the default workspace on launch.
- Fixed issue causing some layers in imported PSD files to be imported with incorrect proportions.
- Fixed issue causing users to be prompted to activate their software when upgrading to a new version of Harmony that requires an update to the licensing system.
- Fixed issue where the input and output ports of a Master Controller node or Script node would not update when changing their port configurations until the user closed and reopened the scene.
- Fixed issue where burn-ins would be rendered in the wrong font on GNU/Linux. Burn-ins on GNU/Linux are now rendered using the Liberation Sans font by default.
- Fixed issue where scripted actions affecting nodes would not cause all instances of the Node View to update, if several instances were opened.
- Removed the Game Skinning toolbar and the Animated Matte Generator view from Paint.
- Removed the Control Selection Mode tool property of the Transform tool from Harmony Essentials and Harmony Advanced, as it is only useful for features that are exclusive to Harmony Premium.

- Fixed issue causing the scope of variables declared by a script called by the `include()` method to be corrupted.
- Fixed small a memory leak that occurred when instantiation a node containing a 3D model with the `Model3D` class in the Harmony scripting interface.
- Fixed issue causing the Select tool to sometimes fail selecting artwork in a drawing layer rigged as the parent of another drawing layer.
- Fixed issue causing Harmony to fail rendering some frames when a Crop node is connected between the main scene Composite and the Write node.
- Fixed issue causing script buttons added to a toolbar when running Harmony in Japanese or Chinese to not run and to not display their icon.
- Fixed a small imprecision in the coordinates reported by the Master Controller 2D Point Widget.
- Fixed a memory leak occurring when rendering a Gaussian Blur or Box Blur effect with a matte.
- Fixed issue causing the number input field widget (`NumberEdit`) created through the Harmony scripting interface to ignore its `minimum` and `maximum` value properties.
- Fixed issue preventing users from replacing a cable going from a group node to another node with a cable going from a different port of the same group to the same node.
- Fixed freeze when moving a layer attached to a composite node that is visible in the Timeline view between two other layers.
- Fixed issue preventing from changing the scale of a 3D model with the Transform tool when that 3D model's x, y and z scale values are locked together.
- Fixed issue causing the Master Controller wizards to add both a node's 3D Path and separate position functions to the list of monitored attributes if the node had both functions in its attributes. Now, only the node's currently used position functions are added to the list.
- Fixed issue where creating a Master Controller with one of the Master Controller wizards would create multiple entries in the Undo history and would hence require using the Undo command multiple times to fully undo its creation.
- Fixed issue causing some effects to stop working in the Render Preview mode of the Camera view, specifically when the Transform tool is selected and the mouse cursor is in the Camera view.
- Fixed issue causing rendered frames to have various rendering errors when a 3D model is in the scene and is rendered through OpenGL.
- Fixed performance issue when rendering a scene with several Colour-Override nodes.
- Fixed issue where the middle mouse button could not be used to move nodes in the Node View when the **Middle Mouse Button Pans the View** preference is disabled.
- Fixed issue where the bounding box of a layer selected with the Transform tool would not rotate when rotating the Camera view.

- Fixed issue where attempting to install an older version of Harmony over a more recent version of Harmony could corrupt the installation on Windows.
- Fixed issue preventing custom grid presets for the Interpolation Grid Wizard from being saved.
- Fixed issue where GNU/Linux would add the fully qualified domain name of the machine to the Harmony Server database's machine-list file when installing the batch processing daemon. To avoid this problem, the installer no longer attempts to add the machine's name to the list, so it must be added manually.
- Fixed a syntax error reported by the installer when installing Harmony on CentOS 6.
- Fixed issue preventing the Interpolation Grid Wizard from working in Harmony Server.
- Fixed issue causing some layers to be hidden in the OpenGL preview of the Camera view if the **Enable Rendering Caching of Composite Nodes** preference is enabled.
- Fixed issue where a Master Controller's `onFrameChanged ()` callback would keep getting triggered after deleting its node.
- Fixed issue causing OpenGL anti-aliasing to stop working when the Transform tool is selected, the cursor is inside the Camera view and the **Enable Rendering Caching of Composite Nodes** preference is enabled.
- Fixed issue causing the OpenGLBypass node to process the image from a Passthrough composite as if it was a flat image.