SOLIDWORKS

3DEXPERIENCE

SOLIDWORKS Composer

User's Guide

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DASSAULT SYSTEMES

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Overview

Composer is a desktop content-creation system that enables the reuse of digital 3D data from CAD and other sources. Easy-to-use, Composer lets you create quickly assembly and disassembly procedures, technical illustrations, interactive 3D animations, training materials, marketing materials, sales tools, and more.

Composer Capabilities

Composer allows users in sales, marketing, customer service, training, support, and manufacturing to create associated 2D and 3D product deliverables directly from digital product data – without requiring CAD knowledge or CAD training.

Composer has the following capabilities:

- Based on a lightweight, open, XML-based architecture.
- Creates 3D interactive documents such as interactive assembly and service procedures.
- Creates high-resolution raster images including BMP, JPG, PNG, and TIF files.
- Produces 2D line art as SVG and CGM files with automatic hidden line and construction line removal.
- Adds annotations, labels, dimensions, arrows, images, and cutting planes that can be used in any way and format the user wishes.
- Controls visual consistency of content through the use of styles.
- Imports data from many 3D CAD systems and can be maintained in the file system or in any PLM system.
- Outputs industry-standard file formats, including PDF, HTML, AVI, and graphics formats like SVG and CGM.
- Lets you document a product while it is incomplete by letting you update all deliverables quickly and easily.
- Uses occlusion detection to find internal, non-visible parts on a single view, all views, or the animation timeline.
- Uses decimation to reduce the tessellation of selected parts to reduce the size of the .smg file.

Composer Benefits

Before Composer, creating graphical content for product documentation was a costly, error-prone process that had to be repeated, usually from the start, for any product or process change. Now, by using Composer, users can:

- Deliver products more quickly to market.
- Quickly and easily incorporate changes into their documentation images.
- Reduce product documentation costs.
- Improve manufacturing yield rates with 3D interactive assembly instructions.
- Provide more comprehensive training materials by leveraging 3D information.
- Improve customer service through delivery of crystal clear interactive documentation.
- Produce product documentation content in parallel with the design of the product.
- Reuse 3D product data in departments such as sales, marketing, customer service, training, support, and manufacturing.
- Increase the value of 3D information while ensuring the creation of accurate, always current deliverables.

Using Composer Documentation

The Composer User's Guide includes a Getting Started covering key capabilities of Composer. To get the most out of this guide, we suggest that you start here.

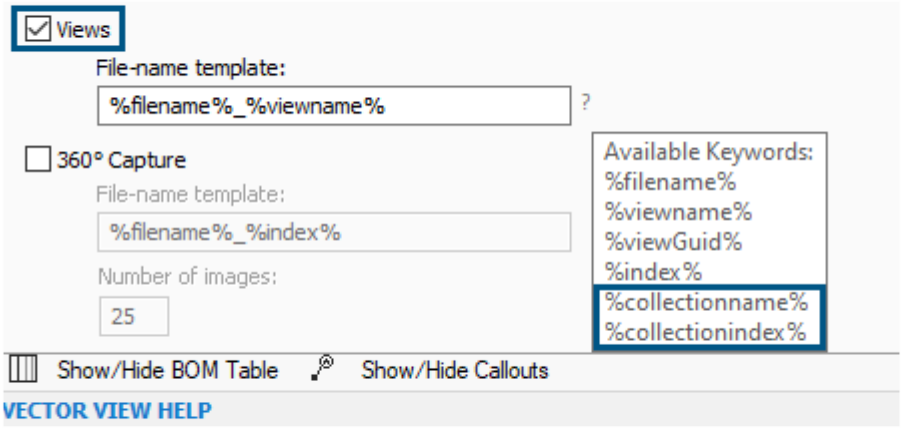
What's New

This page describes recent changes in Composer.

Using the New Filename Template Options for Workshops

The `collectionname` and `collectionindex` filename template options are available in the **Views** section of the **Technical Illustration** and **High Resolution** workshops.

Benefits: Working with workshops is easier.
The `%viewindex%` keyword assigns accurate index for a newly created view.



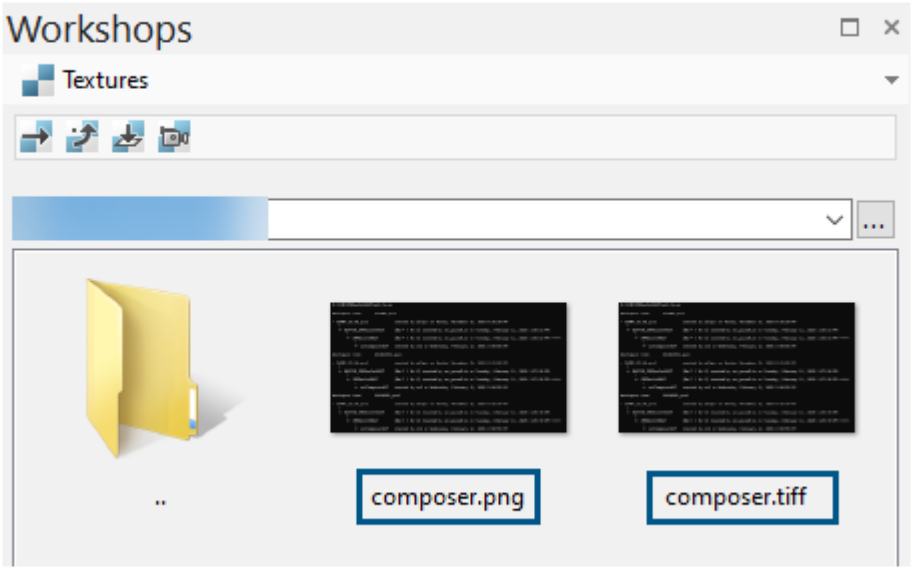
For more information, see *Technical Illustration Workshop* and *High Resolution Image Workshop*.

Using PNG and TIFF Image File Formats

You can use the PNG and TIFF image file formats in Composer.

Benefits: You have more image file options while working in Composer. Working with images is easier.
You can use the PNG and TIFF formats while performing the following actions:

- Working with the texture workshop.
- Importing PNG and TIFF image files for textures in Composer.
- Working with viewport background.

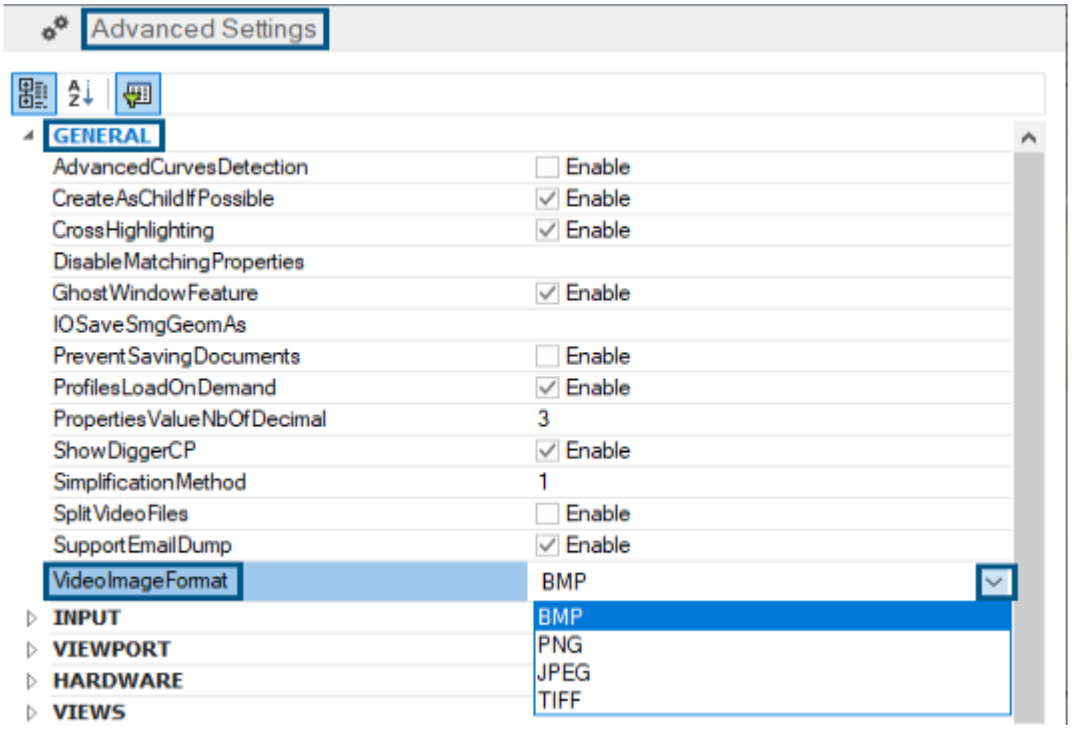


For more information, see *Textures Workshop* and *Adding Textures*.

Using Multiple Image Formats for Generating Videos

You can use BMP, PNG, JPEG, and TIFF image formats for animation frames while creating videos. You can create videos using the **Video Workshop**.

Benefits: You have more image format options for animation frames. Generating videos is easier and faster.



You can use these image formats for MP4, MKV, and FLV output video formats. A x264 library is used for these video formats.

For more information, see *Advanced Settings*.

Getting Started

The Getting Started topics introduce basic Composer concepts and operations. After completing these topics, review the rest of the online help for details about Composer.

Starting Composer

How to start Composer varies depending on whether it is your first time starting it or not.

Start Composer for the First Time

If this is your first time running Composer on this computer:

In the **Composer - Select Language** dialog box, select a language and click **OK**.

Start Composer after the First Time

If you have already run Composer on this computer:

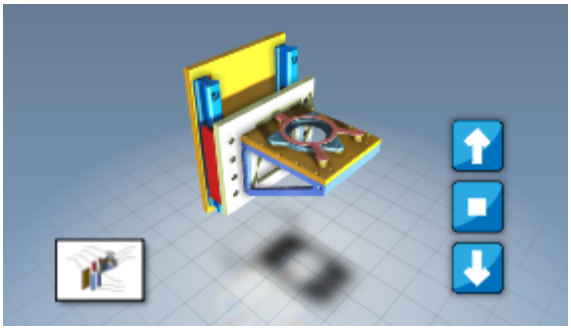
In Windows, click or double-click the **Composer** shortcut on your desktop.

Loading Models

Composer lets you work with models of different types.

1. In the command ribbon at the top of the Composer window, click **File** > **Open**.
2. In the **Open** dialog box, click `toolbox.smg` (in `<install_dir>\Samples`) and click **Open**.

   The toolbox model appears in the large center pane, called the viewport .



Notes:

- `.smg` is the extension for the default Composer file type. See *About Composer File Types*.
- Composer can also import many CAD formats, such as SOLIDWORKS. See *About Supported Import Formats*.
- You can also use the **Open** dialog box to merge models from different files.

Using Views

Composer has two modes, one for working with animations and another for working with views. Views are snapshots of viewport objects, called actors, and their properties.

Views are listed in the Views pane (left side of the Composer window). The toolbox model has four views:

- **initial** and **exploded** are normal views. Normal views capture all properties for all actors.
- **up** and **down** are custom views. Custom views capture only specified actors and properties and can be applied to normal views to modify them. The thumbnail images for custom views have diagonal lines and shading.

The **initial** view is currently displayed because it is the first view in the Views pane.

1. In the upper-left corner of the viewport, ensure that the views icon is displayed.

   If the animation icon is displayed, click the icon to switch from animation mode to view mode.

2. In the Views pane, double-click the **up** view to apply it to the current view.

   The slider assembly moves to its up position because the **up** custom view captured the position of those actors.

   Tip: You can also activate a view by dragging it from the Views pane to the viewport.

3. Drag the **down** view to the viewport.

   The slider assembly moves to the down position.

4. Drag the **exploded** view to the viewport.

   This view explodes the model and adds labels.

5. Drag the **up** and **down** views to the viewport.

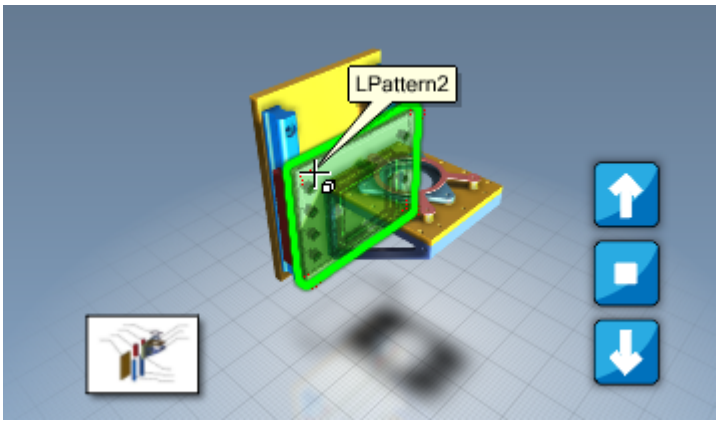
   You can apply custom views to any normal view.

Highlighting and Selecting Actors

The parts, assemblies, and components that make up the 3D model are called geometry actors. The annotations, measurements, and other markup you add to enhance the model are called collaborative actors . To manipulate actors, you highlight (also called preselect) or select them.

1. Drag the **initial** view into the viewport.
2. Move your mouse pointer over the gray **LPattern2** base plate.

   The part highlights in green and a tooltip appears. Composer highlights actors differently depending on the actor type.



3. With **LPattern2** still highlighted, press the **Tab** key.

   The actor temporarily disappears. This is useful to see actors that are hidden behind an actor.

   Note: If the actor does not disappear, ensure that the viewport has focus by clicking in it and then repeat this step.

4. Move your mouse away from **LPattern2**.

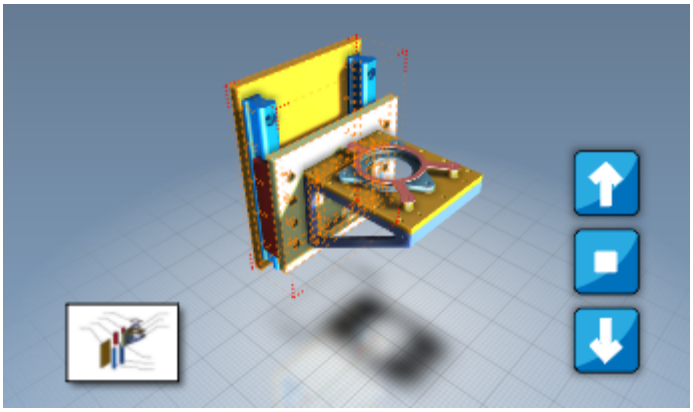
   The actor reappears.

5. Click **LPattern2** to select it.

   The part highlights in orange.

6. Press the **Ctrl** key and click the large brown **Base-Extrude** part.

   Two actors are now selected.



7. Press the **Shift** key and click **Base-Extrude**.

   Shift+click inverts the selection.

8. With only **LPattern2** selected, on the **Home** ribbon tab, in the **Visibility** group, click the ▾ icon on **Visibility** and then click **Show Selection and Hide Others**.

   The viewport shows only **LPattern2**.

   Note: Ribbon buttons with ▾ icons provide command menus. In some cases, these buttons are also bound to commands and you must click the ▾ icon to access the menu. In other cases, the entire button accesses the menu.

9. On the ribbon, click **Home > Visibility > Visibility > Invert Visibility with Ghost**.

   All actors reappear and **LPattern2** displays in ghost (semi-transparent) mode.

10. In the left pane, click the **Assembly** tab.

    The Assembly pane shows the assembly structure.

11. Right-click **toolbox-tutorial** and click **Expand All**.

    You can now see all model components.

12. Move your mouse over different component names.

    The component name in the Assembly tree preselects (the name becomes underlined and the corresponding actor in the viewport highlights).

13. Click to select different components in the Assembly tree.

    The component name highlights in the tree and the corresponding actor in the viewport becomes selected. You can highlight and select geometry actors from the viewport or the Assembly tree. You can highlight and select collaborative actors from the viewport or the Collaboration pane.

14. Clear check boxes next to component names.

    The components disappear in the viewport. You can control actor visibility from the Assembly and Collaboration panes and the viewport.

Navigating the Viewport

The viewport is the main Composer pane. It displays the 3D scene, which is the stage for all Composer actors (geometry, collaboration, camera, lighting, and so on). The viewport lets you visualize one or more models in the same window or in separate windows using the multi-document interface with document tabs.

Note: Viewport navigation affects all 3D actors but not 2D actors such as the four 2D panels in `toolbox.smg`.

1. Drag the **initial** view to the viewport.

   Note: If a message appears that the view has changed, click **Don't Save**. In this tutorial, always click **Don't Save** unless instructed otherwise.

2. Zoom in and out to change the scale of viewport actors.

To zoom...	Do this...
a portion of the viewport	Move the pointer to the area of interest and roll the mouse wheel.
by moving the camera instead of moving the focal point	Press both left and right mouse buttons and drag the mouse up or down in the viewport.
to an actor	Double-click the actor.
to fit the entire model	Double-click the viewport background.

3. Rotate actors in the viewport.

To rotate...	Do this...
the model	Right-click the viewport background and drag. By default, rotation is relative to the vertical axis.
about a point on the model	Right-click an actor and drag. The rotation is around the red dot .
freely, without respect to the orientation of the vertical axis	Press **Ctrl**, hold down the right mouse button, and drag.
the viewpoint from which you observe the model	Press **Shift**, hold down the right mouse button, and drag.
the model about the clicked point or center of the viewport	Press **Alt**, hold down the right mouse button, and drag.

4. To pan the viewport, click the mouse wheel button in the viewport and drag.

5. Click the compass in the upper-right corner of the viewport.

   The compass provides a quick way to view your model's x, y, and z planes. Click other axes and faces of the compass to change the orientation.

6. On the ribbon, click **Home** > **Navigate** > **Align Camera** > **3/4 X+ Y+ Z+** .

   The viewport rotates and zooms to a standard orthographic camera view.

   Tip: You can create custom camera views from the Viewport default document properties. See *Viewport*

7. In the status bar (lower-right corner of the Composer window), click **Camera Perspective Mode** .

   This command toggles the viewport between perspective and orthogonal projection modes. In perspective mode, actor sizes depend on their distance from the camera viewpoint. Orthogonal mode eliminates the effect of distance from the viewpoint (actor sizes remain constant).

8. Click **Camera Perspective Mode** again to turn off perspective mode.
9. In the status bar, click **Show Paper** .

   Blue borders appear in the viewport to show paper margins. Defining paper size ensures that all users have the same Composer experience independent of device and resolution differences. See *Paper Space*.

10. In the status bar, drag the **Zoom Paper** slider.

    Zooming the paper space resizes all actors, including 2D panels. For example, you can zoom in to read text. You can also zoom the paper space by pressing **Ctrl** while rolling the mouse wheel, and you can pan the paper space by pressing **Ctrl** while panning the viewport.

11. In the status bar, click **Fit Paper to Viewport** to reset the paper.

Managing Properties

All actors and the viewport background have properties that define their characteristics, such as color and opacity.

You view and edit properties from the Properties pane in the lower-left corner of the Composer window.

1. Drag the **initial** view to the viewport.
2. In the viewport, click to select the **LPattern2** part.

   The Properties pane displays the **LPattern2** properties.

3. In the Properties pane, for the **Color** property, click to select a new color.

   The viewport updates to show the new color.

4. Drag the **Opacity** slider to approximately 120.

   The part is now partially transparent.

5. With **Opacity** still selected, click **Restore Neutral Properties** in the **Properties** toolbar.

   The default opacity is restored.

   Tip: You can save a new default property value by clicking **Set as Neutral Properties** in the **Properties** toolbar. Changing the neutral value affects all views containing the actor.

6. In the viewport, select any two geometry actors and change some property values.

   The Properties pane shows only properties common to the selected actors. Property changes affect all selected actors.

7. In the Properties pane, with no properties selected, click **Restore Neutral Properties**.

   This restores all properties to their neutral values.

   Tip: Use the **Ctrl** key to add or remove property selections.

8. Select **LPattern2** and change its color again.

   Tip: Use styles to define a set of property values that you can apply to actors. See *Styles Workshop*.

Creating and Updating Views

In the previous topic, you modified the color of the **LPattern** part. When you modify a view, you must decide whether to update the view, create a new view, or discard your changes.

1. Drag the **initial** view to the viewport.

   A message box tells you the current view has changed.

2. In the message box, click **Save**.

   A new view called **View 1** appears in the Views pane. The **initial** view is unchanged.

   Tip: You can also create a new view at any time by clicking **Create View** in the Views pane.

3. Right-click **View 1**, click **Rename View (F2)**, and type `My View`.
4. In the viewport, select any part and change some properties.
5. In the Views pane, click **Update View** .

   Your property changes are saved.

Moving Actors

To move actors in the viewport:

1. Drag the **initial** view to the viewport.
2. Click **Transform** > **Move** > **Free Drag** .

   Free dragging lets you move actors to anywhere in the current plane.

3. In the viewport, drag the **LPattern2** actor to a new position and then press **Esc** twice.

   The first **Esc** clears your selection (unselects **LPattern2)**, and the second **Esc** exits free-dragging mode.

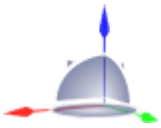
   Note: Many Composer tools remain active until you exit the tool by pressing **Esc**. This behavior lets you perform operations multiple times without having to reselect the tool.

4. Click **Transform > Move > Translate** .

   Translation mode lets you move actors along the x, y, and z axes and planes.

5. In the viewport, select the two blue rails in the model.

   A triad gizmo appears. Gizmos let you manipulate actors in 3D by dragging them. In this case, the red, green, and blue arrows indicate the directions you can move.



6. Drag the blue arrow.

   You can only drag along the y-axis. When you drag the red or green arrows, you can drag along those axes. If you drag the fan area between two axes, you can drag anywhere along that plane.

   Note: Actors other than the two blue rails you selected also move because kinematic links exist between actors. Composer lets you create kinematic relationships to create sophisticated animations.

7. Press **Esc** twice.
8. Click **Transform > Move > Rotate** .

   Rotation mode lets you rotate one or more actors. Contrast this to viewport rotation (right mouse button), which rotates the entire model.

9. In the viewport, click the **LPattern2** actor.

   A spherical gizmo appears with red, green, and blue arcs for the different directions you can rotate.

10. Drag each gizmo arc to rotate in different directions. Drag the center of the gizmo to rotate the part freely (in any direction).
11. Press **Esc** twice.

Adding Collaborative Actors

Use collaborative actors to enhance your models.
Composer provides a large number of collaborative actors, including markup, annotations, measurements, and cutting planes.

1. Drag the **initial** view to the viewport.
2. Click **Author** > **Markups** > **Arrow**.
3. Move the mouse pointer into the viewport.

   A red arrow is attached to the mouse pointer. The status bar at the bottom of the Composer window displays instructions for creating the arrow.

4. Click to position the starting point of the arrow.

   Tip: If you click an actor, the arrow becomes associated with that actor. For example, moving the actor also moves the associated arrow.

5. Move the mouse pointer to change the arrow length and direction, and then click to place the arrow end point.

   The arrow is added to the viewport, and another arrow is attached to the mouse pointer.

6. Add a second arrow to the viewport, and then press **Esc** to exit the arrow tool.
7. With the second arrow still selected, change the arrow **Opacity** and **Background color** in the Properties pane.

   Like geometry actors, collaborative actors have properties.

8. In the viewport, drag the various arrow anchors (yellow triangles and red dots) to change arrow shape and size properties.
9. Click **Author** > **Annotations** > **Label**.
10. Click an actor in the viewport, click again to position the label, and then press **Esc** to exit the tool.

    By default, the label text is the name of the actor to which it is attached.

11. With the label still selected, in the Properties pane, under **Text**, for **Text**, select **String**.
12. For the **Text string** property, type `My Label` and press **Enter**.

    The label text changes from the actor name to `My Label`.

    Tip: To type multiple lines of text, click ... in the **Text string** field, type text in the Text dialog box, and then click **OK**.

13. In the Views pane, click **Update View** to save your changes.
14. On the right side of the viewport, click the blue up arrow.

    An orange box with white-circle corners appears around the arrow indicating it is selected. This is a collaborative actor called a Image 2D panel and is used to add images to your scene.

15. In the Properties pane, in the **Event** group, examine the **Link** property.

An event is an action that takes place when you click an actor. The **view://up** link activates the Composer view called **up**. You clicked the arrow to select it, but nothing happened. This is because an event is only active in Composer Player or when Composer is simulating Player.

16. In the lower-right corner of the Composer window, click **Design Mode** to clear it.

Composer is now in play mode instead of design mode.

17. In the viewport, click the blue up arrow.

The slider assembly moves up.

18. Click each of the other icons:

- The down arrow activates the **down** view.
- The stop button (square box) displays the **initial** view.
- The panel in the lower-left viewport corner displays the **exploded** view.

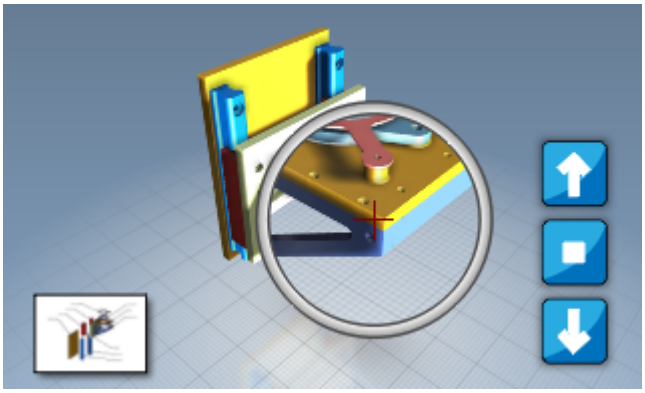
19. Click **Design Mode** to turn on design mode.

Using Digger

The Digger tool lets you zoom parts of your model, change opacity and visibility, and capture a 2D image.

1. Drag the **initial** view into the viewport.
2. Click in the viewport, and then press **Space Bar**.

   Digger appears in the viewport.



3. Move Digger over your model by dragging the Digger ring.

   Digger magnifies the area inside the ring.

4. On the Digger ring, click **Show/Hide Tools**.

   Additional icons appear around Digger.

5. Click each of the four tools on the upper-left side of Digger (**Zoom**, **Cutting Plane**, **X-Ray**, **Onion Skin**) and drag the percentage handle to see the effect on the model.
6. Drag Digger off the model to an empty area of the viewport.
7. Drag the **Change Center of Interest** tool onto your model.

   An attach line connects Digger and your model, and that area of the model appears in Digger.

8. Use the Digger tools to create an effect you want to capture.
9. Click **Capture Picture in 2D Image**.

   Digger disappears and Composer adds an Image 2D panel containing the Digger image to your scene. The panel is a collaborative actor with properties you can modify in the Properties pane.

Creating BOMs

A bill of materials (BOM) is a part list. You can include a BOM table in your scene and create callouts to number the parts in your model.

1. Drag the **initial** view to the viewport.
2. Click **Workshops** > **Publishing** > **BOM**.

   The BOM workshop appears in the Workshops pane, and the BOM pane appears in the left pane. The BOM pane displays the BOM tree, which is currently empty.

3. In the BOM workshop, click **Generate BOM IDs**.

   The BOM pane now shows the BOM tree for your model.

4. In the viewport, press **Ctrl+A** to select all actors.
5. In the BOM workshop, click **Create Callouts**.

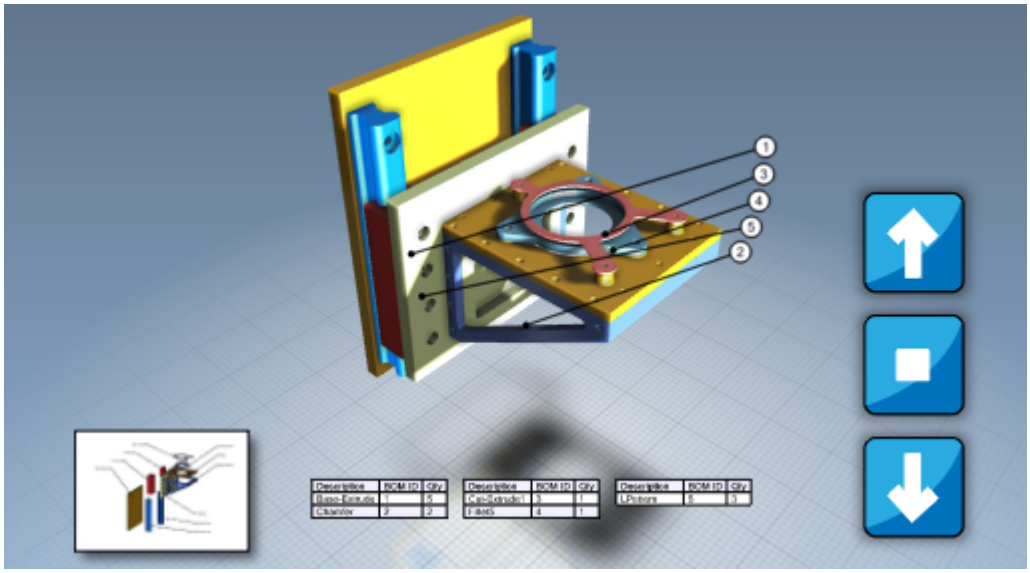
   Callouts appear in the viewport. Note that callouts are created for geometry actors only, not collaborative actors.

6. With all callouts still selected, in the Properties pane, change **Auto alignment** to **Circle**.

   Callouts are collaborative actors with properties you can modify in the Properties pane. **Auto alignment** determines the callout arrangement in the viewport.

7. On the **Home** ribbon tab, in the **Visibility** group, select **BOM Table**.

   The BOM table appears in the viewport. Every Composer document has a BOM table actor that is hidden by default.



8. In the viewport, click to select the BOM table and then modify properties in the Properties pane.

   For example, you can change the BOM table location, specify text and row colors, and enable model highlighting when you hover over the BOM table.

9. In the BOM pane, click **Configure BOM Columns** .
10. In the **Configure Columns** dialog box, select **Color (Actor.Color)** in the **Available properties** list, click , and then click **OK**.

    The BOM list in the BOM pane and the BOM table in the viewport now have **Color** columns. You can include any property or meta-property in the BOM.

Creating Technical Illustrations

The Technical Illustration workshop lets you publish vectorized images of your scene.

1. Drag the **initial** view to the viewport.
2. In the ribbon, click **Workshops** > **Publishing >Technical Illustration** .
3. In the Technical Illustration workshop, click **Preview**.

   Composer generates an SVG vector image of your model and displays it in your Web browser. Depending on your browser security settings, you might need to allow blocked content.

4. Select **Color regions** and click **Preview**.

   The vector image now includes color.

5. Clear **Color regions**, select **Shadows**, and click **Preview**.

   The image has shadows instead of color.

6. Click **Save As** and save as a `.svg` file.

Using Animations

Composer lets you animate your models.

1. Drag the **initial** view to the viewport.
2. Click **Home** > **Show/Hide** > **Animation** .

   Composer switches from view mode to animation mode and displays the Timeline pane at the bottom of the window. The viewport is empty at the beginning of the animation (time=0).

   Tip: You can also switch between view and animation modes by clicking the icon (or) in the upper-left corner of the viewport.

3. In the Timeline toolbar, click **Play/Pause** .

   A 10-second animation plays in the viewport.

4. If the animation begins replaying, click **Stop** and then click **Loop Play Mode** to turn off continuous play mode.
5. Use the other animation controls (**Previous Key** , **Previous Frame** , and so on) to move to different points in the animation.
6. Drag the timebar (the vertical line in the Timeline pane) to move to different points in the animation.
7. Move the timebar to time=12 seconds.
8. In the viewport, select the **Base Extrude** part.
9. In the Timeline pane, click **Set Location Key** .

   This creates a location key that captures the position of the actor at time=12.

10. Drag the timebar to time=15.
11. Using **Free Dragging** mode, drag **Base Extrude** to a new location, and then click **Set Location Key** .
12. Click **Play/Pause** to play the animation from the beginning.

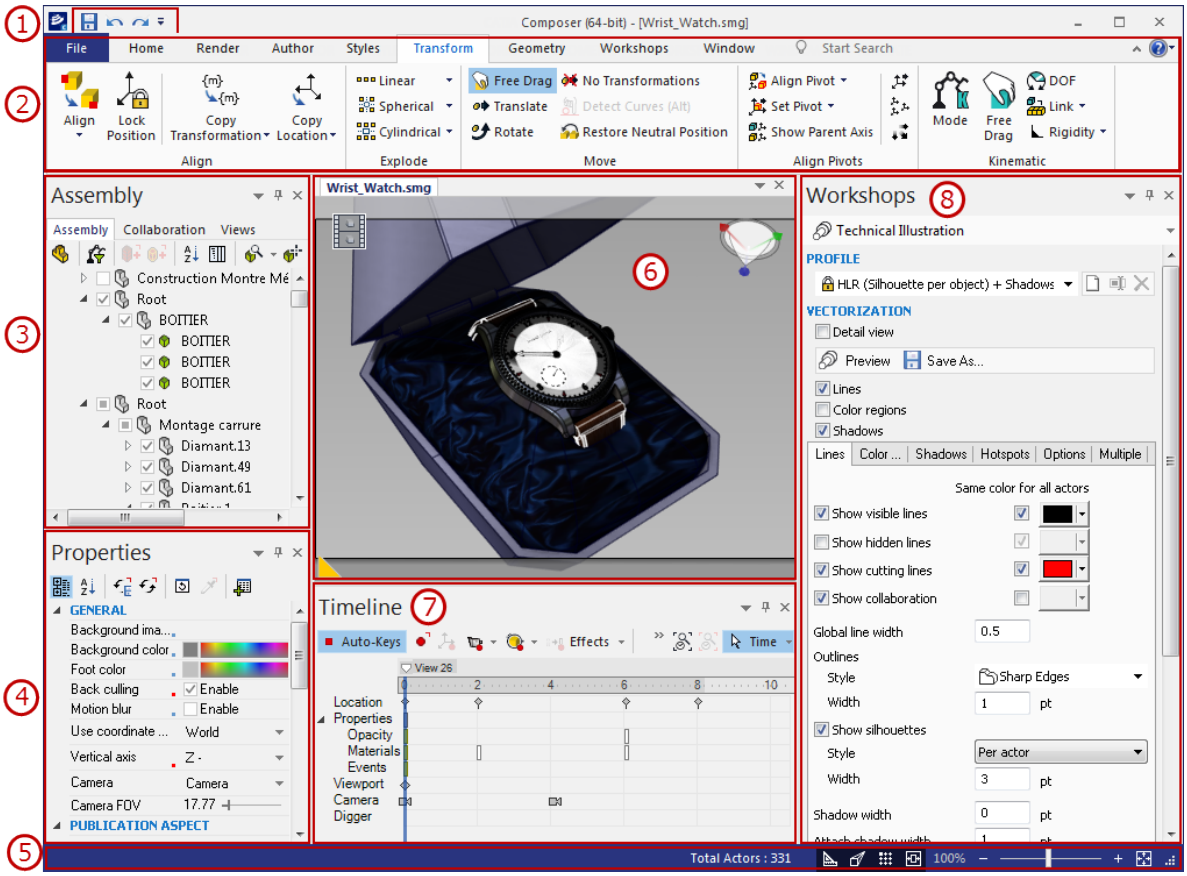
    The animation is now 15 seconds long with the last three seconds moving **Base Extrude**.

13. Click **File** > **Exit Composer** and click **No** to exit without saving.

You have completed the Composer Getting Started topics.

Interface Concepts

The Composer graphical user interface (GUI) is divided into several sections.



The various sections of the interface are numbered in the image above, and described in the table below.

Number	Interface Element	Description
1	Quick Access Toolbar	Provides quick access to frequently used commands. The Quick Access toolbar is configurable. See *Quick Access Toolbar*.
2	Ribbon	Provides access to application features from a ribbon with a number of menus and tabs. See *Working with the Ribbon*.
3	Left Pane	Contains the Assembly, Collaboration, and Views panes by default. You can add other panes such as BOM and Markers. See *Working with the Left Panes*.
4	Properties Pane	Lets you view and edit properties of selected actors, such as color, opacity, and font. See *Editing Actor Properties*.

Number	Interface Element	Description
5	Status Bar	Displays instructions for using commands and other useful information. Also contains several commands. See *Status Bar*.
6	Viewport	Displays the 3D scene, which is the stage for all Composer actors (geometry, collaboration, camera, lighting, and so on). Lets you visualize one or more models in the same window or in separate windows using the multi-document interface with document tabs. See *Navigating the Viewport*.
7	Timeline	Lets you create, edit, and play 3D animations. Composer uses a keyframe-based interface. You create keys to capture actor properties and positions, and then Composer smoothly animates the transition between keys. See *Using the Timeline*.
8	Workshops Pane	Provides access to Composer feature sets, called workshops. See *Working in Workshops*.

Importing and Opening Files

You can import a number of 3D and 2D file formats in Composer. You can also open native Composer files.

Importing and Opening Files

You can import a number of 3D and 2D file formats in Composer. You can also open native Composer (*.smg, *.smgXml, *.smgGeom, *.Geom, *.smgProj) or Sync (*.seeb, *.smgSeeb) files.

Note: When loading Composer documents such as *.smg, smgXML, *.smgProj and fully shattered files, the loading status is displayed in the left-hand side of the status bar. If needed, you can cancel the loading operation by pressing the **Escape** key.

Before you begin: Start Composer.

Import and Open Files

You can import various file formats, as well as open native Composer files from the **Open** dialog box.

1. Click **File** > **Open** .
2. In the **Open** dialog box, select the file to import or open and click **Open**.

   See *Open Files* for more on import or open options.

Open Files from Windows Explorer

You can open native Composer (*.smg, *.smgXml, *.smgGeom, *.Geom, *.smgProj) or Sync (*.seeb, *.smgSeeb) files directly from Windows Explorer.

1. From Windows Explorer, right-click a Composer or Sync file.
2. In the context menu that appears, select an option.

Option	Description
Open	• Opens the document in a new window if no session of Composer is already running. • Opens the document in the already-opened Composer window if a session is already running.
Open in new Window	Opens the document in a new window (that is, a new session of Composer). Opens the document in Player.

Note: If several versions of Composer, Sync or Player are installed, the latest version is used.

About Supported Import Formats

You can import a number of 3D and 2D file formats in Composer, whether from CAD systems (such as SOLIDWORKS, CATIA, and Pro/ENGINEER) or CAD-neutral formats (such as IGES and STEP).

Supported 3D Import Formats

Composer can import the following 3D formats.

Note: Not all import options apply to all formats. See *(Default) Document Properties - Input*. To view the import options matrix, see .

- All Composer formats
- 3DStudio up to 3D Studio MAX 4

  Note: Animations and instances are not supported.

- 3DXML V2 to V4

  Note: Favorite context is supported for 3D Tolerancing & Annotation captures, and the visibility of geometrical elements is properly managed, providing that the favorite context is defined on the annotation set that contains the capture.

- ACIS up to 2025 1.0
- IGES up to 5.3
- Inventor

  Note: Requires SOLIDWORKS and Autodesk Inventor Viewer.

- OBJ Wavefront
- Pro/ENGINEER 16 to Wildfire 5
- Pro/E Creo 1.0 to 11.0
- SOLIDWORKS 2006 to 2026

  Note: Requires SOLIDWORKS or SOLIDWORKS OEM.

- STEP AP203, AP214 & AP242
- STL
- U3D ECMA 1 to 3
- VDA 1.0 and 2.0
- VRML 2.0

  Note: VRML1.0 and animations are not supported. Unicode is not supported by this 3D format (this means that files which use a file path containing Unicode characters cannot be imported).

Supported 2D Import Formats

Composer can also import the following 2D image formats:

- PNG (.png)
- TIFF (.tif, .tiff)
- Bitmap (.bmp)
- Jpeg (.jpg, .jpeg, .jpe)
- Targa (.tga)
- Rgb (.rgb)
- SVG (.svg) (Raster images encapsulated in SVG files are ignored).

About Composer File Types

Composer has several native file types.

Composer File Types

The table below describes the various file types used to handle and share Composer documents.

Composer File Type	Description
SMG (`.smg`)	The default file type. A single file that includes all property, geometry, view, and animation information. **Tip:** `.smg` files are archive files containing `.smgXml`, `.smgGeom`, `.smgOutlines`, and other files required to render the scene. You can view and extract the file content with WinRAR®. Rename the `.smg` file with a `.rar` extension.
Package (`.exe`)	An auto-executable file containing the following: • `.smg` file • Composer Player executable Use packages to distribute models to users who might not have Composer or Composer Player installed. Opening the package file (`.exe`) runs Composer Player and loads the Composer data. **Note:** The Composer Player documentation is not bundled in the package. It is accessed online. **Tip:** You can view and extract the content of package files with WinRAR. Rename the `.exe` file to have a `.rar` extension.
Product (`.smgXml`)	A multi-file format consisting of all the `.smg` components: • `.smgXml` - An XML file containing the assembly structure. It denotes the position of the actors, the properties of the viewport, and so on. Open the `.smgXml` file to load the entire model. • `.smgGeom` - A binary file containing the assembly geometry. • `.smgView` - An XML file containing view definitions. • `.smgSce` - An XML file containing scenario (animation) definitions. • View thumbnails - JPG images that appear in the Views pane. The `.smgGeom`, `.smgView`, and `.smgSce` files must have the same name as the `.smgXml` file. **Tip:** For greater flexibility, use Composer projects instead of Composer products alone.
Project (`.smgProj`)	A multi-file format consisting of one or more Composer product files and a project (`.smgProj`) file. The `.smgProj` file is an XML file that references the top-level `.smgXml`, `.smgView`, and `.smgSce` files that comprise the project. • The `.smgXml`, `.smgView`, and `.smgSce` files can be any name and reside in any folder. • The `.smgXml` and `.smgGeom` files must be the same name and reside in the same folder. Projects organize your Composer files into folders and let you share references. For example, two projects can share the same `.smgXml`, `.smgGeom`, and `.smgView` files but have different `.smgSce` files. Projects also let you import multiple subassemblies even when you do not have the main assembly file.

Composer File Type	Description
Fully Shattered	A Composer product with multiple `.smgXml` and `.smgGeom` files. **Note:** All other Composer formats contain geometry and structure information in one (`.smg`, `.exe`) or two (`.smgXml`, `.smgGeom`) files and are called monolithic file types. In the fully-shattered format: • The main assembly and each subassembly has a `.smgXml` file that includes the neutral properties, assembly hierarchy, and position of its parts. It also includes references to all the parts. • Each part has a `.smgXml` and `.smgGeom` file. Fully-shattered assemblies have several advantages: • The assembly loads all its parts by reference. An assembly does not have geometry files. This keeps the file size of the main assembly small and lets you reuse parts in multiple assemblies. • You can load assembly parts as you need them instead of loading the entire assembly when you open it. For details, see the **Project** > **Geometry** options in the Open dialog box and the **Load on Visibility** command. To load a part, right-click the part in the Assembly tree and click **Product** > **Load Products**. • You can load parts with different levels of details. If you create your fully shattered assembly with more than one level of detail, you can choose the level of detail on the Open dialog box. • You can perform incremental updates. Because parts are loaded by reference, you can update only parts that have changed. When using fully shattered assemblies, you must be aware of the following points: • You cannot create fully-shattered files from Composer. Use Sync. • Create projects with **File** > **New Project**, not **Save As**. Because Composer measurement actors, animation keys, and other authoring content is stored in the top-level project assembly, that content is lost if you create the project using **Save As** and then retranslate the top-level CAD assembly in Sync. • Fully shattered assemblies reference the last saved configuration of its parts. If your assembly uses multiple configurations of a part, then it displays the last saved configuration for all instances of the part. Therefore, you will get improper results when converting (from Sync) in fully shattered mode an assembly that contains multiple instances of the same part with different configurations. • You cannot change the neutral properties of a part in a fully shattered assembly because the part is loaded by reference into the assembly. To change the neutral properties of a part, open the part in its own window. • When you modify a subassembly such as adding/removing an assembly group or merging/exploding actors, you break the fully shattered structure. All the associated structure branches will be saved in the top assembly file. • Undoing an operation that breaks a fully shattered structure does not restore the fully shattered structure.

Benefits of Each File Type

The table below describes the benefits provided by each Composer file type.

Benefit	SMG (.smg)	Package (.exe)	Product (.smgXml)	Project (.smgProj)
Minimal number of files	X	X		
Includes Composer Player		X		
Can edit XML			X	X
Separate product, scenario, and view files			X	X
Product, scenario, and view files can reside in different folders				X

Breaking of External Assembly Links

A warning message is displayed before launching an operation that will break external assembly links in a Composer project (`*.SmgProj` files) or in a fully-shattered product structure (`*.SmgXml` files), prompting you to confirm the operation.

Click **Yes** to perform the operation while breaking assembly links, or click **No** to cancel the operation and preserve assembly links. Select **Don't ask this question again** if you no longer want this message to appear in similar cases.

Working with Actors

In this section, you will learn how to work with actors in different ways.

About Actors and Associativity

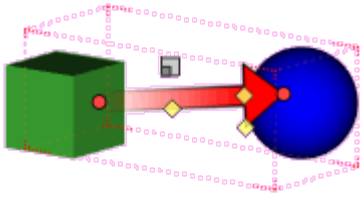
Author commands let you enhance models with 3D redlining, annotations, dimensions, and other collaborative actors.

Note: Collaborative actors are listed in the Collaboration Pane.

Most collaborative actors can be associated with geometry actors. For example, when you create a label, click a geometry actor when placing the first anchor point to attach the label to the actor. Moving the geometry actor also moves the label. You can move the label independently to reposition it, but moving the geometry actor still moves the label.

Notes:

- You can associate some collaborative actors with multiple actors. For example, you can attach the start point of an arrow to one actor and the end point to another.



- You can change actor association by dragging the collaborative actor anchor to a different geometry actor.
- You must associate some collaborative actors, such as measurements, with one or more actors.
- The following collaborative actors are never associative: 3D panels, polylines, custom grids, custom coordinate systems.
- Regarding 2D panels (image 2D, vector image 2D, text 2D):
  - You can associate 2D panels with geometry actors using the **Attach** property. However, moving a geometry actor does not move associated panels.
  - If you create a label on a 2D panel, and then want to delete the 2D panel associated with the label, you should be aware that the position of the label in the 3D will be lost, and you will no longer be able to select its attach line.
- You can select all collaborative actors with broken associations with the **Select Actors with Broken Associations** right-click command.

Translating and Rotating Actors

You can translate and rotate actors in the scene using Move commands.

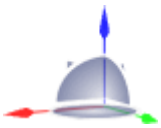
Tip: When **Free Dragging Mode** is disabled, you can move or rotate actors only by dragging the gizmo. When **Free Dragging Mode** is enabled, you also drag actor.

Translate Actors

The translation mode lets you move actors in 3D space.

1. Click **Transform** > **Move** > **Translation Mode**
2. Select one or more actors.

   A triad gizmo appears.



Note: The mouse pointer changes to when positioned for translating.

3. To move actors along an axis, drag a gizmo axis. As you drag, a line indicates the linear displacement.
4. To move actors along a plane, drag a gizmo web (the colored region between two axes). As you drag, a grid indicates the linear displacement.
5. To move actors relative to a model edge or normal (indicated by a red arrow), press **Alt** (**Curve Detection Mode**) while dragging.
6. To type a displacement value, click the gizmo, then type a **Length** in the Properties pane and press **Enter**.

Rotate Actors

The rotation mode lets you rotate actors in 3D space.

1. Click **Transform** > **Move** > **Rotation Mode**
2. Select one or more actors.

   A spherical gizmo appears.

Note: The mouse pointer changes to when positioned for rotating.

3. To rotate actors along an arc, drag a gizmo arc.

As you drag, the angular displacement in degrees is displayed. When **Grid Mode** is enabled, rotation snaps to 45 degree increments. See *Status Bar*.

4. To rotate freely (in any direction), drag the center of the gizmo.
5. To rotate actors around a model edge or normal (indicated by a red arrow), press **Alt** (**Curve Detection Mode**) while dragging.
6. To type a displacement value, click the gizmo, then type an **Angle** in the Properties pane and press **Enter**.

Placing and Aligning Actors

Grids and magnetic lines help you place and align actors in your scene.

Aligning Actors

You can position geometry actors in your models using alignment tools.

1. Click an alignment tool, for example **Transform** > **Align Point to Point** .

   Note: You can activate other alignment tools.

2. Click the feature (line, plane, and so on) you want to align.

   Note: Features are highlighted in red as you hover over the scene.

3. Click the feature you want to align to.

   Notes:

   - Alignment commands move actors but do not permanently attach (mate) them.
   - If an alignment is opposite of what you intended, press **Shift** when selecting the second actor.

About Grids and Magnetic Lines

This topic explains what you need to know before you get started with grids and magnetic lines.

- Grids and magnetic lines do not appear in Composer raster and vector output.
- Composer Player does not display grids or magnetic lines.
- Set grid and magnetic line properties in the Properties pane.

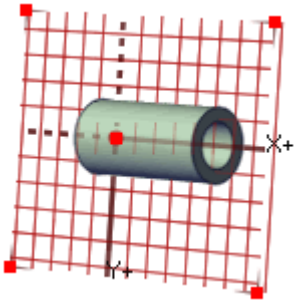
Using a Grid

Grids are planes that help you precisely place and align actors in 3D space. For example, use grids to position lights and cameras around your model.

Tip: To restrict placement of actors to grid lines only, select *Grid Mode* in the status bar.

1. Click **Author** > **Create Grid on Geometry**.
2. Click a geometry actor in the viewport or Assembly pane.

   The grid is attached to the local frame of the selected geometry actor.



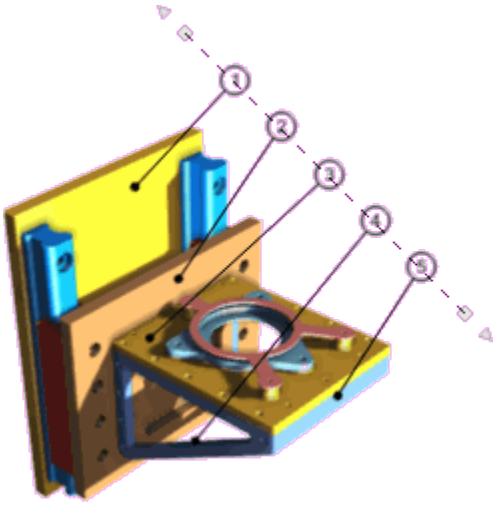
Note: You can also create a grid at the location defined by vertices or axes you select by clicking **Create Grid**. In this case, the resulting grid is not associated with any actor.

3. Resize or position the grid as needed.

To...	Do this...
Resize the grid	Drag a corner anchor. Press **Ctrl** for symmetric changes, **Shift** to maintain the aspect ratio, or **Ctrl** and **Shift** for both.
Move the grid	Drag its origin anchor.
Rotate your scene to make the grid parallel to your screen	Double-click the grid. Double-clicking again flips the scene.
Make actors snap to grid lines	Click **Grid Mode** in the lower-right corner of the Composer window.

Using Magnetic Lines

Magnetic lines let you easily align the following collaborative actors: annotations, measurements, and 2D panels.



Create a Magnetic Line

You can create a magnetic line to align actors easily.

1. Click **Author** > **Magnet** > **Create Magnetic Line**.
2. In the viewport, do one of the following:
   - Click two points that define the magnetic line endpoints.
   - Click an axis to define the magnetic line alignment and then click to position the line.
3. Create additional magnetic lines or press **Esc** to exit the tool.

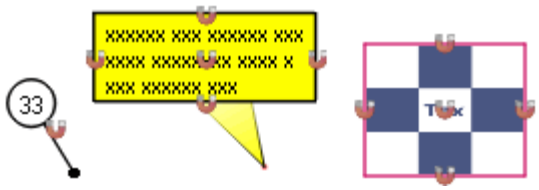
Attach Actors to a Magnetic Line

Once you have created a magnetic line, you can attach actors to it.

Before you begin: To be magnetic (receptive to a magnetic line), an actor's **Auto alignment** property must be **Free 2D** or **Free 3D**.

1. In the viewport, do one of the following:
   - Drag a magnetic line to pick up actors.
   - Drag actors to a magnetic line.

   When you drag magnetic lines and magnetic actors near each other, magnet points indicate where actors can attach. Callouts have one magnet point and all other actors have five.



Notes:

- When attached to a magnetic line, an actor's **Auto alignment** property is set to **Free 2D** automatically.
- Avoid picking up actors unintentionally when dragging magnetic lines, because you cannot use the **Undo** command to undo position changes of **Free 2D** actors.

2. Space actors on the magnetic line as needed.

To...	Do this...
Space actors evenly on a magnetic line	Set the magnetic line **Spacing** property (Properties pane) to **Uniform**.
To position actors freely	Set **Spacing** to **Custom**.

Align a Magnetic Line

You can align a magnetic line to an axis (geometry actor edge or coordinate system axis).

1. Select one or more magnetic lines.
2. Click **Author** > **Magnet** > **Align Magnetic Line**
3. Click an axis on which to align.

Note: Hovering over an axis highlights the axis and shows the effect on the magnetic line.

Tip: You can also align a magnetic line by clicking its alignment button and then clicking an alignment axis.

Transform a Magnetic Line

You can move, rotate or transform magnetic lines.

Transform the magnetic line as needed.

To...	Do this...
Move a magnetic line	Drag the middle of the line.

To...	Do this...
Rotate a magnetic line	Drag a square anchor.
Resize a magnetic line	Drag a triangular anchor.

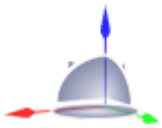
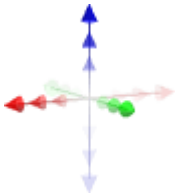
Transforming Actors

This section provides more information about Transform commands such as Explode or Pivot alignment.

About Gizmos

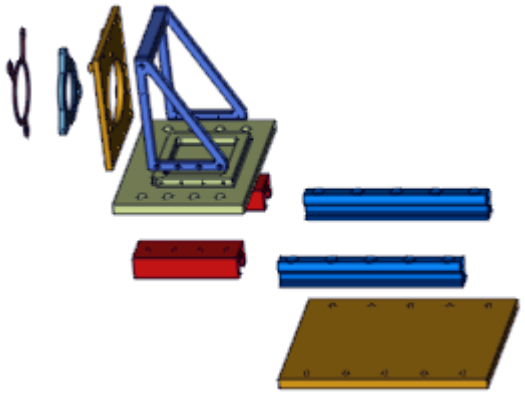
Gizmos are graphic objects that let you manipulate actors in 3D.

Gizmos appear at actor pivot coordinates during transformations, unless one pivot is displayed for multiple actors. There are several types of gizmos.

Type of gizmo	Appearance
Translation	
Rotation	
Linear/Cylindrical Explosion	
Spherical Explosion	

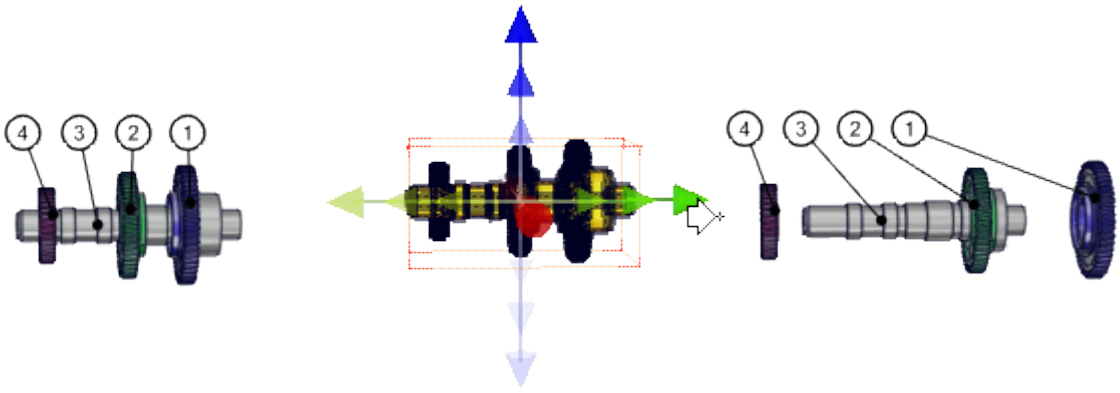
About Explode Transformations

Explode commands add space between two or more actors.



During explode transformations, actors move along the transformation axis based on their bounding box centers. The actor whose bounding box center is the farthest from the movement direction does not move. In the following example, the green axis shows the movement direction (to the right). The actors move in the order shown, with actor 4 remaining stationary.

Note: If you reverse the direction of movement (to the left), actors move in reverse order, and actor 1 remains stationary.



Before **Linear Explosion** **After**

Copying Actor Translation and Rotation Changes

You can copy the location or transformation of one actor to another.

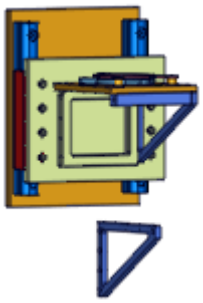
Copying Actor Translation and Rotation Changes

You can copy the location or transformation of one actor to another.

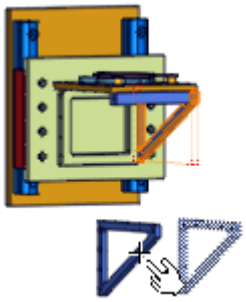
Copy Actor Translation and Rotation Changes Relative to its Neutral Position

You can copy actor translation and rotation changes relative to its neutral position.

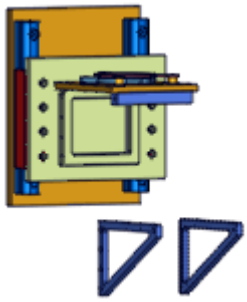
1. Move an actor, for example, using **Free Drag** .



2. Select another actor, click **Copy Transformation in World Coordinate System** and then hover over the first actor to visualize the result.



3. Click the first actor.



Copy Transformations between Two Actors

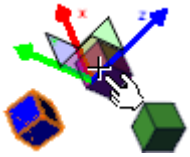
You can transform the selected geometry actors based on the transformation represented by the starting and ending coordinate systems you select.

Notes:

- This command cannot transform collaborative actors.
- To specify the coordinate systems, you can select geometry actors (to use their local coordinate systems) or coordinate system collaborative actors.

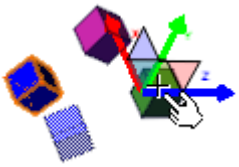
1. Select one or more geometry actors to transform.

2. Click **Copy Transformation Between 2 Actors** .
3. Select the starting coordinate system by clicking a geometry actor or coordinate system collaborative actor.



Note: When you hover over a geometry actor, its coordinate system is displayed.

4. Select the ending coordinate system by clicking a geometry actor or coordinate system collaborative actor.

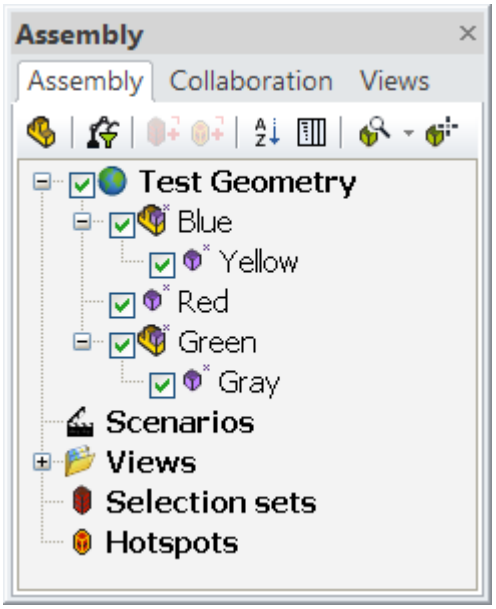


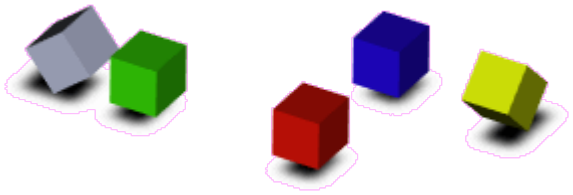
The transformation is applied. In this example, the blue cube is rotated and translated based on the transformation represented by the pink and green cube coordinate systems.

Copy Location and Copy Transformation Examples

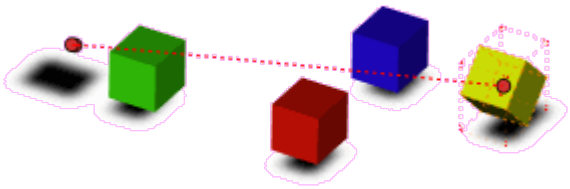
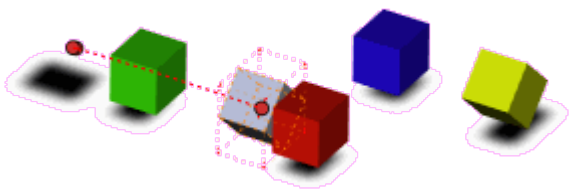
This topic provides a comparison of **Copy Transformation** and **Copy Location** commands.

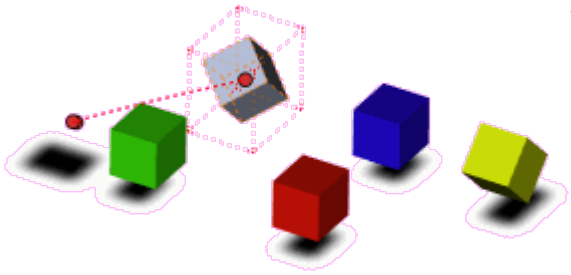
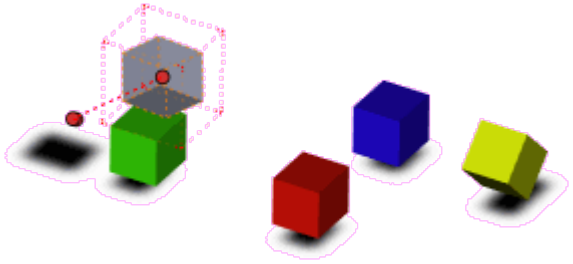
Let's take an example. The starting location is the following:





- **Blue** is the parent of **Yellow**, and **Green** is the parent of **Gray**.
- **Blue** and **Yellow** have been transformed, with **Red** being their neutral position.
- **Gray** is the selected actor to which **Copy Location** or **Copy Transformation** is applied, and **Yellow** is the target actor.

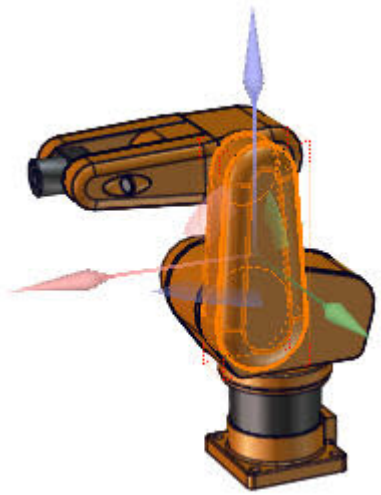
Icon	Command Name
	Moves **Gray** to exactly the same location as **Yellow**.
Copy Location in World Coordinate System	
	Moves **Gray** to the same location relative to its parent (**Green**) as **Yellow** is relative to its parent (**Blue**).
Copy Location in Parent	

Icon	Command Name
	Applies the **Yellow** transformation relative to its neutral position (**Red**) to **Gray**.
Copy Transformation in World Coordinate System	
	Applies the **Yellow** transformation relative to its parent (**Blue**) to **Gray**.
Copy Transformation in Parent	

Using Align Pivots

You can use pivot alignment to move a local coordinate system to a defined kinematic condition.

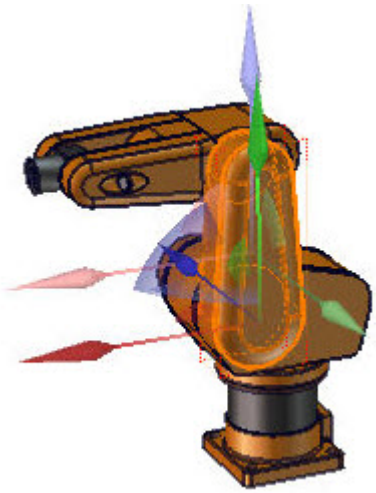
In the following example, the initial position is as follows:



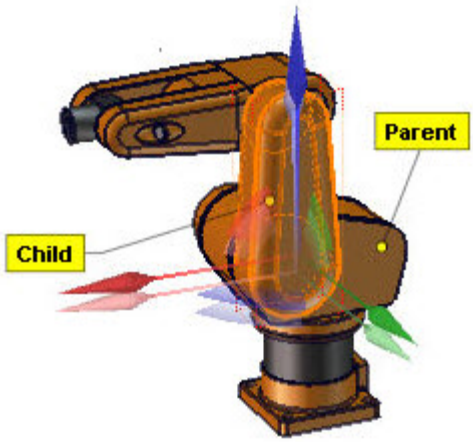
1. Click **Transform** > **Pivot Transform Mode**.

   This enables pivot transformation mode.

2. Move the local coordinate system to the kinematic link location using a command such as **Set Pivot On Line/Axis**.



3. Use **Align Pivots With Given Pivot** to align the child and parent coordinate systems.



Note: If it is not possible to align both coordinate systems, add a rigid parent.

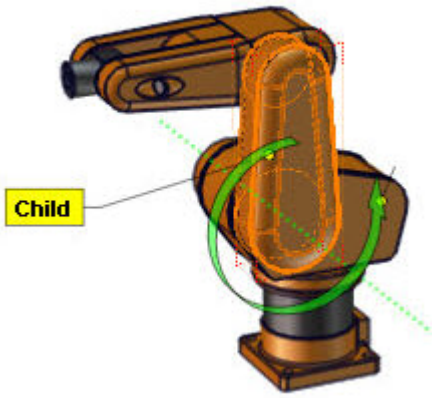


Figure 1: Final position, with degrees of freedom shown:

Creating Kinematic Links Between Actors

Kinematic commands let you manage the assembly tree structure and animate assemblies using kinematic constraints. You can apply kinematic links to parts and assemblies.

1. Click **Transform** > **Kinematic** > **Link Child to Parent** to create child-parent relationships between the actors. You can also achieve this by dragging actors into assemblies in the Assembly tree.

   Note: A child can have only one parent but a parent can have multiple children.

2. Click **Transform** > **Pivot Transform Mode** and pivot alignment tools to align each child-parent group's pivots.

   Note: For kinematic motions to work, a child's pivot must be in the same alignment as its parent's pivot, and all pivots in a chain of child-parent relationships must be aligned in the same direction. The child pivot location determines where the link is applied and the parent pivot location determines the link orientation and movement. For example, all pivots could have the Z direction pointing up or down. Use **Align Pivots** to copy pivot alignment between specified actors.

3. In the Properties pane for a selected child or parent, assign the appropriate **Link type** (such as **Free** or **Linear**) and the axis.

   Select **Show/Hide Degrees of Freedom** to see the direction of motion.

4. Optionally, select **Limited joints** and specify motion limits.
5. Select **Kinematic Free Dragging** and drag the actors to visualize their motions.

Working with Annotations

Annotation commands let you add labels, callouts, links, and other annotations to your models.

Create a Label

You can create a label linked to an actor.

1. Click **Author** > **Create Label** .

   A text box is created.

2. Click the actor to which you want to link the text box.
3. Position the text box and click to validate.
4. You can create additional labels, or exit the creation mode if you're done.

   - To create additional labels, repeat steps 2 and 3.
   - To exit the label creation mode, press **Escape**.

Create a Label with Multiple Lines of Text

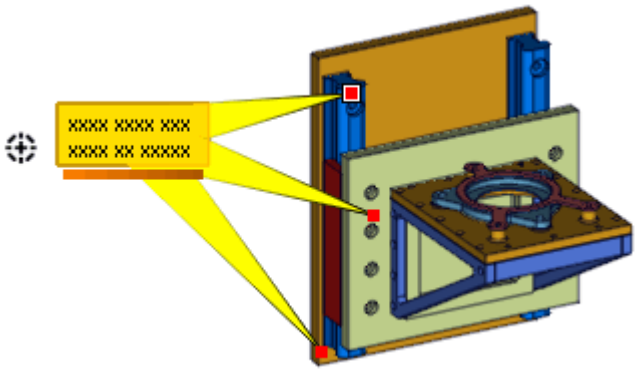
You can create a label containing multiple lines of text.

1. Create a label as explained above.
2. Click the label to select it, and choose either of the following methods:

   - Click the label again to switch it to edit mode. Type your text, and press **Ctrl+Enter** each time you want to create a new line.
   - In the Properties pane for the label, under **Text**, set **Text** to **String**. Click in the **Text string** property field, then click the ellipsis (...). The **Text** pane appears. Type your text, and press **Enter** each time you want to create a new line.

Create Annotations with Several Lines

You can create multiple attach lines from an annotation.



1. To add a line, drag a line from the annotation target to the destination.

Note: You cannot undo the creation of a line. To remove a line, proceed as explained in the next step.

2. To remove a line, drag the red anchor at the destination into the annotation target .
3. To attach an annotation to 2D panels, create one of the 2D panels before creating the annotation.

Important: An annotation always has the same number of attach lines in all views. For example, creating a new attach line for a label in one view adds it to all views containing that label, and you must define what actor the line is attached to in each view. If you need different numbers of attach lines across views, create different annotations.

Using Styles

You can define your own styles, and apply them to actors.

Define a Style

You can define your onw styles in the Styles workshop.

1. Click **Workshops** > **Properties** > **Styles** .
2. In the viewport, select an actor with the properties for which you are defining a style.
3. In the Styles workshop, click **New** , type a name, and then click **OK**.
4. Click **Show Style and Selection Properties** .
5. Select one or more properties to define in this style and specify property values.

   The available properties depend on the selected actor.
6. For the **Family** property, select the actor family to which this style applies, or **Generic** when applicable to all families.
7. To make the style the default for the specified family, click **Set as Default** .

Apply a Style

Once you have defined a style, you can apply it to actors.

1. On the Styles tab, select **Auto Subscribe** when you want to subscribe actors to the style, or clear **Auto Subscribe** when you want to apply styles without subscribing.
2. Select one or more actors in the viewport.

   The Styles tab shows only styles applicable to the selected actors.
3. Click the style to apply.

   The style is applied to the selected actors. If **Auto Subscribe** is selected, the actors update automatically when the style changes.

Adding Textures

You can apply 2D images (such as materials and logos) to 3D actor surfaces.

1. Select one or more actors.

   Tip: Use **Align Camera on Face** to position an actor before applying a texture. See *Navigate Commands*.

2. **In the Properties pane,** under **Texture**, select **Enable**.

   Texture properties appear, and a default texture appears on the selected actors.

3. Choose the texture to apply:
   a. Double-click **Map path**. You can choose the following types of files:

      - PNG (.png)
      - TIFF (.tif, .tiff)
      - Jpeg (.jpg, .jpeg, .jpe)
      - Targa (.tga)
      - Rgb (.rgb)
      - Bitmap (.bmp)

      The default folder for texture images is defined in Application Paths. See *Application Paths*.

   b. In the dialog box, select an image and click **Open**.

   Tip: You can also drag an image from the Textures workshop or Windows Explorer to an actor.

4. Select a **Projection mode**: **Planer** (default), **Spherical**, or **Cylindrical**.
5. In the Textures workshop toolbar, click **Set Texture Projection Axis** or **Set Texture Projection Camera** and position the texture on the model.
6. If necessary, position the texture using **Texture Translation Mode** or **Texture Rotation Mode**.
7. In the Properties pane, adjust the proportion and scale of the texture using **Ratio height/width** and **Scale**.
8. Optionally select **Mosaic (repeat)** to reproduce the image repeatedly.

Tip: **Copy Appearance Properties** (Properties pane) copies textures and other appearance properties from one actor to another. See *About Actor Properties*.

Creating a Layer

Layers are views that capture actor visibility; actor invisibility is not captured. You can create layers.

1. Set actor visibility in the scene as needed.
2. In the Layers pane toolbar, click **Create Layer** .
3. In the dialog box, type a layer name and click **OK**.

   The layer is added to the Layers pane.
4. To apply the layer to a view, double-click the layer name.

Filtering

You can use filters to locate geometry and collaborative actors based on their properties. In this task, you will learn how to filter by color to display all the parts of a specific color.

1. In the ribbon, click **Workshops** > **Properties** > **Filters** .
2. In the viewport, select any actor.

   Tip: To avoid having to select a color later, select an actor with the color you are filtering on.

3. In the Filters workshop, click **Show Filter and Selection Properties** .
4. Select the **Color [Actor]** property.

   The available properties depend on the selected actor.

5. Set the operator to = (equal to).
6. Select a color from the palette.
7. Click **Show Matching Actors** .

Applying Secure 3D Brush

You can use `Secure 3D Brush` to protect your intellectual property (IP) by degrading information at the geometrical level while preserving total model coherence.

Notes:

- Secure 3D Brush affects only selected actors. When no actors are selected, it affects the entire model.
- Measurement collaborative actors added to secured models do not have accurate values, and some measurements are not possible.
- Secure 3D Brush moves tessellation vertices to reduce accuracy. To remove tessellation vertices without affecting model accuracy, use *Decimation Tab*.
- You can degrade the geometry of the entire model when you save it by selecting the **Reduce accuracy** option.
- The Composer degradation approach prevents unauthorized reverse engineering because it is not based on a technology that traps the list of graphic primitives as they are sent to the graphic card (which is the case for Acrobat3D®, for example).
-

1. If you want to apply `Secure 3D Brush` to one or several specific actors, select these. Otherwise, `Secure 3D Brush` affects the entire model.
2. On the **Geometry** tab, click **Secure 3D Brush** .
3. In the Secure 3D Brush dialog box, select a **Radius** and **Precision**.
4. In the viewport, hold down the left-mouse button and drag over the selected actors.
5. Press **Esc** when finished.

Working with Cutting Planes

Cutting Plane commands let you create and manage cross-section (cutaway) views of your models.

About Cutting Planes

With cutting planes, you can create and manage cross-section (cutaway) views of your models.

When one or more cutting planes are enabled:

- Some advanced rendering effects, such as ambient occlusion, per-pixel lighting, and shadow mapping, are disabled.
- Render modes with silhouette lines (such as **Shaded Illustration** and **Technical**) display as **Smooth with Outline** because cutting-plane rendering does not support silhouettes.
- **Custom** render mode displays as **Smooth with Outline** because **Custom** is incompatible with cutting planes.

Creating and Manipulating Cutting Planes

With cutting planes, you can create and manage cross-section (cutaway) views of your models.

1. Click **Author** > **Cutting Planes** > **Create** .

   If no actors are selected, the cutting plane is applied to the entire model. The cutting plane is created normal to the positioning arrow .

   Note: You can display a maximum of three cutting planes simultaneously.

   Tip: To orient your model so the cutting plane is parallel to the screen, double-click the cutting plane.

2. Select the plane and do either of the following:

   - To move the cutting plane to another position, click **Author** > **Cutting Planes** > **Move Cutting Plane** . Press **Alt** to align on an axis.
   - To rotate the cutting plane, move the mouse over a cutting-plane edge (the mouse pointer changes to) and drag.
   - To change the cutting plane depth, move the mouse over the cutting plane (the mouse pointer changes to) and drag.

Using Two Cutting Planes to Create a Quarter Cross Section

Using two cutting planes, you can create a quarter cross section.

1. Create a cutting plane through the center of your model:
   a. Click **Author** > **Cutting Planes** > **Create** .
   b. In the viewport, press **Alt** to enable curve detection, position your mouse pointer over your model until indicates the correct position (alignment does not matter), and then click.

   Tip: You can reposition the cutting plane after creating it with **Move Cutting Plane** .
2. In the Properties pane, for **Axis**, select the alignment you want.
3. Click **Author** > **Cutting Planes** > **Create and Add** to create a second cutting plane.
4. Click **Author** > **Cutting Planes** > **Union Mode** to toggle between a thin cut and a thick cut.
5. Drag the edge of the second cutting plane to rotate to achieve a 45-degree cross section.

   Tip: To create a 90-degree cut, set the **Axis** property for the second cutting plane.
6. For each cutting plane, in the Properties pane, set the **Opacity** to 0 and **Capping** > **Color** to the same color.
7. If you want only some actors to be cut:
   a. Select the actors you want to cut.
   b. Click **Author** > **Cutting Planes** > **Apply to Selection** .

Working with Views

In this section, you will learn how to work with views.

About Views

You can manage the views of the active document in the **Views** pane.

Normal and Custom Views

There are two view types in Composer, normal and custom views.

- Normal views capture all non-neutral viewport properties: positions and properties of all actors, actor visibility, camera position and zoom scale, Digger position, and so on.

  Note: Only the properties of visible objects are stored in views.

- Custom views, also known as intelligent views, capture only the actors and properties you specify. When you apply a custom view to a normal view, only the captured properties are applied. For example, you can apply a custom view that captures only camera position to one or more normal views.

Each view has a preview thumbnail image. Thumbnails for custom views have diagonal lines and shading.

Normal View	Custom View

The Active View

The active view is the one that is currently displayed in the viewport, and on which you are performing modifications (such as moving or adding actors, changing actors' properties, etc.).

The active view is surrounded by a thick border in the Views pane. This enables you to differentiate between the active view and other views which may be selected (these are surrounded by a thin border and highlighted).

Active View, not selected: surrounded by a thick border	Active View, selected: surrounded by a thick border and highlighted	Inactive View, selected: surrounded by a thin border and highlighted

Note: When the mouse focus is in the Views panel, the color surrounding the active view and selected view(s) is a light blue. When the Views panel loses the focus, the color surrounding the active view and selected view(s) turns to a light gray.

Miscellaneous Information about Views

There are a number of things you should know about views.

- You can create normal views and perform many view-management operations from the Views pane. To create custom views and perform customized update operations, use the Views workshop.
- When you modify your scene and then switch views, you are prompted to update the view or create a view.
- When you open a model in View mode, the first view listed in the Views pane is displayed. See *Project*.
- Composer animates the transition between views. You can control the animation using Animation document properties. To ensure smooth animation between views, use the same **Camera Perspective Mode** for each view. See *Animation* and *Status Bar*.
- The **Define actor visibility in views by** option specifies how view definitions store actor visibility, which affects file size and update behavior. See *Update*.
- You can create animations by dragging views to the timeline. For example, drag the view showing initial actor positions to the beginning of your timeline and then drag the view showing final positions to a later time.

  Note: If collaborative actors do not appear in the animation, click in the timeline and then change collaborative actor visibility (for example, click **Home** > **Visibility** > **Visibility** > **Show All** or press **Ctrl+T**). To change actor visibility, set **Opacity** property keys.

- When you play a view, if an object becomes or remains invisible between views, its properties are not modified.

Working with Views

You can create, update and lock views.

Create a View

You can create a view based on a scene displayed in the viewport.

Before you begin: In the viewport, prepare the scene to be captured.

1. Click **Workshops** > **Publishing** > **Views** > .
2. In the Views workshop, under **Select items to capture**, select the actors and properties to capture, and then click **Create**.
3. In the Views pane, optionally rename the view:
   a. Right-click the view and click **Rename View**.
   b. Type a new name.

Tip: You can also create views from the Views pane:

- **Create View** creates a normal view.
- **Create Camera View** creates a custom view that captures only camera position.

Update a View

You can update an existing view.

Note: Updating a custom view adds the selected items to the view definition. For example, when you update with **Viewport** selected a custom view that captures only camera position, the view definition now includes both **Camera** and **Viewport**.

1. In the Views pane, select one or several views to update.
2. In the viewport, prepare your scene to be captured and optionally select actors whose properties you are propagating.
3. Click **Workshops** > **Publishing** > **Views** > .
4. In the Views workshop, under **Select items to capture**, select the actors and properties to capture, and then click **Update** .

Tip: You can also update views from the Views pane:

- To update all properties captured by a view, use **Update View** .
- To update views with the visibility and properties of the actors selected in the viewport, use **Update Views with Selected Actors** .
- To update views according to the changes performed on selected assemblies, select **UpdateViewsWithSelectedAssemblies** in the **Advanced Properties** page (**Document Properties** dialog box), and use **Update Views with Selected Actors** .

Note: Only the properties of visible objects are stored in views.

Lock a View

You can lock a view, to avoid updating it by mistake for example. Once a view is locked, you can unlock it if needed.

1. In the Views pane, select the view to lock.

   Note: You can also select several views.

2. Right-click the view and click **Lock Views**.

   A lock symbol appears on the view thumbnail, indicating that the view is locked. You can no longer update it.

3. To unlock the view, select and right-click it, and click **Unlock Views**.

   You can now update it if needed.

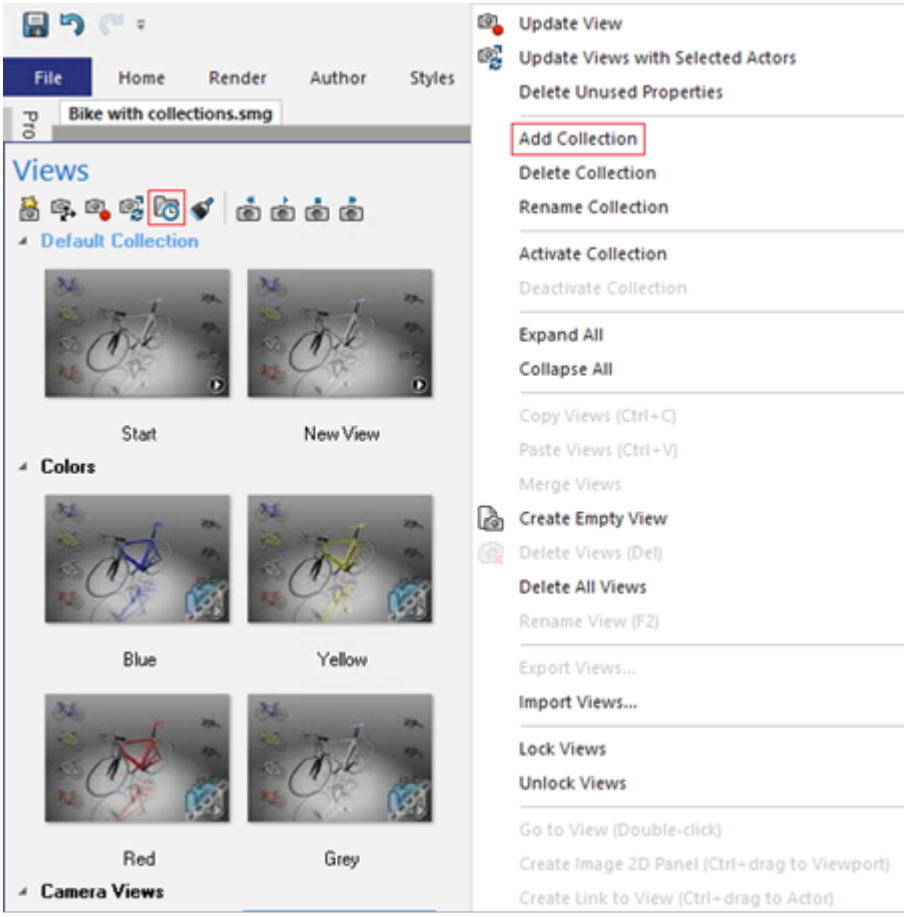
View Collections

Collections help you organize and categorize views so that you can easily manage them. A collection can be empty or contain items. You can manage and organize views into collections in the Views pane.

Create View Collection

You can create a collection of views in the Views pane by doing the following:

- In the Views pane, click **Create View Collection** .
- Right-click a view and select **Add Collection**.

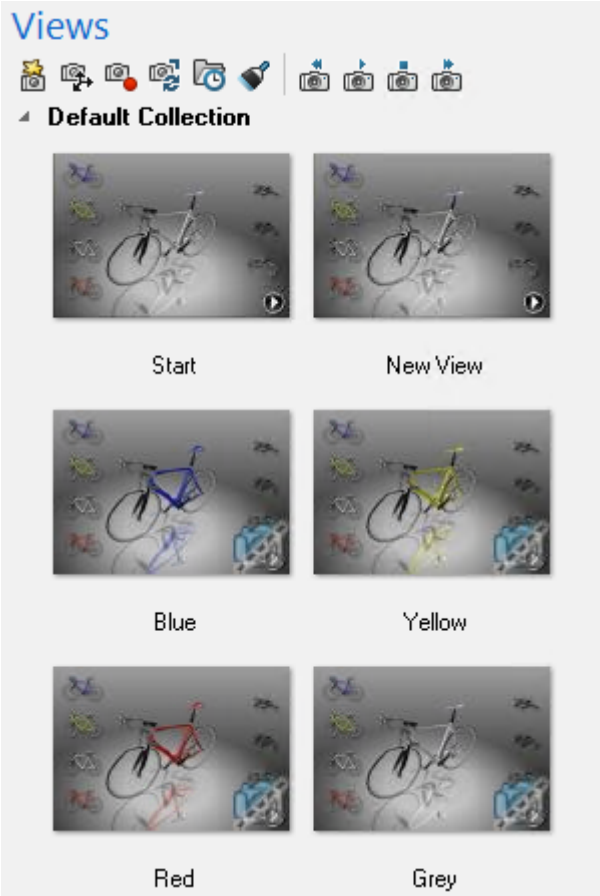


A new collection is added in the Views pane.

In the example above, if you want to add a new collection after the collection **Colors**, right-click the view **Yellow** and select **Add Collection**. A new collection is added containing all the views from the selected view through the last view of that collection. In this case, the views **Yellow**, **Red**, and **Grey** get added to the new collection (Collection 4).

You can also delete collection views. Right-click the view and select **Delete Collection**. The collection gets deleted and all the views from that collection get added to the collection before it.

In the same example above, if you right-click the view **Yellow** in the collection **Colors** and select **Delete Collection**, the collection **Colors** gets deleted and all the views from that collection get added to the **Default Collection** (the collection before it). You can delete the first collection in the Views pane only if it is the last remaining collection. For example, you can delete the **Default Collection** only if it is the last collection in the Views pane.



Note: The character ~ is used as a delimiter in the list of collection names in the `.smgXml` file and cannot be used while naming a collection.

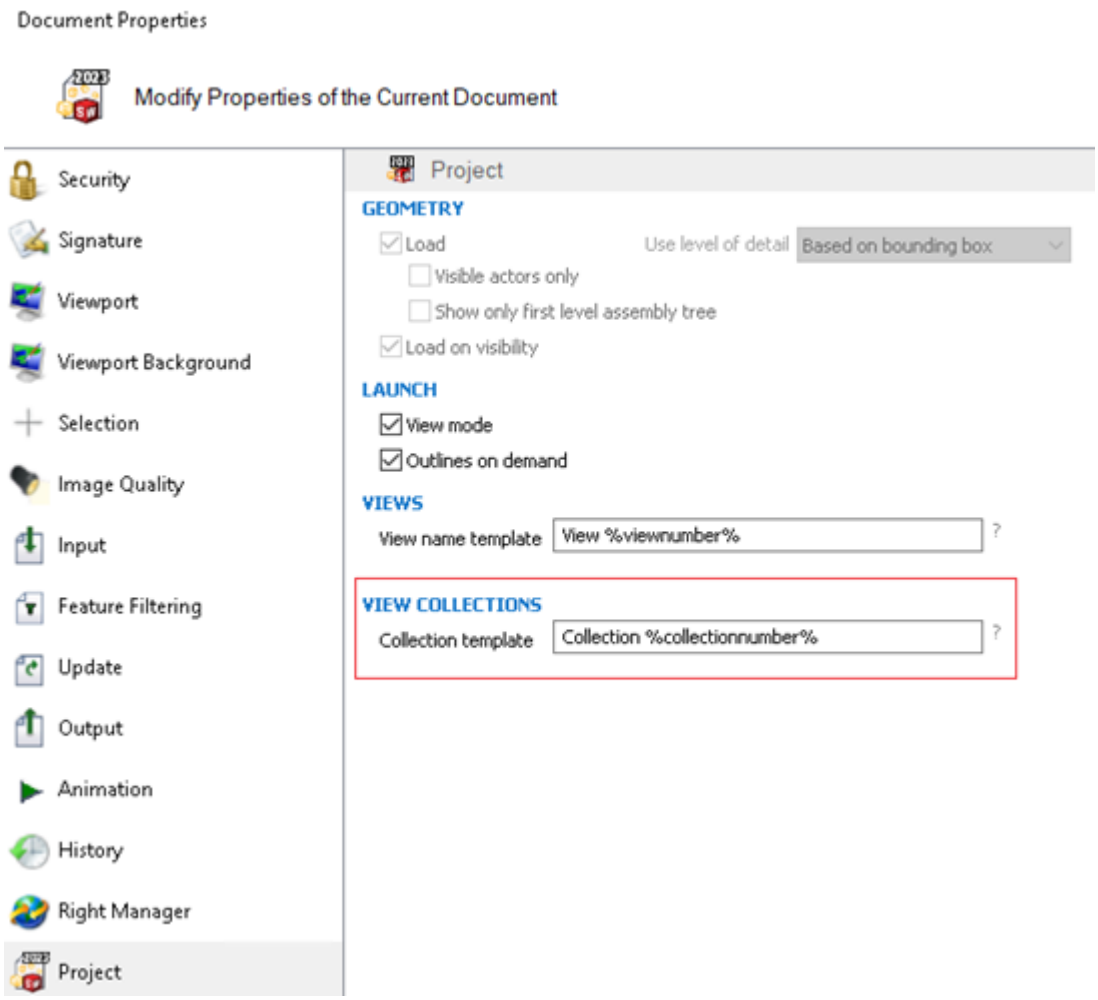
Collection Capabilities

You can:

- Drag views into empty collections
- Drag collections to reorder their sequence
- Drag views within the same collection or across collections
- Add collections
- Delete collections
- Rename collections
- Activate or deactivate collections
- Delete collection views

You can specify a template to use for collection names when creating collections. To specify a template, click **File** > **Properties** > **Document Properties** > **Project**. Under **View Collections**, in the **Collection Template** box, enter the name.

Note: You can use alphanumeric characters or optional variables. For more details, see *View Collections*.


Document Properties
Modify Properties of the Current Document
Security
Signature
Viewport
Viewport Background
Selection
Image Quality
Input
Feature Filtering
Update
Output
Animation
History
Right Manager
Project
Project
GEOMETRY
Load
Use level of detail
Based on bounding box
Visible actors only
Show only first level assembly tree
Load on visibility
LAUNCH
View mode
Outlines on demand
VIEWS
View name template
View %viewnumber%
VIEW COLLECTIONS
Collection template
Collection %collectionnumber%

Working with the Ribbon

The ribbon provides access to application features thanks to a number of menus and tabs.

Working with the Ribbon

The ribbon provides access to many commands thanks to a number of dedicated tabs.

Access Ribbon Commands

You can access application features in the ribbon through dedicated menus and tabs.

1. In the ribbon, click the appropriate menu or tab.

Commands in the...	Allow you to...
File *menu*	Manage your files, including publishing to many formats, and set application and document properties.
Home *tab*	• Copy, cut, and paste content. • Access commonly used workshops and entire animation mode. • Manage actor visibility in the scene. • Use the Digger tool as a magnifying glass to isolate areas of your scene. • Navigate the viewport by moving the position and orientation of the camera.
Render *tab*	Control scene lighting and rendering characteristics.
Author *tab*	Enhance models with 3D redlining, annotations, dimensions, and other collaborative actors.
Styles *tab*	View the style gallery, apply styles to actors, and subscribe actors to styles. Use the Styles workshop to create and manage styles.
Transform *tab*	Translate and rotate alignments, and explode actors.
Geometry *tab*	Manipulate geometry actors.
Animate *tab*	Animate your scenes.
Workshops *tab*	Launch a specific workshop.
Window *tab*	Manage Composer window panes and document windows.
Help *tab*	Register the product, access product documentation, and manage your license.

   The dedicated commands appear.

2. Click the command you want to use.

Minimize the Ribbon

You can minimize the ribbon interface to increase the space available for the viewport and other Composer panes.

To toggle between full and minimized ribbon, do one of the following:

- Click **Minimize the Ribbon** in the upper-right corner of the Composer window.
- Double-click the active ribbon tab.
- Press **Ctrl+F1**.
- Right-click in the ribbon and click **Minimize the Ribbon**.

The ribbon is now minimized.

Note: When the ribbon is minimized, you can access ribbon commands by clicking a ribbon tab. For example, click **Transform** to view transformation commands.

Search for Commands in the Ribbon

You can search for commands that appear in the ribbon and recently used documents.

1. On the ribbon, click in the **Start Search** box.
2. Type the name of the command or recent document you are looking for.

   Ribbon commands and recently accessed documents that contain the search string appear.

3. Click a command to execute it or a document to open it.

Notes:

- The search is limited to commands that appear on the ribbon.
- If the command is on the current ribbon tab, the command is highlighted. If the command is on a different tab, the current tab does not change.

Miscellaneous Background Information

This theme provides miscellaneous background information.

About the Creation of PDF Templates

By default, Composer generates PDF files using standard templates.
You can create and use custom templates to suit specific needs. Creating your own template requires Adobe Acrobat. Use **Button Tool** to create button zones that Composer replaces with content.

Tips: You can use an application such as Microsoft Word or Microsoft PowerPoint to create the template and then open the document in Adobe Acrobat to convert to PDF. For Composer to replace zones, use the following names:

- **SeemageReplace** - Replaced by the 3D content. This zone is required for PDF export.

Note: "Seemage" is the original name of the company that created Composer.

The following zones are valid for U3D export only:

- **SeemageBOM** - Replaced by the interactive BOM.
- **SeemageConfig** - Replaced by view selection buttons (with or without icons).
- **SeemageConfig0**, **SeemageConfig1** … - Specifies the exact position of the view buttons. Create as many zones as there are views, with numbering starting at 0.
- **SeemageLabel0**, **SeemageLabel1** … - Specifies extra zones for button labels. Create as many as zones as there are views, numbering them starting at 0.

About Copy/Paste

Copy/Paste commands let you copy, cut, and paste collaborative and geometry actors. You can also paste text and images from other applications into Composer to create labels and 2D panels, respectively.

About the Copy/Paste Mechanisms

This topic provides general information regarding how copy/paste works in Composer.

- Copy/cut/paste for collaborative actors uses the Windows clipboard, so you can copy/cut/paste collaborative actors across Composer documents, and even across Composer applications. For geometry actors, these commands are the same as the right-click commands in the Assembly pane, which do not use the Windows clipboard. See *Right-Click Commands*.
- You cannot copy/cut/paste the following collaborative actors: cutting planes, grids, cameras, coordinate systems, paths, intersection lines, BOM tables, ground, and compass.
- You can also access these commands from the viewport mini-toolbar, and for collaborative actors only using shortcut keys (**Ctrl+C**, **Ctrl+X**, **Ctrl+V**) in the Collaboration pane and viewport. For more on the mini-toolbar, see *Application Preferences - General*
- You cannot paste Composer actors into other applications.

Tip: If pasted actors are not visible in the current viewport, use **Zoom Selection** or **Zoom Fit All**.

Paste Results

Paste results depend on the content. This topic provides information on what results you should expect when pasting content from the clipboard.

Clipboard Content	Paste Result
Geometry actor	New geometry instance named `copy of original_name as a child of` the currently selected geometry actor. **Note:** You can copy/paste geometry actors only within the same Composer document.
Collaborative actor	New actor of same type named `Copy n of original_name`. **Note:** You can copy/paste collaborative actors across Composer documents, and even across Composer applications.
Image of supported format (BMP, JPG, etc.)	New image 2D panel named `Pasted Image n`.
Text	New label named `Pasted Label n`.

Paste Location

The location of pasted actors in the viewport depends on the content type and whether the actor is associated with (attached to) geometry. This topic provides information on paste location depending on clipboard content.

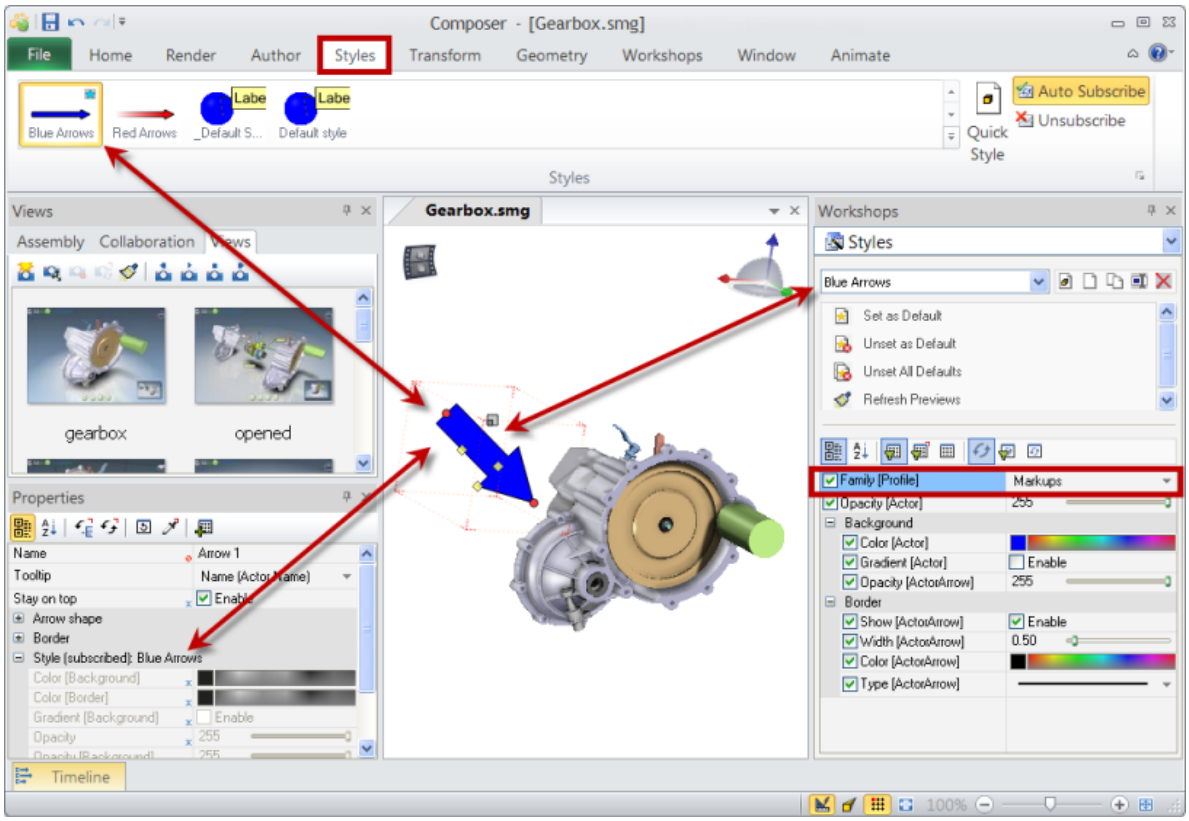
Clipboard Content	Paste Location
2D collaborative actor	Preserves location with slight offset from the original actor: Before After
Geometry actor	Preserves location. When the original actor is present at that location, the copy completely overlaps the original.
3D collaborative actor with no association	Preserves location. When the original actor is present at that location, the copy completely overlaps the original.
3D collaborative actor with association: Associated actor found (GUID match)	Preserves location in the associated actor's local coordinate system.
3D collaborative actor with association: Associated actor not found	Arranges pasted actors in a circle around the viewport center to facilitate reattachment.
Text and images from other applications	Creates actors in the viewport at the current mouse position.

About the Style Preview

The style preview images reflect many but not all style properties.

When one or more actors are selected:

- Only styles applicable to those actors are shown.
- When the actors are subscribed to a style, that style is highlighted.



In the preceding illustration:

- Only Markups and Generic styles are displayed because an arrow is selected in the viewport.
- The Blue Arrows style is highlighted because the selected arrow is subscribed to that style. The Properties pane shows that some properties are defined by the style.

You can perform the following operations from the style gallery:

- To apply a style to the selected actors, click the style.
  - When **Auto Subscribe** is selected, the actors are subscribed to the style (automatically update when the style changes).
  - When **Auto Subscribe** is cleared, the style is applied without subscribing the actors.

  Note: Clicking a style also makes it the current style in the Styles workshop.

- To scroll through the styles, click and , or click **More** to see all styles organized by family.

- To set or clear default styles, right-click a style and click **Set as Default**, **Unset as Default**, or **Unset All Defaults**. Each actor family can have its own default style, which is applied by default when new actors are created. Default styles have stars on the preview images.
- To delete a style, right-click a style and click **Delete**. You cannot delete locked styles (see *Profiles* for details) and default styles (use **Unset as Default** first).

Note: The Advanced application setting must be selected to generate style preview images. See *Application Preferences - Hardware Support*.

File Menu

File commands let you manage your files, including publishing to many formats, and set application and document properties.

Icon	Command Name	Description
	New Project	Creates a new Composer project. For details, see *New Project*.
	Open	Opens a Composer, CAD, or other supported 3D-format file. For details, see *Open*. **Tip:** You can also open a Composer file (`.smg`, `.smgGeom`, `.smgXml`, or `.smgProj`) by double-clicking it in Windows Explorer. The Composer application starts if it is not already running.
	Update SMG File	Updates your scene geometry and metadata from CAD source files. For details, see *Update Composer Document*.
	Update PDF File	Updates models in PDF files generated from Composer. To update a PDF file: **1.** Open the PDF file with Composer. The 3D model (SMG or U3D) appears. **2.** Edit the model. **3.** Click **File** > **Update** > **PDF**. **Note:** You can also use **Publish to PDF** to create a new PDF file.
	Save	Saves the active document as an SMG (`.smg`) or product (`.smgXml`) file. **Note:** Saving a document does not save changes to its views. Update any modified views before saving the file.
	Save As	Saves a copy of the active document. You can save to the following Composer formats: • Composer (`.smg`) • Composer product (`.smgXml`) • Composer project (`.smgProj`) You can also save in 3DXML (the Dassault Systèmes interoperability format), 3ds®, U3D®, VRML, XAML®, and other formats. **Notes:** • U3D is the only format which exports Composer animations. Therefore, it is based on the content available in Animation mode. Assembly nodes which are not selected in the Assembly pane will not be exported. • The VRML specification requires that node names do not start with a digit. For this reason, when a Composer file is saved to the VRML (*.wrl) format, actors that start with a digit are renamed : the first digit is replaced with the underscore character '_'. For example, an actor called `12345` will be renamed `_2345`. This does not impact the file name itself. **Tip:** You can preserve the first digit by activating the **IOVRMLExportNaming** advanced setting in the application preferences. In this case, an actor called `12345` will be renamed `_12345`. For more information, see *Advanced Settings*.
	Save Package As	Saves the active document as an auto-executable file. For details, see *Save Package As*.

Icon	Command Name	Description
	Save Image As	Saves the viewport as a raster image using the current High Resolution Image Workshop settings. You can save to the following formats: • Bitmap (.bmp) • Jpeg (.jpg, .jpeg, .jpe) - **Joint Photographic Experts Group format** • Tiff (.tif, .tiff) - **Tagged Image File format** • Png (.png) - **Portable Network Graphics format**
	Save Video As	(Available in Animation Mode only.) Saves your animation as an AVI, FLV, MKV, or MP4 file using the current Video Workshop settings.
	Copy Image to Clipboard	Copies the current viewport image to the Windows clipboard (captures the screen) so you can paste it (**Ctrl+V**) into another application.To capture a portion of the viewport, enable **Detail View** in the High Resolution Image Workshop. **Tip:** You can also capture the viewport with **Ctrl+K** .
	Print	Prints the current viewport, letting you change print settings first. This command uses the current High Resolution Image Workshop settings.
	Quick Print	Prints the current viewport without changing print settings. This command uses the current High Resolution Image Workshop settings.
	Print Preview	Displays the current viewport as it will be printed.
	Print All Views	Prints all views, letting you change print settings first. If no views are defined, prints the current viewport. This command uses the current High Resolution Image Workshop settings.
	Publish to HTML	Saves the active document as an HTML Web page. For details, see *Publish to HTML*.
	Publish to PDF	Saves the active document as a PDF document. Specify the PDF template to use and the format (U3D®, SMG, or preview image). For U3D format, select additional options. For details, see *Publish to PDF*.
	Send by E-mail	Sends the active document by e-mail as an SMG file or self-extracting executable. For details, see *Send by E-mail*.
	Document Properties	Lets you view and edit properties for the active document. For details, see *Managing (Default) Document Properties*.
	Default Document Properties	Lets you set default document properties, which are applied to new documents. The settings apply to the current user. For details, see *Managing (Default) Document Properties*.
	View XML File	Opens the XML scene description file in your default XML editor.
	Close	Closes the active document.
	Application Preferences	Lets you set global Composer application settings for the current user. For details, see *Accessing and Customizing Application Preferences*.
	Exit Composer	Exits Composer. You are prompted to save documents with unsaved changes.
	Recent Documents	Lists files you have accessed recently. Click a file to open it.

Home Tab

The **Home** tab provides access to frequently used commands.

Copy/Paste Commands

Copy/Paste commands let you copy, cut, and paste Composer collaborative and geometry actors.

Icon	Command Name	Description
	Cut (Ctrl+X)	Same as **Copy**, but also deletes the selected actors.
	Copy (Ctrl+C)	Copies the selected actors to the clipboard, replacing the previous clipboard content.
	Paste (Ctrl+V)	Pastes the clipboard into the current Composer document.

Show/Hide Commands

View commands let you access commonly used workshops and entire animation mode.

Icon	Command Name	Description
	Animation	Switches to animation mode and displays the Timeline. See *Timeline*.
	Technical Illustration	Shows or hides the Technical Illustration workshop. See *Technical Illustration*.
	High Resolution Image	Shows or hides the High Resolution Image workshop. See *High Resolution Image Workshop*.

Visibility Commands

Visibility commands let you manage actor visibility in the scene. Actors can be visible, hidden, or ghosted (partially transparent).

Note: Animations do not record changes to actor visibility. To hide or show actors in animations, while in Animation mode show all actors that participate in the animation (**Show All** or selectively show actors) and then change actor visibility by setting **Opacity** property keys.

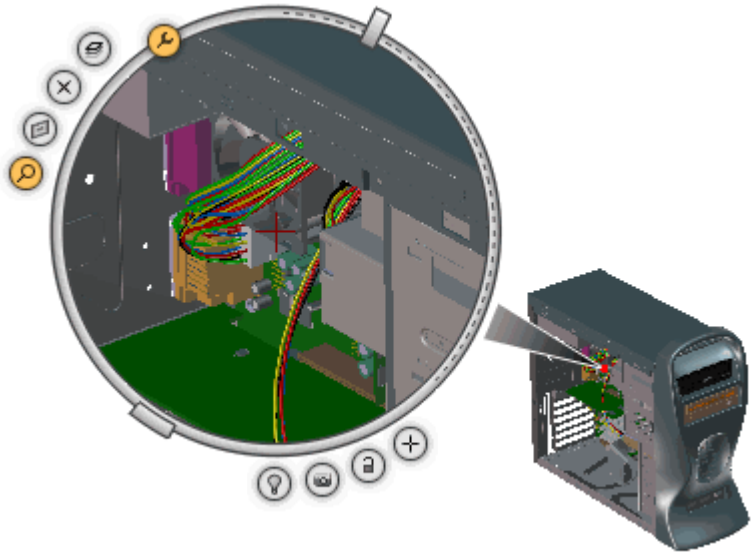
Icon	Command Name	Description
	Show All	Displays all actors.
	Show All Geometry	Displays all geometry actors without affecting the visibility of collaborative actors.
	Show Selection and Hide Others	Displays the selected actors and hides all other actors.
	Show Selection and Ghost Others	Displays the selected actors, ghosts (displays as partially transparent) all other geometry actors, and hides all other collaborative actors. **Notes:** • You cannot ghost collaborative actors. Ghosting collaborative actors hides them. • You cannot select ghosted actors in the viewport. Select them in the Assembly tree.
	Hide Selection	Hides the selected actors without affecting the visibility of other actors. **Tips:** • You can also hide actors by pressing **H**.

Icon	Command Name	Description
		• You can temporarily hide actors by highlighting them in the scene and pressing **Tab**. To restore visibility, press **Shift+Tab** or move the mouse off the actor. This capability is useful to access actors that are below other actors.
	Show Selection	Displays the selected actors without affecting the visibility of other actors.
	Ghost Selection	Makes the selected actors partially transparent without affecting the visibility of other actors. **Notes:** • You cannot ghost collaborative actors. Ghosting collaborative actors hides them. • You cannot select ghosted actors in the viewport. Select them in the Assembly tree.
	Invert Visibility	Hides visible actors and displays hidden and ghosted actors.
	Invert Visibility with Ghost	Ghosts visible actors and displays hidden and ghosted actors.
	Unghost	Restores full visibility to all ghosted actors.
	Restore Active View Visibility	Restores the visibility of all actors of the active view. Use this command when you have made changes in the view (such as changing actors' position, adding actors, changing actors' visibility) and then want to restore the visibility of all actors to the last updated state. Other properties such as color, opacity, position, etc. will not be restored. **Note:** This command does not apply to the following: • Custom views created in the Views workshop • Captures and views originating from CAD data
	Load on Visibility	Loads unloaded product geometry as required to display actors in the viewport.
	Collaboration	Shows or hides visible collaborative actors. For example, if you have five collaborative actors of which three are visible, clicking this command hides the three visible actors, and clicking the command again displays the three previously visible actors (not all five actors).
	Callouts	Shows or hides all callouts. **Tip:** The **Filter on visible callouts** BOM table property controls whether callout visibility affects the BOM table.
	BOM Table	Shows or hides the BOM table (a Vector Image panel) in the viewport. Every document has a BOM table that is empty until you generate IDs from the BOM Workshop. See *BOM Workshop*. You can view and modify the BOM table columns from the BOM pane. See *BOM*.

Digger Commands

The Digger tool acts like a magnifying glass to isolate areas of your scene.

You can modify opacity, visibility, and magnification (zoom) and then capture a 2D image. You can set animation keys to display Digger in animations. To display Digger, click **Home** > **Digger** > **Digger** or press **Space Bar**, **X**, or **Ctrl+D** while in the viewport. To move Digger, drag the Digger ring.



Note: Detail views (created with Digger, the High Resolution workshop, or the Technical Illustration workshop) do not update automatically. You must manually update detail views.

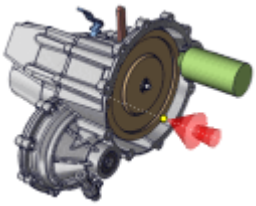
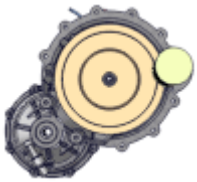
Icon	Command Name	Description
	Radius	Resizes the Digger zone. Drag the **Radius** handle in or out.
	Percentage	Changes the effect of the **Onion Skin**, **X-Ray**, **Cutting Plane**, and **Zoom** tools. Drag the **Percentage** handle around Digger.
	Display/Hide Tools	Shows or hides the Digger tools (such as **Onion Skin** and **X-Ray**).
	Zoom	Magnifies the objects in the Digger zone. Click to activate, and then drag the **Percentage** handle.
	Cutting Plane	Displays a cutting plane. The cutting plane is parallel to the screen. Click to activate, and then drag the **Percentage** handle. **Note:** Due to a technical limitation, enabling **Cutting Plane** turns off the ground.
	X-Ray	Peels the layers of the model. As the depth increases, actors change to a ghost outline and then disappear. Click to activate, and then drag the **Percentage** handle.
	Onion Skin	Peels the layers of the model. As the depth increases, actors disappear. Click to activate, and then drag the **Percentage** handle.
	Light Change	Displays a temporary spot light in the Digger zone. To display the light, drag the icon into the Digger zone. To return to original lighting, drag the tool outside the Digger zone. **Note:** Due to a technical limitation, **Light Change** does not work with 3-light lighting modes, such as **Heavy Metal**.
	Capture Picture in 2D Image	Creates an image 2D panel of the Digger zone that you can then drag to a location in the scene. Image resolution is determined by the High Resolution Image workshop resolution settings and scaled for the viewport size. To change properties such as the border color and attach-line shape, select the panel and modify properties in the Properties pane.

Icon	Command Name	Description
	Lock/Unlock Depth Direction	When locked, **Onion Skin**, **X-Ray**, and **Cutting Plane** tools stay at their original layer depth as you move the model or Digger in the viewport. When unlocked, these tools update as the viewport changes.
	Change Center of Interest	Changes what is displayed in the Digger zone. To change the center of interest, drag the tool to the desired location in your scene. To return the center of interest to the center of Digger, drag the tool inside Digger.

Note: The `Per-pixel Lighting` rendering mode is not compatible with `Cutting Plane` and `Lock Depth Direction` both selected. In this case, `Per-pixel Lighting` is automatically disabled within the Digger zone. This is also the case for dependent features (such as shadow mapping, ambient occlusion or glow).

Navigate Commands

Navigate commands let you navigate the viewport by moving the position and orientation of the camera.

Icon	Command Name	Description
	Align Camera on Face	Orients the model so the selected actor face is parallel to the viewport. To align to a face: **1.** Activate this mode. **2.** Position your mouse so the red arrow is normal to the desired face.  **3.** Click the face.  **4.** Press **Esc** to exit the tool.
	Align Camera Front/Back **Align Camera Right/Left** **Align Camera Top/Bottom** **Align Camera 3/4 X+ Y+ Z+** **Align Camera 3/4 X+ Y- Z+** **Align Camera 3/4 X- Y- Z+** **Align Camera 3/4 X- Y+ Z+**	Orients the model to a predefined camera view. To swap between symmetric views (for example, Front and Back views), click the tool again. These tools also zoom to fit the model, or when actors are selected, zooms to the selection.

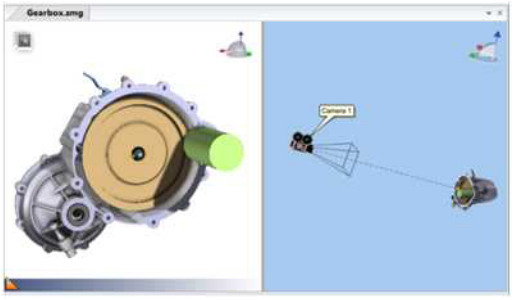
Icon	Command Name	Description
	Custom 1	Orients the model to a user-defined camera view. For details, see *(Default) Document Properties - Viewport*.
	Custom 2	**Note: (o)** next to the view name indicates an orthogonal view (no perspective).
	Custom 3	
	Custom 4	
	Select Mode	Selects actors when you click in the viewport. This is the default mode. • To select an actor, click it. • To add an actor to the selection (multi-select), press **Ctrl**. The mouse pointer changes to . • To invert the selection of an actor, press **Shift**. The mouse pointer changes to . • To select all visible actors completely inside a selection box, drag from right to left. The mouse pointer changes to . • To select all visible actors inside or touching the border of a selection box, drag from left to right. The mouse pointer changes to . **Tip:** You can exit other modes and return to selection mode by pressing **Esc** one or more times as needed. **Notes:** The following modes are always available: • Rotation mode - Right mouse button • Pan mode - Middle mouse button • Zoom mode - Mouse wheel
	Select by Color	Selects all actors of the same color. **Note:** This command always selects actors using default selection mode (see *Assembly Selection Mode*).
	Select Instances	Selects all instances of the selected geometry instance. When you select an actor that is not an instance, only that actor is selected.
	Select Inside Sphere	Selects all actors fully contained by a spherical selection window. Click to place the center of the sphere, drag to change the sphere size, and then click again to finish the selection. **Note:** This command always selects actors using default selection mode (see *Assembly Selection Mode*).
	Select Across Sphere	Selects all actors that are contained by or intersect a spherical selection window. Click to place the center of the sphere, drag to change the sphere size, and then click again to finish the selection. **Note:** This command always selects actors using default selection mode (see *Assembly Selection Mode*).
	Select Adjacent Parts	Selects all parts that are in contact with, or that intersect, the currently selected part. **Note:** This command is available only when one or several parts (i.e. geometry actors) are selected.

Icon	Command Name	Description
	Select All Actors	Selects all visible actors, both collaborative and geometry. **Tips:** • You can also press **Ctrl+A** while in the viewport. • Select hidden and ghosted actors from the Assembly and Collaboration trees.
	Invert Selection	Selects unselected actors and clears selected actors. **Note:** This command clears *Assembly Selection Mode*.
	Unselect Hidden and Ghosted Actors	Removes hidden and ghosted actors from the current selection. **Note:** This command clears *Assembly Selection Mode*.
	Select Geometry Filter	Lets you select geometry actors. When cleared, you cannot select parts but you can select assemblies when **Assembly Selection Mode** is enabled.
	Select Collaboration Filter	Lets you select or deselect collaborative actors. Select this option to make collaborative actors appear in the selection.
	Rotate Mode	Rotates the camera when you left-click and drag in the viewport. By default, rotation is relative to the vertical axis. Clicking a geometry actor and dragging rotates the camera around the clicked point. Otherwise, rotation is around the center of the viewport. • To rotate freely, without respect to the orientation of the vertical axis, press **Ctrl** while dragging. • To rotate the view point from which you observe the model, press **Shift** while dragging. • To roll about the clicked point or center of the viewport, press **Alt** while dragging. **Tip:** You can rotate when not in rotation mode by right-clicking in the viewport.
	Pan Mode	Moves the camera across the scene when you left-click and drag in the viewport. To pan the paper space, press **Ctrl** while dragging. **Tip:** You can pan while in other modes by clicking the mouse wheel in the viewport and dragging.
	Zoom Mode	Zooms the 3D space when you left-click and drag in the viewport. Zooming affects 3D actors only. This zoom method moves the camera, which lets you penetrate geometry. **Tips:** • You can also zoom while in other modes by pressing both left and right mouse buttons and dragging the mouse up or down in the viewport. • Another method of zooming is available by rolling the mouse wheel in the viewport. This zoom moves the camera focal point (field-of-view angle), not the camera itself. The zoom focal point is the mouse pointer location. • To zoom the 2D paper space, press **Ctrl** while rolling the mouse wheel. Zooming the paper space affects 2D and 3D actors.
	Zoom Area Mode	Creates a zoom region when you left-click and drag in the viewport. • To zoom in, drag left-to-right. • To zoom out, drag right-to-left.

Icon	Command Name	Description
	Fly Through Mode	Moves the camera as though you were flying. To move closer to the model, hold down the left mouse button. To move farther away, hold down the right mouse button. To control the speed of the fly-through effect, press the **Up Arrow** or **Down Arrow** keys.
	Inertia Mode	Causes the camera to continue moving after you rotate or pan the model. The faster you rotate or pan, the more the model moves when you stop. **Note:** Selecting **Inertia Mode** also selects **Rotate Mode**, but you can then change the mode and **Inertia Mode** stays enabled.
	Zoom Fit All	Fits the entire scene while keeping the same camera direction. **Tip:** You can also double-click in the viewport background or double-click the middle button over the model.
	Zoom Selection	Zooms to the selected actors while keeping the same camera direction. **Tip:** You can also double-click an actor.
	'Fly-With' Mode (Translate keeping distance)	Attaches the camera target to the selected actor and sets *camera properties* as follows: **Property** / **Enabled** Roll ✓ Pitch Yaw Lock distance to target ✓ The camera follows the attached actor at constant distance. **Tip:** To avoid having to reposition the camera later, orient the camera as needed before attaching it. **Note:** Setting this mode clears all camera animation keys for this camera.
	'Target' Mode (Follow keeping position)	Attaches the camera target to the selected actor and sets *camera properties* as follows: **Property** / **Enabled** Roll Pitch ✓ Yaw ✓ Lock distance to target The camera remains stationary but tracks the movement of the attached actor. **Tip:** To avoid having to reposition the camera later, orient the camera as needed before attaching it. **Note:** Setting this mode clears all camera animation keys for this camera.

Icon	Command Name	Description
	'Move-With' Mode (Rigid attachment)	Attaches the camera and target to the selected actor and sets *camera properties* as follows: **Property** / **Enabled** Roll ✓ Pitch ✓ Yaw ✓ Lock distance to target — Not enabled, but the distance between camera and target does not change because both the camera and target are attached to the same actor. The camera moves in lock-step with the attached actor. **Tip:** To avoid having to reposition the camera later, orient the camera as needed before attaching it. **Note:** Setting this mode clears all camera animation keys for this camera.
	'Free' Mode (Detach)	Detaches the camera and target from its attached actors and sets *camera properties* as follows: **Property** / **Enabled** Roll ✓ Pitch ✓ Yaw ✓ Lock distance to target The camera can move freely in the viewport. **Note:** Setting this mode clears all camera animation keys for this camera.
	Attach Target to Selection	Attaches the camera target to the selected actor. The target moves with the actor. The target does not necessarily have to be located on the actor. **Tip:** To avoid having to reposition the camera later, orient the camera as needed before attaching it. **Notes:** • In animation mode, this command creates a camera key at the current time. • You can also attach a camera target to an actor by dragging the target anchor while pressing **Alt**. Dragging without **Alt** moves the target anchor without changing the actor attachment.
	Attach Center to Selection	Attaches the camera to the selected actor. The camera moves with the actor. The camera does not necessarily have to be located on the actor. **Tip:** To avoid having to reposition the camera later, orient the camera as needed before attaching it.

Icon	Command Name	Description
		Notes: • In animation mode, this command creates a camera key at the current time. • You can also attach a camera to an actor by dragging the camera anchor while pressing **Alt**. Dragging without **Alt** moves the camera without changing the actor attachment.
	Detach Target	(Available when the camera target is attached to an actor.) Detaches the camera target from the attached actor. The target anchor no longer moves with the actor. **Notes:** • In animation mode, this command creates a camera key at the current time. • You can also detach targets by dragging the target anchor while pressing **Alt** onto empty viewport background (not on an actor).
	Detach Center	(Available when the camera center is attached to an actor.) Detaches the camera from its attached actor. The camera no longer moves with the actor. **Notes:** • In animation mode, this command creates a camera key at the current time. • You can also detach cameras by dragging the camera anchor while pressing **Alt** onto empty viewport background (not on an actor).
	Add Camera	Creates a new camera actor at the current viewport camera position. Make sure you set the viewport camera orientation the way you want it before creating the camera to avoid having to redefine the camera's initial orientation. **Notes:** • Cameras are listed in the *Collaboration* pane under **Cameras**. • To make a camera the viewport camera, set the viewport *Camera* property. Camera commands in the **Attach Camera** menu operate on the current camera of the active viewport, not the newly created camera. Note that the **Camera** property is animatable, so the viewport camera can change depending on the timeline position. • Set camera properties in the *Properties* pane. • When only one camera (`Camera`) is defined, its animation keys are shown in the timeline regardless of camera visibility. When multiple cameras are defined, animation keys are shown only for visible cameras. Change camera visibility by toggling its check box in the Collaboration pane. **Tip:** Grids can help you position cameras. **Tip:** To facilitate working with cameras, split the viewport into multiple panes and set different viewport cameras. In the following illustration, the left viewport shows the model from the perspective of `Camera 1` and the right viewport uses its active camera to show the `Camera 1` actor.

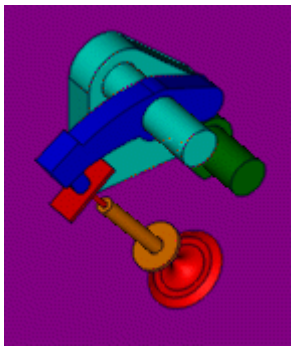
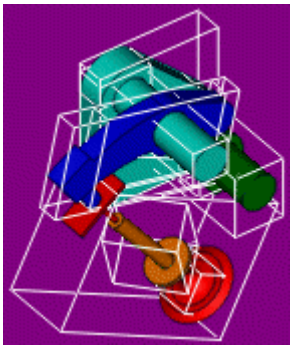
Icon	Command Name	Description
		

Render Tab

The **Render** tab lets you control scene lighting and rendering characteristics.

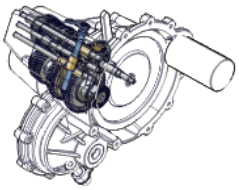
Mode Commands

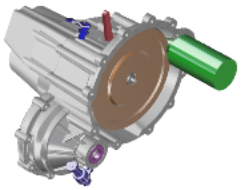
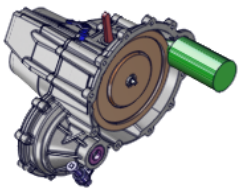
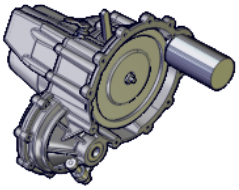
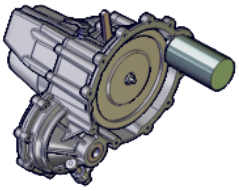
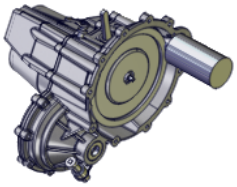
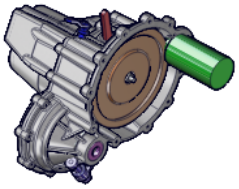
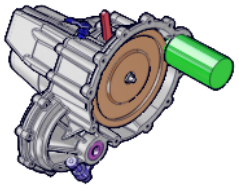
Render mode commands let you choose model display characteristics.

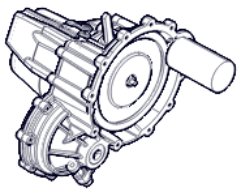
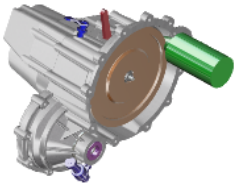
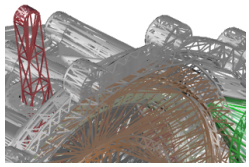
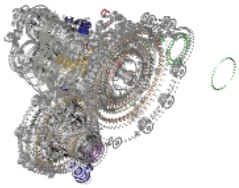
Icon	Command Name	Description
	Mode	Specifies the render mode, which determines display characteristics such as lighting and color. See *Render: Mode Commands* below.
	Show/Hide Bounding Boxes	(Listed under **Mode**.) Displays minimum bounding boxes around actors.  Disabled  Enabled
	Outline Style	Specifies the outline style for render modes that support outlines, such as **Smooth with Outline** and **Technical**. See *Render: Outline Style Commands* below.

Render: Mode Commands

Custom rendering lets you set different rendering modes for individual geometry actors. You can also configure visible and hidden line styles in vector output. Configure custom rendering from the **Custom rendering** category in the *Properties* pane.

Icon	Render Mode	Example	Lighting	Outlines	Silhouette Lines	Color Source
	Custom		Mode-specific	Mode-specific	Mode-specific	Mode-specific

Icon	Render Mode	Example	Lighting	Outlines	Silhouette Lines	Color Source
	Smooth		Yes *	No	No	Actor
	Smooth with Outline		Yes *	Yes	No	Actor
	Shaded Illustration		Special **	Yes	Yes	Special (White)
	Shaded Illustration with Color		Special **	Yes	Yes	Actor (Attenuated)
	Shaded Illustration Without Silhouette		Special **	Yes	No	Special (White)
	Technical		Yes *	Yes	Yes	Actor
	Flat Technical		No	Yes	Yes	Actor

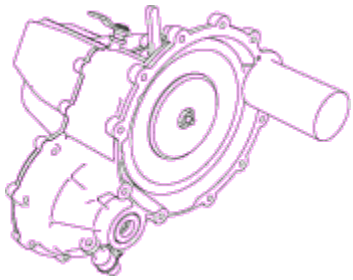
Icon	Render Mode	Example	Lighting	Outlines	Silhouette Lines	Color Source
	Silhouette		No	Yes	Yes	None
	Flat		Yes *	No	No	Actor
	Wireframe		Yes *	No	No	Actor
	Points		Yes *	No	No	Actor

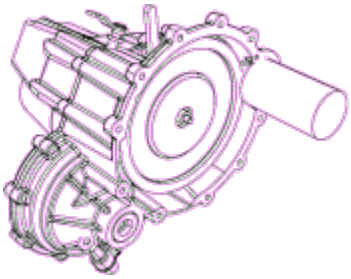
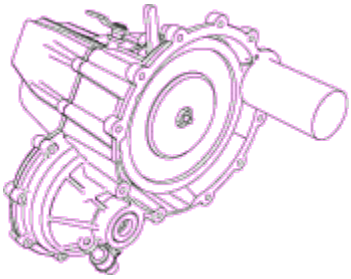
Legend:

- * Supports predefined lighting modes (Soft, Medium, ...)
- ** Internal colored soft lighting. Not configurable (no properties).

Note: When one or more cutting planes are enabled, **Custom** render mode and modes with silhouette lines (such as **Shaded Illustration** and **Technical**) display as **Smooth with Outline**.

Render: Outline Style Commands

Icon	Outline Style	Description	Example
	Sharp Edges	Draws significant model edges only as determined by the **Minimum angle** document and actor properties.	

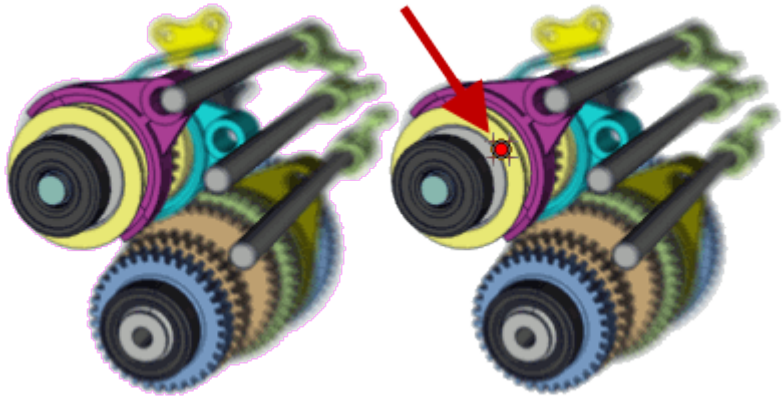
Icon	Outline Style	Description	Example
	Construction Edges	Draws surface construction lines in addition to sharp-edge lines. Construction edges are the boundaries between faces (as defined in some CAD formats).	
	Smart Outlines	Draws center lines for some circular fillets (depending on fillet angle and length) in addition to sharp-edge lines. **Note:** Smart-outline generation can be time intensive.	

Depth of Field Commands

Depth of Field (DOF) commands let you enable the DOF effect and set the focal point.

Icon	Command Name	Description
	Enable Depth of Field	Enables the DOF effect. Portions of the scene away from the camera focal point appear blurred. For details, see *Depth of field* in the Properties pane. **Note:** Requires *Advanced* OpenGL hardware acceleration. Disabled Enabled
	Set Depth-of-Field Focal Point	Lets you place the DOF focal point in your scene. At the focal point, there is no blur. To set the focal point, click this command and then click a geometry actor in the viewport. The focal point is associated with the actor; moving the actor moves the focal point. To set the focal point without actor association, click in empty viewport background or press **Alt** before clicking an actor. The focal-point icon is red when associated with an actor and white otherwise.

Icon	Command Name	Description
		Tip: You can also change the focal point by dragging the icon in the viewport.
	Show/Hide Depth-of-Field Focal Point (Visible)	Displays the DOF focal-point icon in the viewport. **Note:** Enabling **Automatic** or using **Set Focal Point** also enables **Visible**.
	Set Depth-of-Field Focal Point Automatically (Automatic)	Changes the DOF focal point each time you rotate or pan the viewport. To disable the automatic behavior, clear this option. To set the focal point manually, use **Set Focal Point** (which also disables **Automatic**).



Disabled Enabled

Lighting Commands

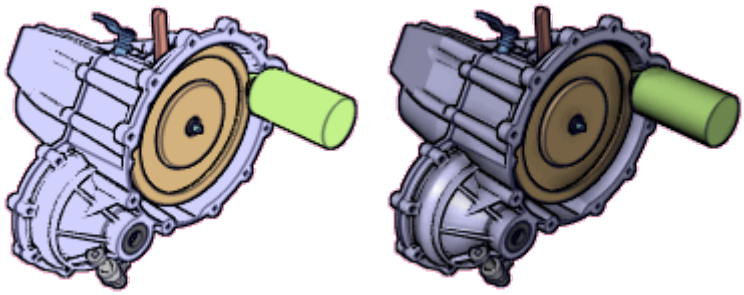
Lighting commands let you control how your model is illuminated. You can select from several standard (predefined) lighting modes, create custom light sources, and apply lighting effects.

Icon	Command Name	Description
	Mode	Defines the number and type of lights used to illuminate your 3D scene. See *Lighting: Mode Commands* below.
	Create	Creates custom (user-defined) light sources. See *Lighting: Create Commands* below.
	Enable Per-Pixel Lighting	Displays shaded surfaces based on the color and illumination at each pixel. For details, see the *Per-pixel lighting* viewport property. **Note:** Requires *Advanced* OpenGL hardware acceleration.
	Enable Shadows	Makes all geometry actors cast and receive shadows, making rendering for lighted scenes more realistic. For details, see the *Shadows* viewport property. **Note:** Shadows requires per-pixel lighting. Enabling **Shadows** also enables **Per-pixel Lighting**.

Icon	Command Name	Description
	Enable Ambient Occlusion	Enables the ambient occlusion lighting effect. For details, see the *Ambient occlusion* viewport property. **Note:** Requires *Advanced* OpenGL hardware acceleration.
	Enable Glow	Enables the glow lighting effect. For details, see the *Glow* viewport property. **Note:** Requires *Advanced* OpenGL hardware acceleration.

Lighting: Mode Commands

Icon	Command Name	Description
	Custom	Specifies that model lighting is determined by the spot, directional, and positional lights you have created. To use standard lighting modes, clear this option.
	Soft (1 Light)	Selects a predefined lighting mode consisting of one, two, or three light sources from different directions and with varied lighting characteristics.
	Medium (2 Lights)	
	Metal (3 Lights)	
	Heavy Metal (3 Lights)	
	High Contrast	
	Shaded Illustration (Cool & Warm)	
	Default (2 Lights)	
	Light	Turns on or off scene lighting (custom or predefined lighting mode). When lighting is off, ambient lighting comes from all directions, colors are flat, and there are no shadows.



Disabled Enabled

Lighting: Create Commands

Icon	Command Name	Description
	Create Spot Light	Creates a light source with a focused, cone-shaped beam that is brightest at its center. To create a spot light, activate this tool, click to place the light origin, click the target, and then move the mouse to change the beam size and click again. Press **Esc** to exit the tool.
	Create Directional Light	Creates a light source that produces parallel rays from a single direction as though the source were placed infinitely far away from the model. To create a directional light, activate this tool, click to place the light origin, and click again in the direction of the light beam. Press **Esc** to exit the tool.
	Create Positional Light	Creates a light source at a specific coordinate in the model space that emits light in all directions. To create a positional light, activate this tool, and then click to place the light origin. Press **Esc** to exit the tool.

Notes:

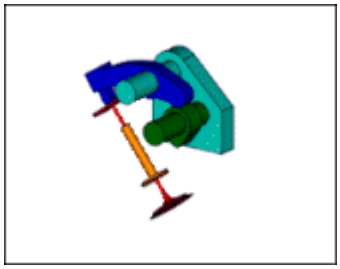
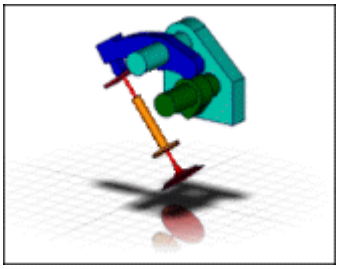
- Custom light sources are active in **Custom** lighting mode only.
- Set light properties, such as intensity and color, from the *Properties pane*.
- A model can have a maximum of 12 simultaneous active light sources.
- Light types have different icons in the viewport: spot, directional, and positional.
- Lights can be animated.
- Light actors are listed in both the Collaboration pane (under **Lights**) and Assembly pane:
  - When placed in the viewport, lights are created at the root of the Assembly tree.
  - When attached to a geometry actor, lights are placed in the Assembly tree under the actor.

Tip: Grids can help you position lights.

Ground Commands

Ground commands let you manage the ground actor, which can add depth and realism to your scene.

Set additional ground properties in the **Properties** pane. See *Ground Properties*.

Icon	Command Name	Description
	Show/Hide Ground	Displays the ground actor. The ground actor appears in the Collaboration pane under **Environment**.  No Ground  Ground with Shadow, Mirror, and Grid **Note:** Ground is displayed only when at least one 3D actor is visible in the viewport.
	Show/Hide Ground Shadow	Displays shadows of geometry actors on the ground.
	Show/Hide Ground Mirror	Displays reflections of geometry actors on the ground. **Tip:** You can control mirror opacity with the **Refection intensity** property (Properties pane for the ground actor). **Notes:** • The mirror does not reflect actors such as annotations, outlines, cutting planes, and Digger. • Reflections do not display in Silhouette render mode.
	Show/Hide Ground Grid	Displays a grid on the ground. Grid properties are available on the Properties pane for the ground actor.

On Demand Commands

On Demand commands apply rendering effects that are configured as on-demand.
These effects are configured in the **Applications Preferences - Viewport** page. See *Applications Preferences - Viewport*.

Icon	Command Name	Description
	High Quality (Apply On-Demand Rendering)	Applies lighting and rendering effects that are configured as on-demand on the **Applications Preferences - Viewport** page. This command also temporarily hides the mode icon and paper margins. Use this command prior to taking a screenshot of the viewport to create better images, or to see what images generated by the High Resolution Image workshop will look like. **Notes:** • You can also press **A** while in the viewport to apply on-demand rendering. • Commands such as **Save Image As** and **Print** do not benefit from high-quality rendering. Use the High Resolution Image workshop to create high-quality images.
	On Demand Settings	Displays the **Applications Preferences - Viewport** page, where you can configure rendering effects as on-demand.

Author Tab

Author commands let you enhance models with 3D redlining, annotations, dimensions, and other collaborative actors.

Note: Collaborative actors are listed in the Collaboration Pane.

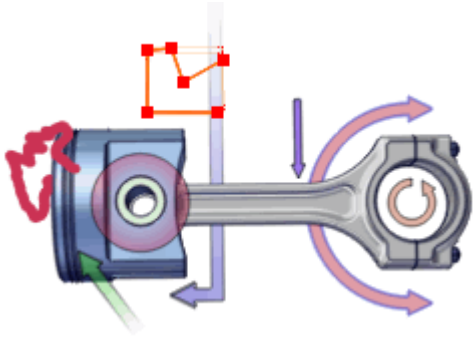
Tools Commands

Grids and magnetic lines help you place and align actors in your scene.

Icon	Command Name	Description
	Create Grid on Geometry	Creates a grid attached to the local frame of a geometry actor.
	Create Grid	Creates a grid at the location defined by vertices or axes you select. Follow the status bar prompts to make the selections. The resulting grid is not associated with any actor.
	Transform Grid on Geometry	Moves a grid to the local frame of a geometry actor. Any actor association does not change.
	Transform Grid	Moves a grid to a new location. Any actor association does not change.
	Create Magnetic Line	Creates a magnetic line.
	Align Magnetic Line	Aligns a magnetic line to an axis (geometry actor edge or coordinate system axis).

Markups Commands

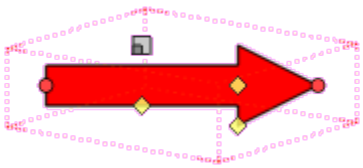
Markup commands let you create and manage actors that enhance your models, such as arrows and redlining.



Notes:

- All markups are associative.
- Set markup properties in the Properties pane. See *Markup Properties*.

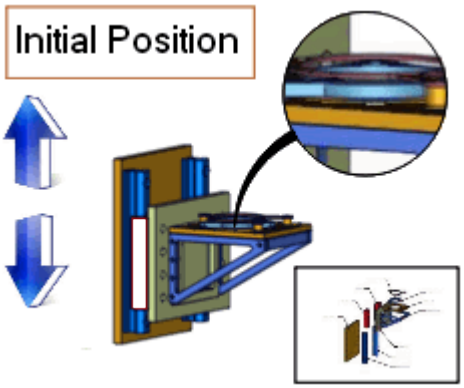
Icon	Command Name	Description
	Create Redlining	Adds free-hand redlining. Click and drag on an actor or in the viewport. **Note:** To change redlining color, click the lower half of the **Redlining** button, and select a color. This color is also used for arrows and circles.

Icon	Command Name	Description
	Create Polyline	Creates a line with multiple segments. Click any number of times to create nodes, and then right-click (or press **End**) to end the polyline. **Tips:** • Press **Alt** to detect circle centers as polyline nodes. • Use grids to help you create polylines. After creating a polyline: • To move a node, drag the anchor. Press **Alt** to constrain the movement. • To move the entire polyline, use *Free Dragging Mode* or other transformation tools. • To resize a polyline segment, press **Alt** and drag the adjacent segment while in **Free Dragging Mode**.
	Add Polyline Node	Adds segments to polylines. Click a polyline to add a node.
	Remove Polyline Node	Removes segments from polylines. Click a node to remove it.
	Split Polyline	Splits a polyline into multiple segments. Click the node at which to split.
	Join Polylines	Merges two polylines. Click the two ends to merge.
	Create Composite Polyline	Creates a polyline from selected edges. Click any number of edges, and then right-click to end the polyline. The edges need not be adjacent.
	Create Arrow	Creates a straight arrow. Click to place the arrowhead, and then click to place the tail. **Tip:** To easily change arrow shape and size properties, drag anchors in the viewport. Anchor behavior varies between arrow types (straight, corner, circular).  • Scales arrows by multiplying size properties by the same value. **Note:** Scaling does not change straight-arrow length because length is typically determined by the positions of geometry actors with which arrows are associated. • Changes shaft width, head width, head length, and head shape. Dragging the head-width anchor changes head and shaft widths simultaneously. To change just head width, press **Shift** while dragging the anchor. • Changes arrow length, position, rotation (circular arrows), and association. To change the geometry actor or actors with which the arrow is associated, drag a anchor onto another actor.
	Create Circular Arrow	Creates a circular arrow, which is automatically set on a circle or axis if detected. Click to place the center (axis), and then click to define the offset (radius). **Tip:** To rotate or resize the arrow, drag the arrow body. A dashed line shows the original radius. The arrow snaps to this line when nearby so you can easily change the rotation angle without changing the radius.

Icon	Command Name	Description
	Create Corner Arrow	Creates a corner arrow. Click to place the corner, and then click to define the size.
	Create Circle	Creates a circle. Click to place the center, and then click to place the radius.

Panels Commands

Panel commands let you insert images (2D and 3D) and 2D text boxes in your 3D scene.



Note: Set panel properties in the Properties pane. See *Panel Properties*.

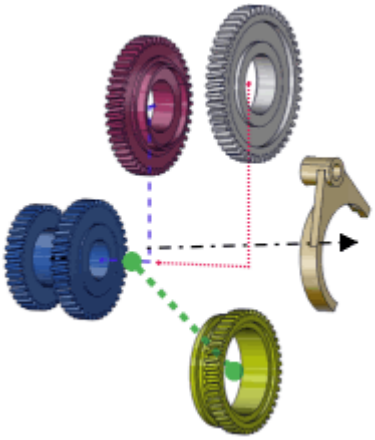
Icon	Command Name	Description
	Create Image Panel	Creates raster image 3D panels. Click to place one corner, and then click to place the diagonal corner. Image panels have one anchor at the upper-right corner.
	Create Vector Image Panel	Creates vector image (`.svg`) 3D panels. Click to place one corner, and then click to place the diagonal corner. Vector Image panels have one anchor at the upper-right corner.
	Create Image 2D Panel	Creates raster image 2D panels. Click to place one corner, and then click to place the diagonal corner. Image 2D panels have one anchor at each corner. 2D panel positions are fixed (unaffected by camera movement). **Tips:** • You can also create an image 2D panel by dragging a file of a supported image type from the *Image Library* workshop or Windows Explorer window into the viewport.

Icon	Command Name	Description
		• To create an Image 2D panel linked to a view, **Ctrl**+drag a view from the Views pane into the viewport.
	Create Next Button	Creates an image 2D panel preconfigured as a "next" button, which steps through all your views or animation markers. The panel is subscribed to the **Play Widget Next** style, which defines several properties including **Event > Link** as **next://**. See *Panel Properties* You can modify the style in the *Styles* workshop. **Tip:** To add a button to all your views, create a button in one view and then use *Update Views with Selected Actors*.
	Create Previous Button	Creates an image 2D panel preconfigured as a "previous" button, which steps backwards through all your views or animation markers. The panel is subscribed to the **Play Widget Previous** style, which defines several properties including **Event > Link** as **previous://**. You can modify the style in the *Styles* workshop.
	Create First Button	Creates an image 2D panel preconfigured as a "first" button, which activates the first view or moves the animation to the first marker. The panel is subscribed to the **Play Widget First** style, which defines several properties including **Event > Link** as **first://**. You can modify the style in the *Styles* workshop.
	Create Last Button	Creates an image 2D panel preconfigured as a "last" button, which activates the last view or plays the animation up to the last marker. The panel is subscribed to the **Play Widget Last** style, which defines several properties including **Event > Link** as **last://**. You can modify the style in the *Styles* workshop.
	Create Set of Navigation Buttons (All Buttons)	Creates a complete set of navigation buttons (first, previous, next, last).
	Create Vector Image 2D Panel	Creates vector image (`.svg`) 2D panels. Click to place one corner, and then click to place the diagonal corner. Image 2D panels have one anchor at each corner. 2D panel positions are fixed (unaffected by camera movement).
	Create Text 2D Panel	Creates 2D text boxes. Click to place the lower-left panel corner, type the text, and then click outside the panel to finish. **Notes:** • Unlike most **Author** commands, which create actors until you exit the command, this command creates one panel. To create additional text panels, click the command again. • The **AutoFit** property (*Panel Properties* pane) determines sizing behavior. • You can embed properties and meta-properties in panel text. For details, see the **String** property (*Panel Properties* pane). • 2D panel positions are fixed (unaffected by camera movement).

Paths Commands

Path commands let you create associative and non-associative lines that show actor displacement in views or during animations.

Associative paths automatically update when the associated actor moves. Non-associative paths do not update automatically.

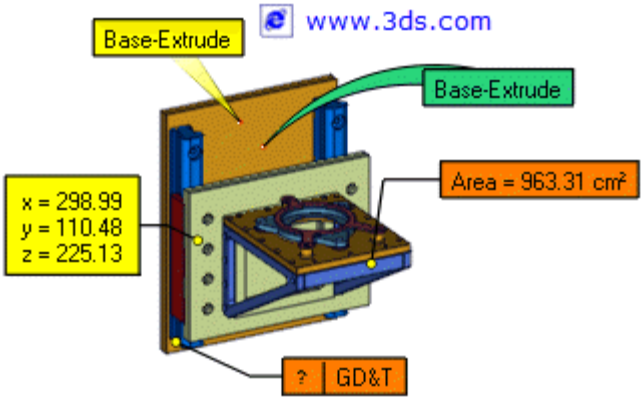


Note: Set path properties in the Properties pane. See *Path Properties*.

Icon	Command Name	Description
	Create Associative Path from Animation	(Available when an actor is selected in animation mode only.) Creates an associative line. Select an actor that has been moved from its neutral position. During the animation, the path is updated in real time.
	Create Non-Associative Path from Animation	(Available when an actor is selected in animation mode only.) Creates a non-associative path.
	Create Associative Path from Neutral	(Available when an actor is selected.) Creates an associative line from neutral position. Typically used in View mode.
	Create Non-Associative Path from Neutral	(Available when an actor is selected.) Creates a non-associative line from neutral position. Typically used in View mode.
	Generate Free Path	(Available when a path is selected.) Creates a customizable path from an associative or non-associative path. You can modify free paths as you would polylines. **Note:** Generating a free path from an associative path creates a non-associative path and hides the original associative path. To create a free path, create a path (associative or non-associative), optionally set the **Construct mode** (Properties pane), and then click **Generate Free Path**. The free path contains anchors you can drag, and you can use polyline commands (such as **Add Node**).

Annotations Commands

Annotation commands let you add labels, callouts, links, and other annotations to your models.



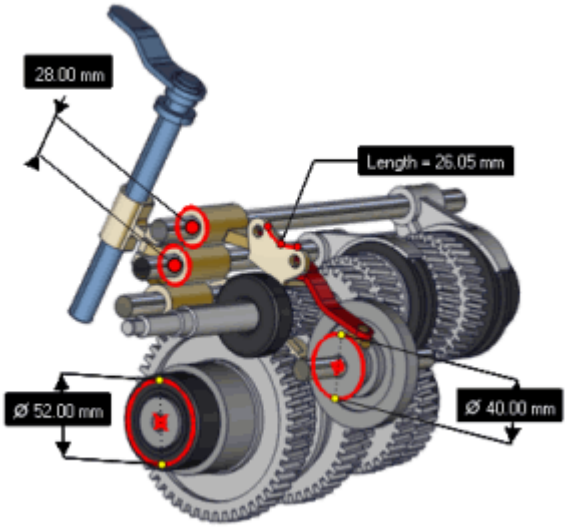
Notes:

- All annotations are associative.
- Set annotation properties in the Properties pane. See *Annotation Properties*.

Icon	Command Name	Description
	Create Label	Creates a text box linked to an actor.
	Create Label with Multiple Actors	Creates a label linked to multiple actors. Select the actors before selecting this tool.
	Create GD&T Label	Creates a text box linkable to an actor where you can define geometric dimensioning and tolerancing (GD&T) symbols. You can define pre, middle, and post symbols in the Properties pane.
	Create Area Label	Creates a label containing the area of the selected actors. The area is computed when importing the CAD model (see *Application Preferences - Input*).
	Create Volume Label	Creates a label containing the volume of the selected actors. The volume is computed when importing the CAD model (see *Application Preferences - Input*).
	Create Coordinate Label	Creates a label containing the point coordinates in the world frame.
	Create Callout	Creates a label with the associated geometry actor's BOM ID as the text (by default), or blank if no BOM ID is defined. Callouts are also known as balloons. **Notes:** • You can also display BOM quantities. In the *Annotation Properties*, under **Callout exponent**, select a **Quantity exponent** location and set the **Font ratio**. • You can configure how callout widths are determined from *(Default) Document Properties - Image Quality*. • You can also create callouts with multiple attach lines. See *Create Annotations with Several Lines*.
	Create Link	Creates a link to a Web page, file, view, or other target. The **Link** property (Properties pane, **Event** category) defines the link target, and the **String** property (Properties pane, **Text** category) defines the link text.

Measurements Commands

Measurement commands let you create labels from model dimensions, such as angles and distances.



Notes:

- Most measurements are associative.
- You can set measurement units from *Unit Settings*.
- Set measurement properties in the Properties panel. See *Measurement Properties*.

Tip: To move measurement text and attach lines, drag any part of the measurement. To move just the text, press **Alt** while dragging.

Icon	Command Name	Description
	Create Linear Length Measurement	Creates a label containing a line length.
	Create Curve Length Measurement	Creates a label containing the length of a polyline or CAD feature such as a curve or pipe. **Tip:** To display the sum of multiple curve lengths, select the curves first.
	Create Arc Length Measurement	Creates a label containing an arc length (defined by three points) or a circle perimeter (press **Alt** for curve detection). **Tip:** To flip the arc direction, in the *Measurement Properties*, for **Complementary**, click **Proceed**.
	Create Thickness Measurement	Creates a label containing the thickness of the actor at the selected point.
	Create Diameter Measurement	Creates a label containing a circle diameter.
	Create Diameter Measurement from 3 Points	Creates a label containing the diameter of a circle defined by three points.
	Create Radius Measurement	Creates a label containing a circle radius.
	Create Radius Measurement from 3 Points	Creates a label containing the radius of a circle defined by three points.
	Create Distance Measurement Between 2 Points	Creates a label containing the distance between two points. **Tip:** Press **Alt** to detect circle centers.

Icon	Command Name	Description
	Create Distance/Angle Measurement Between 2 Lines	Creates a label containing the distance between two lines.
	Create Distance/Angle Measurement Between 2 Planes	Creates a label containing the distance between two parallel planes or the angle between two nonparallel planes.
	Create Distance Measurement Between 2 Axes	Creates a label containing the minimal distance between two detected circle axes.
	Create Distance Measurement Between 2 Centers	Creates a label containing the distance between two detected centers.
	Create Distance Measurement Between 2 Actors	Creates a label containing the distance between two faces, lines, or points. **Note:** This tool can create a variety of measurements, but it can be hard to select the intended geometry. Consider using a more specific tool when possible.
	Create Distance Measurement Between Plane and Point	Creates a label containing the distance between a plane and a point.
	Create Distance Measurement Between Line and Point	Creates a label containing the minimal distance between a line and a point.
	Chain Measurement Mode	Creates a series of distance measurements where the last point of one measurement is the first point of the next. **Tip:** You can also press **Ctrl** while selecting points.
	Fan Measurement Mode	Creates a series of distance measurements where the first point is common to all other points. **Tip:** You can also press **Shift** while selecting points.
	Create Angle Measurement from 3 Points	Creates a label containing the angle defined by three points. The first selected point is the vertex.
	Create Plane Projected Measurement	Creates a plane-projected (horizontal or vertical component) measurement. First select a face that indicates the normal direction of the dimensions, and then select a series of points for a chain of dimensions. **Tip:** Press **Alt** to detect hole centers.
	Project Plane Measurement on Axis	Creates a projected measurement between a plane-projected measurement and an axis. First select a plane-projected measurement, then select a plane to get the axis.
	Create Minimal Distance Measurement	Creates a label containing the minimal distance between two selected actors. **Note:** When actors move after creating the measurement, the distance between the two points defining the measurement updates automatically, but the points defining the minimal distance do not. To recompute a new minimal distance, delete the existing measurement and create a new one.
	Create Global Dimensions Measurement	Creates three labels containing the height, length, and width of the bounding box of the selected actors according to the world coordinate system. If no actors are selected, the dimensions apply to all visible actors. **Note:** Dimension measurements do not have associations.

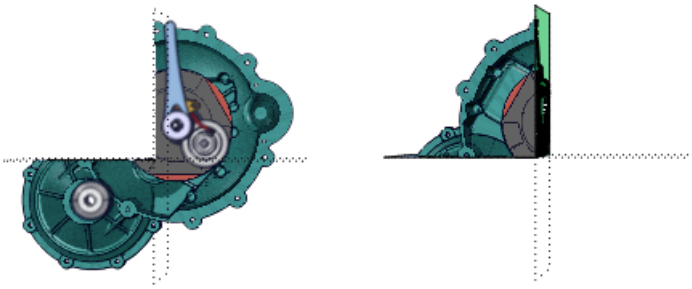
Icon	Command Name	Description
	Create Local Dimensions Measurement	Creates three labels containing the height, length, and width of the bounding box of the selected actors according to a custom coordinate system. If no actors are selected, the dimensions apply to all visible actors. **Note:** Activate the coordinate system with the **Use coordinate system** property of the viewport before running this command.
	Create Coordinate System on Geometry	Creates a coordinate system (CS) at an actor's local frame. The CS is listed in the Collaboration tree and in the Assembly tree under the actor.You can change the CS origin and orientation by transforming the CS actor in the viewport or from the Properties pane.To enable a CS, right-click it in the Collaboration tree and click **Enable Coordinate System**.Dimensions are based on the current CS.
	Create Coordinate System	Creates a coordinate system (CS) at the location defined by vertices or axes you select. Follow the prompts in the status bar to make the necessary selections. The CS is listed in the Collaboration tree and at the top level of the Assembly tree (the CS is not associated with an actor).You can change the CS origin and orientation by transforming the CS actor in the viewport or from the Properties pane.To enable a CS, right-click it in the Collaboration tree and click **Enable Coordinate System**.Dimensions are based on the current CS.

Cutting Planes Commands

Cutting Plane commands let you create and manage cross-section (cutaway) views of your models.

Note: Set cutting plane properties, such as capping and hatching behavior, in the *Cutting Plane Properties* pane. See *Cutting Plane Properties*.

Icon	Command Name	Description
	Create Cutting Plane	Creates a cutting plane on the selection and hides any other visible cutting planes. If no actors are selected, the cutting plane is applied to the entire model. The cutting plane is created normal to the positioning arrow . You can display a maximum of three cutting planes simultaneously. **Tip:** To orient your model so the cutting plane is parallel to the screen, double-click the cutting plane.
	Create and Add Cutting Plane	(Available when at least one cutting plane is visible in your scene.) Creates a cutting plane on the selection and adds it to the scene without hiding existing cutting planes. If no actors are selected, the cutting plane is applied to the entire model.
	Create Cutting Plane from 3 Points	Creates a cutting plane from three points you select. **Tip**: Press **Alt** to select circle centers.
	Move Cutting Plane	Moves the selected cutting plane to another position. Press **Alt** to align on an axis.
	Apply Cutting Plane to Selection	Applies a cutting plane to selected geometry actors. Select the cutting plane and the actors you want to cut, and then click this command. To add actors to the selection, select the actors and then **Ctrl**+click this command. To remove actors from the selection, select the actors and then **Shift**+click this command.

Icon	Command Name	Description
	Union Mode	Inverts actor visibility (swaps **Front space opacity** and **Back space opacity** property values): 
	Flip Cutting Plane	Inverts the cut and uncut parts of your model created by the selected cutting plane.
	Create Cutting Line Actor from Cutting Plane	(Available when the **Cutting line** property is enabled for the cutting plane.) Creates an independent cutting line actor that you can move.
	Save Cutting Line	Saves the cutting line in a vector image file.

Styles Tab

Styles commands lets you view the style gallery, apply styles to actors, and subscribe actors to styles. Use the Styles workshop to create and manage styles.

Icon	Command Name	Description
	Style Preview	Shows the gallery of defined styles. The style preview images reflect many but not all style properties.
	Quick Style	(Available when at least one actor is selected.) Creates a new style from all properties (except name and location) of the selected actor. When multiple actors are selected, the style contains only the common properties.
	Auto Subscribe	Enables style subscriptions. When an actor is subscribed to a style, the actor automatically updates when the style is modified. When **Auto Subscribe** is selected: • New actors are automatically subscribed to the default family style, or to the default Generic style when no family default is defined. • Clicking a style in the gallery subscribes the selected actors to the style. When **Auto Subscribe** is cleared: • Default styles are applied to new actors but without subscriptions. Future changes to the style do not affect the actors. • Clicking a style in the gallery applies the style but does not create subscriptions. **Note:** You cannot change subscribed properties in the Properties pane. You must update the style to change the properties.
	Unsubscribe	Removes style subscriptions from the selected actors. Style changes no longer affect the actors.
	Show/Hide Styles Workshop	Displays the Styles workshop, where you create and manage styles.

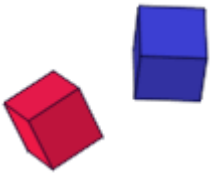
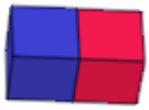
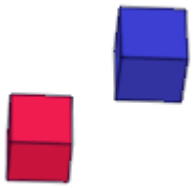
Transform Tab

Transform commands let you translate and rotate alignments, and explode actors.

Align Commands

Align commands help you position geometry actors in your models.

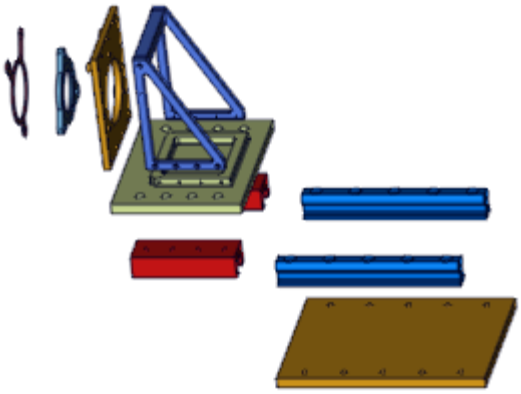
For example, you can move an actor so an edge aligns with the edge of another actor. You can also copy the location or transformation of one actor to another.

Icon	Command Name	Description
	Align Point to Point	Moves actors by aligning two points.
	Align Line/Axis to Line/Axis	Moves actors by aligning a line or axis with a line or axis.
	Align Point to Plane	Moves actors by aligning a point and a plane.
	Align Line/Axis to Plane	Moves actors by aligning a line or axis with a plane.
	Align Plane to Plane	Moves actors by aligning two planes.
		Changes actor orientation (rotation) but not position (x-, y-, and z-coordinates) during alignment operations. **Example:**  Starting location before aligning the cubes plane-to-plane.
	Lock Pivot Position Mode	 With **Lock Pivot Position Mode** disabled, the red cube changes both orientation and position.  With **Lock Pivot Position Mode** enabled, the red cube changes orientation but not position.
	Copy Transformation in World Coordinate System	Copies actor translation and rotation changes relative to its neutral position. To copy transformations, select one or more actors, activate this tool, and then click the actor whose transformation you are copying. For a comparison of **Copy Transformation** and **Copy Location** commands, see *Copy Location and Copy Transformation Examples*.
	Copy Transformation in Parent	Copies actor translation and rotation changes relative to its parent. To copy transformations, select one or more actors, activate this tool, and then click the actor whose transformation you are copying. For a comparison of **Copy Transformation** and **Copy Location** commands, see *Copy Location and Copy Transformation Examples*.

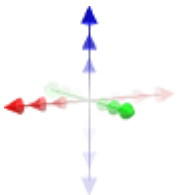
Icon	Command Name	Description
	Copy Transformation Between 2 Actors	Transforms the selected geometry actors based on the transformation represented by the starting and ending coordinate systems you select. This command cannot transform collaborative actors. To specify the coordinate systems, you can select geometry actors (to use their local coordinate systems) or coordinate system collaborative actors.
	Copy Location in World Coordinate System	Copies actor location (position and rotation) in the world coordinate system. To copy locations, select one or more actors, activate this tool, and then click the actor whose location you are copying. For a comparison of **Copy Transformation** and **Copy Location** commands, see *Copy Location and Copy Transformation Examples*.
	Copy Location in Parent	Copies actor location (position and rotation) in the parent coordinate system. To copy locations, select one or more actors, activate this tool, and then click the actor whose location you are copying. For a comparison of **Copy Transformation** and **Copy Location** commands, see *Copy Location and Copy Transformation Examples*.

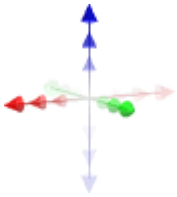
Explode Commands

Explode commands add space between two or more actors.



Tip: Use associative paths or polylines to create explode lines. See *Paths Commands* and *Markups Commands*.

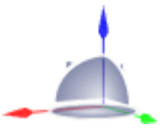
Icon	Command Name	Description
	Linear Explode Mode	Creates an exploded view along an axis. Select actors and a gizmo appears.  Drag a gizmo axis to explode actors in the desired direction. The mouse pointer changes to when positioned for explosion.

Icon	Command Name	Description
		Tips: • Press **Alt** to enable curve detection. • Instead of dragging the gizmo, you can type the explode distance. Click a gizmo arrow, and then type a value for **Length** in the Properties pane. The value is divided between the exploded actors. For example, when you explode four actors and specify 300 mm, the three gaps between the actors are 100 mm each. • To simply move one or more actors along an axis, use **Transform** > **Move** > **Translate** instead of linear explosion. See *Move Commands* below.
	Part-by-Part Linear Explode Mode	(Available in animation mode only.) Creates a linear explode by moving parts one at a time. Location keys for each part are uniformly positioned in the time period between the current time and the first key set prior to that time.
	Spherical Explode Mode	Creates an exploded view around a point. Select actors and a gizmo appears. Drag the gizmo to explode actors in the desired direction. The mouse pointer changes to when positioned for explosion.
	Part-by-Part Spherical Explode Mode	(Available in animation mode only.) Creates a spherical explode by moving parts one at a time. Location keys for each part are uniformly positioned in the time period between the current time and the first key set prior to that time.
	Cylindrical Explode Mode	Creates a cylinder exploded view around an axis. Select actors and a gizmo appears.  Drag a gizmo axis to explode actors in the desired direction. The mouse pointer changes to when positioned for explosion. **Tip**: Press **Alt** to enable curve detection.
	Part-by-Part Cylindrical Explode Mode	(Available in animation mode only.) Creates a cylindrical explode by moving parts one at a time. Location keys for each part are uniformly positioned in the time period between the current time and the first key set prior to that time.

Move Commands

Move commands translate and rotate actors in the scene.

Tip: When **Free Dragging Mode** is disabled, you can move or rotate actors only by dragging the gizmo. When **Free Dragging Mode** is enabled, you also drag actor.

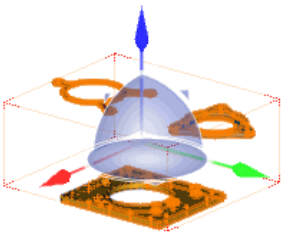
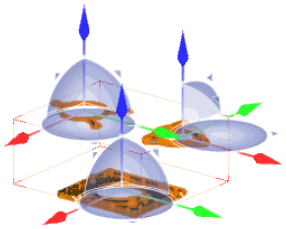
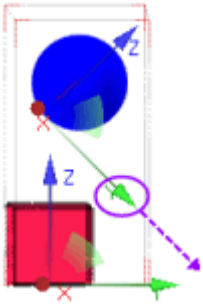
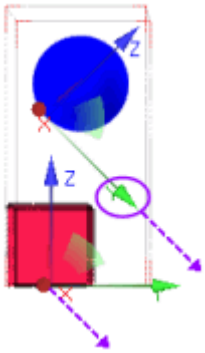
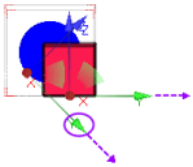
Icon	Command Name	Description
	Free Dragging Mode	Lets you move geometry actors in 2D space. Select and drag actors anywhere in the viewport. The mouse pointer changes to when positioned for free dragging. **Tips:** • This mode is not required to drag collaborative actors. • To resize polyline segments, press **Alt** and drag the adjacent segment.
	Translation Mode	Lets you move actors in 3D space. Select one or more actors and a triad gizmo appears.  **Note:** The mouse pointer changes to when positioned for translating.
	Rotation Mode	Lets you rotate actors in 3D space. Select one or more actors and a spherical gizmo appears. **Note:** The mouse pointer changes to when positioned for rotating.
	No Transformations Mode	Disables all transformations. This is the default mode so you do not move actors unintentionally.
	Curve Detection Mode	Toggles the interactive recognition of transformation axes on CAD models. Select an actor, click this tool, select an edge or a face of a geometry actor, then drag. The edge or face does not have to touch or be near the actor you want to move. The selected actor moves along, or rotates about, the direction indicated by the detected curve or edge. Alternatively, you can hold down the **Alt** key and then select the edge or face of a geometry actor.
	Restore Neutral Position	Returns actors to their original (default) locations, both position (x-, y-, and z-coordinates) and rotation. **Tip:** To set a new default position, click **Set as Neutral Properties** (Properties toolbar).

Align Pivots Commands

Pivot alignment commands let you manipulate actor pivots.

A pivot is an actor property that defines a transformation point, such as the point about which an actor rotates or where kinematic constraints are applied. Gizmos appear at actor pivot coordinates unless one pivot is displayed for multiple actors.

Icon	Command Name	Description
	Pivot Transform Mode	Enables pivot transformation mode. Translation and rotation tools move actor pivots instead of actors themselves. Use this mode and the pivot alignment commands to precisely position pivots.

Icon	Command Name	Description
	Multiple Gizmos Mode	Enables multiple gizmos display mode. Each selected actor has its own gizmo instead of one gizmo for the entire selection.  Disabled  Enabled **Note:** To illustrate the effect of this mode, Composer switches to **Translation Mode** or **Rotation Mode**, whichever was used last, when you are not already in a transformation mode other than **Free Dragging Mode**. (Gizmos are not displayed in **Free Dragging Mode**.)
	Local Transformations Mode	Selected actors (or pivots when in **Pivot Transformations Mode**) move relative to their own coordinate systems. To have all actors (or pivots) move relative to the gizmo you drag, clear **Local Transform Mode**. Example:  With both actors selected, translate the sphere along its y-axis.  Without **Local Transform Mode**, the cube moves along the sphere's y-axis. Relative spacing between the actors is maintained.  With **Local Transform Mode**, the cube moves along its own y-axis, causing a collision in this example.

Icon	Command Name	Description
	Show Pivot on Parent Axis Mode	Displays pivots according to the pivot orientation of the parent.
	Align Pivots with Given Pivot	Aligns pivot axes of the selected actors with the pivot of an actor you select.
	Align Pivots with Local Axis	Aligns pivot axes of the selected actors with the local coordinate system of each actor.
	Align Pivots with World Axis	Aligns pivot axes of the selected actors to the world coordinate system.
	Align Pivots with Line/Axis	Aligns pivot axes of the selected actors to a line or axis you select.
	Set Pivots on Local Coordinate System	Moves pivots of the selected actors to the local coordinate system origin of each actor.
	Set Pivots on Bounding Box Centers	Moves pivots of the selected actors to the bounding box center of each actor.
	Set Pivot on Point	Moves pivots of the selected actors to a point you select.
	Set Pivot on Line/Axis	Moves pivots of the selected actors to a line or axis you select.

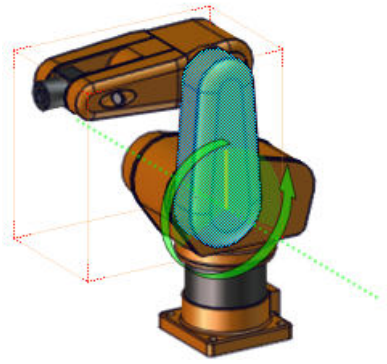
Kinematic Commands

Kinematic commands let you manage the assembly tree structure and animate assemblies using kinematic constraints. You can apply kinematic links to parts and assemblies.

Kinematics is the branch of mechanics that deals with the motion of a body or a system of bodies without considering the effect of mass or forces acting on the system.

For more information, see *Creating Kinematic Links Between Actors*.

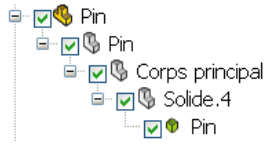
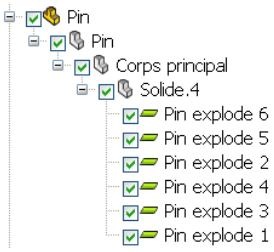
Icon	Command Name	Description
	Interactive Inverse Kinematics Mode	Enables interactive inverse kinematics (IK) mode. All transformations consider kinematic links. Whereas forward kinematics (FK) evaluates how moving a parent affects its children, IK evaluates how moving a child affects its parents. When you move an actor, the linked actors move according to their link constraints, and the root parent remains stationary.
	Kinematic Free Dragging	Enables both Free Dragging Mode and Interactive IK Mode so you can move actors while obeying kinematics.
	Show/Hide Degrees of Freedom	Shows the degrees of freedom (DOF) allowed by the kinematic links for the selected actors. When nothing is selected, shows the DOF of all actors.

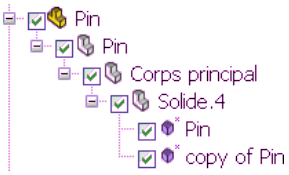


Icon	Command Name	Description
	Link Child to Parent	Creates child-parent links between actors. Any current selection is ignored. Click the child first and then the parent. Set kinematic link properties in the Properties pane. **Note:** Actors with kinematic links have 'K' overlays (for example,) in the Assembly tree.
	Link Selection to Parent	Links the selected actors as children of the parent you select. Set kinematic link properties in the Properties pane.
	Add Rigid Parent Level	Adds a rigid parent link to a parent level. Add rigid parents when you are otherwise unable to align the coordinate systems of a parent and child.
	Delete Child-Parent Links	Deletes the child-parent links of the selected assembly groups or actors.
	Kinematic Rigidity Mode	Enables kinematic rigid mode, which lets you freeze some levels.
	Add Current Links to Rigid Set	(Available in **Kinematic Rigidity Mode**.) Adds the current selection to a set of rigid modes.
	Remove Current Links from Rigid Set	(Available in **Kinematic Rigidity Mode**.) Removes a selection from a set of rigid modes.
	Clear Rigid Links Set	(Available in **Kinematic Rigidity Mode**.) Clear all rigid links.

Geometry Tab

Geometry commands let you manipulate geometry actors. Geometry commands do not affect collaborative actors.

Icon	Command Name	Description
	Detect Clones	Detects parts that have identical or similar geometry and creates instances (when they are not already instances imported from CAD). For details, see *Clones Detection Tab*.
	Merge Geometry	Merges all geometry of the selected actors into a new actor. New (merged) actors appear under the lowest common parent in the assembly tree. When there is no selection, the entire scene is merged under the assembly root.Merging reduces the number of actors, which improves performance (animation speed, load and save time). **Important:** • Ensure that **Keep Animation When Merging Mode** is selected or cleared as appropriate. • You cannot undo merges.
	Merge Geometry by Color	Same as **Merge Geometry** except merges only geometry of the same color.
	Keep Animation When Merging Mode	Preserves animations when merging. Composer merges only actors with the same keys (on the actors and their parent assemblies). When this option is cleared, Composer merges actors without considering keys, which can break animations.
	Explode Geometry	Exposes faces for the selected geometry actors. For example, explode a part to apply different face colors or textures.  Before  After
	Explode Geometry by Color	Explodes geometry by color.
	Update Geometry	Updates selected actors from a CAD file. This command updates changes in geometry, adds new actors, and deletes old actors. It does not update meta-properties or change the relative positions of actors. Association between actors in the active document and the file is by actor ID, which is based on actor name. You cannot update geometry if IDs have changed. If only one actor is selected and there is one actor in the file with a different name, you are prompted before updating the geometry. If a part has instances, all instances are updated (because they share the same reference). You cannot replace just one instance. **Tip:** To update the geometry of an actor whose name has changed: • Select the actor. • Click **Geometry** > **Update**.

Icon	Command Name	Description
		• In the Choose Update File dialog box, select the CAD file. • On the Update options page, select **Modify geometry**. • Click **Update**. If the CAD file contain several solids, the actor will contain these solids. **Notes:** • You can configure update behavior from *(Default) Document Properties - Update*. • To update an entire assembly, use *Update Composer Document*.
	Copy Geometry	Copies the geometry and properties of selected actors and creates new instances (clones). The clones are named `copy of actor_name` and appear in the Assembly tree under the same parents as the copied actors. To create clones under a different parent, use the **Copy Actors** and **Paste Actors** right-click commands in the assembly tree. See *Right-click Commands*. Before  After
	Replace Geometry	Replaces the geometry (mesh) of the selected actors with the geometry of another actor in the model. For example, you can substitute a screw in your model with a replacement screw. All properties of the replaced actors are unchangedexcept **Emission** and **Shininess**, which take the replacement actor's values. All views and animations are preserved. To replace geometry, select one or more actors to replace, click this command, and then select the replacement actor.
	Scale Geometry	Scales the selected geometry actors in the world coordinate system. See the *Scale Geometry* dialog box.
	Symmetrize Geometry	Makes the geometry symmetrical according to the desired point, plane, or axis. To duplicate the geometry, copy it first.
	Flip Faces	Changes the direction of badly directed faces, which can affect actor rendering.
	Flip Normals	Changes the direction of the normals, which can affect actor rendering.
	Primitives	Creates simple geometry actors: • **Point** • **Line** • **Square** (To create a rectangle, modify **Width** or **Depth** in the Properties pane) • **Disc** • **Cube** • **Sphere** • **Cylinder** For example, use primitives to embellish your scene, such as creating floors and walls. You can change properties and apply meta-properties to primitives from the Properties pane.
	Secure 3D Brush	Protects your intellectual property (IP) by degrading information at the geometrical level while preserving total model coherence. For details, see the *Secure 3D Brush* dialog box.

Animate Tab

Animate commands let you animate your scenes.

Note: The timeline is active in Animation mode only. If you are in View mode, click **Switch to Animation Mode** in the upper-left corner of the viewport or click **Animation** on the **Home** ribbon tab. By default, the Timeline pane is docked at the bottom of the Composer window.

Icon	Command Name	Description
	Load Root Scenario	Applies a previously saved scenario (`.smgSce`) file to the entire assembly (except for its root node).
	Save Root Scenario	Saves the entire assembly animation (all keys in the timeline) as a scenario (`.smgSce`) file.
	Reload Scenario References	Reloads child scenarios. When a scenario changes, it is sometimes necessary to reload the scenario to get the changes.
	Export Scenarios	Saves the animations of the selected actors as a `.smgSce` file. For example, you can apply the animation of one actor to another actor by exporting a scenario, editing the scenario file to change actor IDs, and then applying the scenario to another actor (in the Assembly tree, right-click the actor and click **Scenario** > **Apply Scenario to Node**).
	Clear Tracks and Remove All Child Scenarios	Deletes all animations.
	Copy Path from Actor	Copies the animation path (location keys) from an actor to the selected actors. Select one or more actors, click **Copy Path from Actor**, and then select the actor whose path you are copying.
	Create Path from Line (Linear Speed)	Creates animation paths (location keys) for the selected actors or camera based on a polyline or line detected on geometry. Animation speed is constant; actors complete short segments more quickly than long segments.
	Create Path from Line (Linear Time)	Creates animation paths (location keys) for the selected actors or camera based on a polyline or line detected on geometry. Animation speed is based on line segment lengths; actors complete each segment in the same amount of time.
	Create Camera Key	Creates a camera key at the current timebar location with camera location and target you select. **Note:** This command automatically selects the active camera. When a camera is selected, camera paths are displayed in the viewport. **Tip:** To create camera keys from the current camera orientation and zoom (instead of specifying camera location and target), use **Set Camera Keys**.
	Smooth Camera Path	Selects the camera and sets **Path** to **Smooth**. For details, see *Camera Properties*.
	Linear Camera Path	Selects the camera and sets **Path** to **Linear**. For details, see *Camera Properties*.
	Custom Camera Path	Selects the camera and sets **Path** to **Custom**. For details, see *Camera Properties*.
	Delete Unused Keys	Removes redundant keys from the selected actors, which can improve performance. If no actors are selected, the application clears unused keys for all actors. For example, if an actor has multiple property keys setting its color to blue, this command deletes redundant keys. This command is particularly useful if you use auto-key mode.

Icon	Command Name	Description
	Delete All Keys	Removes all animation keys.
	Delete Keys of Selected Actors	Removes all animation keys on the selected actors.
	Delete Camera Keys	Removes all camera keys for all cameras.
	Delete Digger Keys	Removes all Digger keys.
	Play/Pause	Plays or pauses the animation. **Tip:** If the animation plays beyond your last key, there might be keys for hidden actors. Press Ctrl+T to show all actors and then delete unwanted keys.
	Pause	Pauses the animation. Click **Play/Pause** to resume the animation.
	Stop	Stops the animation.
	Loop Play Mode	Plays the animation continuously.
	Camera Play Mode	Shows the animation from the camera's viewpoint. To show the animation using a fixed viewpoint, turn off this mode. All navigation tools (zoom, pan, and so on) are available when **Camera Play Mode** is off.
	Digger Play Mode	Shows Digger movement during animation. To ignore Digger keys, disable this mode.
	Display Time Settings	Lets you set frame-rate, animation duration, and time scaling. For details, see *Time Settings*.
	Show/Hide Timeline	Shows or hide the timeline pane.
	Display Animation Properties	Displays the *Document Properties - Animation* page.

Workshops Tab

Workshops are feature sets that help you create different output formats and perform other operations.

Icon	Workshop Name	Description
	Getting Started	The Getting Started workshop lets you open Composer Help, release notes, recently used files, and sample models.
	Models	The Model Browser lets you browse the file system for Composer files.
	Textures	The Textures workshop lets you apply 2D images (such as materials and logos) to 3D actor surfaces.
	Styles Workshop	The Styles workshop lets you create and manage styles. Styles are sets of property definitions you apply to actors to easily implement consistent appearances and behaviors.
	Filters Workshop	The Filters workshop lets you locate geometry and collaborative actors based on their properties.
	Image Library	The Image Library contains stock images from which you can create image 2D panels.
	BOM	The BOM workshop lets you manage the bill of materials (BOM) list and table. A BOM is a list of parts, which is an essential part of the design and manufacture of most products.
	Technical Illustration	The Technical Illustration workshop lets you create and publish vectorized images of your scene.
	High Resolution Image	The High Resolution Image workshop lets you generate high resolution raster images (BMP, JPEG, TIFF, PNG) of your scene.
	Views	The Views workshop lets you create and update views.
	Video	The Video workshop lets you create AVI (.avi) video files of your animations.
	Simplification	The Simplification workshop reduces the size and improves the graphical performance of your models.
	Clearance Checking	The Clearance Checking workshop performs static clash detection, clearance checking, and minimal distance tests. Use this workshop to qualify service and assembly procedures.
	Interactive Collision Detection	The Interactive Collision Detection workshop checks whether actors collide with other actors during an animation or when moving a selection.

Window Tab

Window commands let you manage Composer window panes and document windows.

Viewport Commands

Viewport commands let you configure the viewport layout.

Icon	Command Name	Description
	1 Pane	Specifies the viewport pane arrangement for the current document. To select a viewport pane, click in the pane or move the mouse pointer over a pane and press **Esc**. The icon in the lower-left corner indicates the active pane. When there is more than one pane, `Main Viewport` is displayed at the bottom of the primary viewport pane. The **Camera** viewport property is animatable for the main viewport pane only. Some display attributes are common to all panes while other are unique: • **Common to all panes**: Actor appearance (visibility and properties), rendering style • **Unique to each pane**: Camera orientation (zoom scale and rotation angle), viewport properties (background, grid, and so on) **Tip:** Navigation mode common to all viewport panes controls whether all panes of a given document use the same navigation mode. See *Application Preferences - Viewport*.
	2 Horizontal Panes	
	2 Vertical Panes	
	3 Panes - 1 Left & 2 Horizontal Right	
	3 Panes - 1 Right & 2 Horizontal Left	
	3 Panes - 1 Up & 2 Vertical Down	
	3 Panes - 1 Down & 2 Vertical Up	
	4 Panes	
	Show/Hide Vector View	Toggles display of the Technical Illustration workshop preview image if one has already been generated. When **ExternalVectorViewWindow** is enabled, vector images are displayed in Internet Explorer See *Application Preferences - Advanced Settings*. Otherwise, vector images appear in a viewport pane. **Note:** You must have at least two viewport panes displayed to see the vector view. **Tip:** Right-click the vector image to access Adobe SVG Viewer commands, such as zoom and save commands.
	Full Screen Mode	Expands the viewport to fill the computer screen. To exit full screen mode, click **Close Full Screen** or press **F11**.

Show/Hide Commands

Show/Hide commands let you show or hide Composer panes.

Command Name	Description
Assembly Tree	Shows or hides the Assembly tree. See *Assembly Pane*.
Collaboration Tree	Shows or hides the Collaboration tree. See *Collaboration Pane*.
BOM Tree	Shows or hides the BOM tree. See *BOM Pane*.
Views	Shows or hides the Views pane. See *Views Pane*.

Command Name	Description
Layers	Shows or hides the Layers pane. See *Layers Pane*.
Markers	Shows or hides the Markers pane. See *Markers Pane*.
Properties	Shows or hides the Properties pane. See *Properties Pane*.
Timeline	Shows or hides the timeline. See *Timeline*.
Workshops	Shows or hides the workshop pane. See *Working in Workshops*.
Information	Shows or hides the Information tab.

Window Commands

Windows commands let you organize viewport windows when you have multiple documents open.

Icon	Command Name	Description
	Switch Windows	Displays the **Windows** dialog box. See *Windows*.
	Cascade	Arranges documents in overlapping windows.
	Tile Horizontally	Arranges document windows one above the other.
	Tile Vertically	Arranges document windows side-by-side.

Help Menu

Help commands let you register the product, access product documentation, and manage your license.

The **Help** menu is located in the upper-right corner of the Composer window.

Icon	Command Name	Description
	Contextual Help	Opens this help system and displays the topic appropriate to your location in the application. **Tip:** You can also press **F1** to activate contextual help.
	Help Topics	Opens this help system at the top level.
	Getting Started Topics	Opens this help system at the Getting Started topics, which provide a quick overview of Composer capabilities.
	Programming Guide	Opens the *Composer Programming Guide*, which documents the Composer application programming interfaces (APIs) and command-line interface.
	Save Log File	Saves an XML file containing useful information for technical support such as product version, operating system, RAM, and last operations performed.
	About	Displays Composer version, copyright, and licensing information.

Working with the Left Panes

The upper-left pane contains the Assembly, Collaboration, and Views panes by default, but you can add other panes such as BOM and Markers. The lower-left pane contains the Properties and information panes by default. You can organize the left panes according to your needs or working habits.

Organizing the Left Panes

The upper-left pane contains the Assembly, Collaboration, and Views panes by default, but you can add other panes such as BOM and Markers. The lower-left pane contains the Properties and Collaboration panes by default. You can change what tabs are displayed, reorder and undock panes.

1. To change what tabs are displayed, click **Window** > **Show/Hide**, then the pane's name.
2. To reorder the panes, drag a tab to a new position on either the upper or lower pane.
3. To undock a pane (make it an independent window), drag a tab out of its pane.

Assembly Pane

The Assembly pane lets you view and manage the structure of your models.
You can also manage views, visibility, hotspots, and selection groups.

Toolbar Commands

Toolbar commands let you manage assemby and selection groups.

Tip: You can manage assembly/selection groups by dragging them from the pane.

Icon	Command Name	Description
	Assembly Selection Mode	Selects parent assembly nodes instead of leaf (geometry) nodes when you select actors in the assembly tree or viewport. In default mode (when assembly selection mode is not selected, also known as part selection mode), all geometry under your selection is selected.When in assembly selection mode, the viewport has a blue border. You can also select assemblies while in default mode as follows: • Press **Alt** while making a selection in the viewport. • After selecting an actor in the viewport, press the left arrow key. This selects the assembly that holds the selected actor. Continue to press the left or right arrow key to change your selection. Selection and highlighting colors depend on the selection mode. Choose colors from **Document Properties - Selection**. See *Selection*. Use assembly selection mode whenever possible to improve performance and to create more maintainable animations (because actors inherit assembly keys). For example, you have an assembly with 10,000 parts. To change the opacity of the entire assembly during an animation, enable assembly selection mode, select the assembly, and change the opacity. This creates one animation key. The alternative is to use default mode, select the assembly (which selects all 10,000 parts), and change the opacity. This creates 10,000 keys. The performance with one key is better than with 10,000 keys. In addition, if you add another part to the assembly, the assembly key applies to the new part automatically. You can also use assembly selection mode to implement compound motion, where actors move in more than one direction. A common example of compound motion is when you combine translation of an assembly of nuts or bolts with rotation of the individual nuts or bolts. This allows the nuts or bolts to rotate around their own axes while the entire group of nuts or bolts moves. **Note:** The properties available for an assembly might differ from the properties available for individual geometry actors.
	Show Actors with Kinematic Links Only	Lists in the Assembly tree only actors with kinematic links. See *Kinematic Commands*.
	Create Selection Set	Creates a selection set containing the selected actors. Selecting a selection set selects all actors in the set, and the Properties pane displays properties common to all actors in the set. Use selection sets to operate on the same actors repeatedly. Selection sets are listed in the Assembly pane. When you create a selection set, its name is selected so you can type a different name.
	Create Hotspot	Creates a hotspot containing the selected actors. Hotspots are groups of actors, similar to selection sets, with shared highlight, tooltip, and link properties that can supersede those of the individual actors. Although hotspots can be active in the viewport, their primary purpose is for defining custom hotspots in vector output (see *Hotspots Tab*). Hotspots can contain geometry actors and most collaborative actors (not ground, cutting planes, and other non-vectorizable actors). **Notes:** Hotspots are always listed in the Assembly pane, even when the hotspot contains collaborative actors. To create a hotspot: **1.** Select one or more actors. **2.** Click **Create Hotspot** . The new hotspot appears under **Hotspots** in the Assembly tree, and hotspot properties appear in the Properties pane. See *Properties*. **3.** Optionally type the hotspot name or press **Enter** to accept the default.

Icon	Command Name	Description
		4. Specify hotspot properties in the Properties pane.
	Sort Alphabetically	Sorts the tree by alphabetical order. By default, the actor order for SOLIDWORKSassemblies matches the CAD system.
	Configure Columns	Displays the **Configure Columns** dialog box, where you select columns to display. See *Configure Columns*.
	Search Actors	Displays the **Search** pane, where you can search for actors. See *Search*. Click ▾ to access the **Search Next Actor** and **Search Previous Actor** commands, which find the next or previous actor using the current search criteria.
	Select Actors	Displays the **Select** pane, where you can select actors using advanced capabilities. See *Select*.

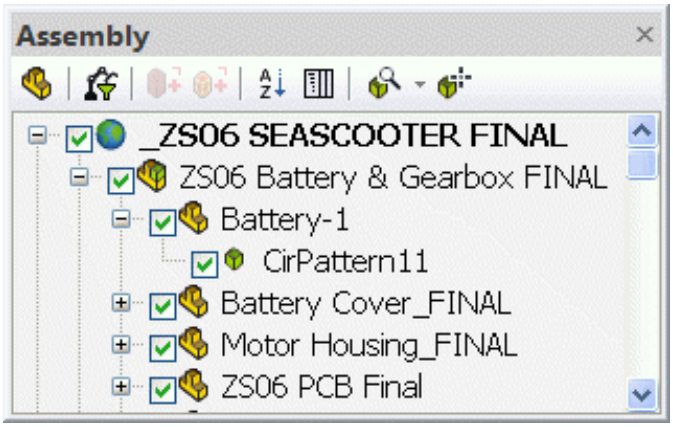
Assembly Tree Symbols

This section describes the symbols used in the assembly tree.

To show or hide an actor in the viewport, select ☑ or clear ☐ the check box next to the actor name.

The ▣ symbol indicates a node with children of mixed visibility.

You can also hide an actor in the viewport by selecting it and pressing **H**. Click an actor's name to select it. Right-click an actor to access functions such as copy, paste, and delete.

Symbol	Description
	The assembly root. **Note:** The root assembly node never displays ▣. To determine if the root node has mixed visibility, examine its children.
	Assemblies are yellow and green. For SOLIDWORKS and Pro/ENGINEER models only, Composer internally tags nodes it identifies as part or assembly nodes. Nodes that instantiate SOLIDWORKS `.sldpart`or Pro/ENGINEER `.prt` files are part nodes. Nodes that instantiate SOLIDWORKS `.sldasm` or Pro/ENGINEER `.asm` files are assembly nodes. For example, in the following assembly:  • **ZS06 Battery & Gearbox** is an assembly node. • **Battery-1** is a part node. • **CirPattern11** is a geometry node.

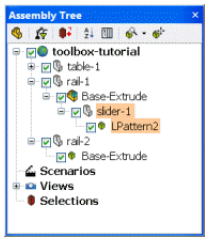
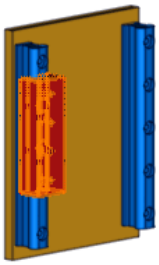
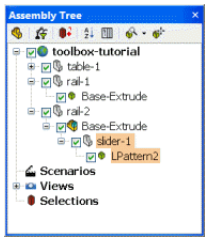
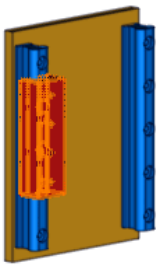
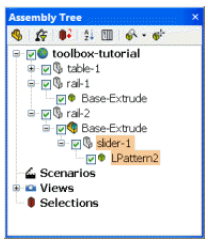
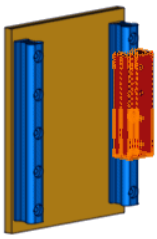
Symbol	Description
	Tip: You can generate BOM IDs based on node type. See *Main Area*.
	Parts (`.sldprt`, `.prt` files) are yellow. **Note:** For SOLIDWORKS models, the **Merge file into one actor per part** import option merges all part geometry and creates single nodes that are both part and geometry nodes. For other CAD formats, this option merges part geometry but creates part nodes with geometry nodes.
	Internal structures (such as geosets) and other groups are white.
	Geometry is green.
	Instances of geometry (the same geometry referenced in several positions of the model) are violet and have an 'x' overlay.
	Actors with kinematic links defined have a 'K' overlay.
	In fully shattered structures and projects, assembly and part nodes in product (`.smgXml+ .smgGeom`) format are displayed in red. For details about products and fully shattered structures, see *File Types*.
	Product nodes for which geometry is not loaded have an hourglass overlay. You can load product geometry by: • Right-clicking and clicking a **Products** command. • Double-clicking the icon. • When **Load on Visibility** is enabled, enabling actor visibility by clicking the check box. See *Visibility Commands*.
	Scenarios describes the animation of a set of actors. For details, see the *Animate Tab*.
	Views gives access to different view types: • **Views** - Lists Composer views, which is useful for switching views while the Assembly pane is active. For details about views, see *Views Pane*.
	Selection sets lists selection sets. Selecting a selection set selects all actors in the set, and the Properties pane displays properties common to all actors in the set. Use selection sets to operate on the same actors repeatedly.
	Hotspots lists hotspots. Hotspots are groups of actors, similar to selection sets, with shared highlight, tooltip, and link properties that can supersede those of the individual actors.

Right-click Commands

Right-click a part or assembly to display a context menu.

Right-click Command	Description
Create Assembly Group	Creates an assembly group. Use assembly groups to apply the same animation to multiple parts. You can create complex animations by animating individual parts and their parent assemblies during the same time period.
Create Dummy Actor	Creates actors without graphic representation. For example, create dummy actors for extra BOM table entries such as glue and tape.
Delete Empty Groups	Deletes groups containing no elements, such as parts with no geometry.
Cut Actors	Cuts the selected geometry actors. You can then **Paste** to change the actor locations in the assembly tree. **Note:** You can also copy, cut, and paste geometry actors using **Home** > **Cut/Paste** ribbon commands. See *Copy/Paste Commands*.

Right-click Command	Description
Copy Actors	Copies the selected geometry actors. You can then **Paste** to duplicate the actors in another location in the assembly tree.
Paste Actors	Pastes the previously copied geometry actors under the selected parent.
Paste Actors Keeping Relative Location in Parent	Pastes the previously copied geometry actors keeping relative locations in the parent. In this example, `slider-1` moves from `rail-1` to `rail-2`:

Before		
After **Cut Actors** and **Paste Actors**		
After **Cut Actors** and **Paste Actors Keeping Relative Location in Parent**		

Delete Actors	Deletes the selected actors. **Important:** Deleting an actor removes it from all views. Consider hiding instead of deleting actors.
Rename Actor	Renames the selected actor. **Note: Rename Actor** is unavailable when **DisableMatchingProperties** matches `Actor.Name`. See *Advanced Settings*.
Add Actors to Selection Set	(Available when you right-click a selection set.) Adds the selected actors to the selection set.
Remove Actors from Selection Set	(Available when you right-click an actor under a selection set.) Removes the selected actors from the selection set.
Delete Selection Set	(Available when you right-click a selection set.) Deletes the selected selection sets without affecting the actors in the sets.
Add Actors to Hotspot	(Available when you right-click a hotspot.) Adds the selected actors to the hotspot.
Remove Actors from Hotspot	(Available when you right-click an actor under a hotspot.) Removes the selected actors from the hotspot.

Right-click Command	Description
Delete Hotspot	(Available when you right-click a hotspot.) Deletes the selected hotspots without affecting the actors in the hotspot.
Product > **Open Product**	Opens a product (`.smgXml+ .smgGeom`) in a new document window. For example, use this command to change the neutral properties of a part in a fully shattered structure. You cannot change neutral properties when accessing the part from a fully shattered assembly because the part is only referenced by the assembly.
Product > **Add Products**	Adds products to the current project or fully-shattered assembly.
Product > **Export Product**	Saves the selected node as a product.
Product > **Load Products**	Loads product geometry. Nodes that are not loaded have hourglass overlays on their Assembly tree icons, such as .
Product > **Load Head Products**	Loads one level of geometry, not the entire product hierarchy.
Product > **Load Products (Choose LOD)**	Loads product geometry with the level of detail (LOD) you select from the **Level of Detail** dialog box. See *Level of Detail*. To change the LOD of a model that is already loaded, unload the product and reload using this command.
Product > **Unload Products**	Unloads product geometry. Use this command to reduce memory usage when you are no longer working with a part or subassembly.
Scenario > **Reload Scenario References**	Reloads referenced scenarios. For example, you can reload scenarios when referenced scenario files change while the model is open in Composer. A scenario describes the animation of a set of actors. For details, see *Animate Tab*.
Scenario > **Apply Scenario to Node**	Applies a scenario from the current or another project. For details, see *Add Child Scenario*.
Scenario > **Export Branch Scenario**	Saves the animations of the selected actors their children as a `.smgSce` file. The actor identifiers (GUIDs) start from the level where you initiate the export.
Scenario > **Delete Scenario**	Deletes the selected scenario.
Expand All	Displays all tree nodes.
Collapse All	Displays only top-level tree nodes.

BOM Pane

The BOM (bill of materials) pane shows the BOM tree, which lists geometry actors with their BOM IDs, quantities, and other properties and meta-properties.
The BOM tree defines what appears in the BOM table.

To display the BOM pane, click **Window** > **Show/Hide** > **BOM Tree**.

Notes:

- If the BOM tree is empty, create BOM IDs from the BOM Workshop. See *BOM Workshop*.
- To display the BOM table in the viewport, select **Home** > **Visibility** > **BOM Table** in the ribbon, or enable **Panels** > **BOM** in the Collaboration pane.

Tip: You can change the BOM **Description** by clicking a row in the BOM tree and pressing **F2** . This does not change the group/actor name.

Icon	Command Name	Description
	Show Visible Actors Only	Includes only visible actors in the BOM tree and BOM table. To include all actors, unselect this command. **Tip:** To define a default state for new documents, set **BOM.Filter** on the (Default) Document Properties - Advanced Properties page. See *Advanced Properties*.
	Save BOM Tree	Saves the BOM in XML, HTML, or CSV format.
	Configure BOM Columns	Displays the **Configure Columns** dialog box, where you select columns to display. See *Configure Columns*.
	Show/Hide BOM Workshop	Shows or hides the BOM Workshop, where you define and generate BOM IDs and callouts. See *BOM Workshop*. **Tip:** You can change BOM IDs from the Properties pane of a geometry actor.

Collaboration Pane

The Collaboration pane lists collaboration actors sorted by type.

Toolbar Commands

Toolbar commands let you manage assemby and selection groups.

Tip: You can manage assembly/selection groups by dragging them from the pane.

Icon	Command Name	Description
	Assembly Selection Mode	Selects parent assembly nodes instead of leaf (geometry) nodes when you select actors in the assembly tree or viewport. In default mode (when assembly selection mode is not selected, also known as part selection mode), all geometry under your selection is selected.When in assembly selection mode, the viewport has a blue border. You can also select assemblies while in default mode as follows: • Press **Alt** while making a selection in the viewport. • After selecting an actor in the viewport, press the left arrow key. This selects the assembly that holds the selected actor. Continue to press the left or right arrow key to change your selection. Selection and highlighting colors depend on the selection mode. Choose colors from **Document Properties - Selection**. See *Selection*. Use assembly selection mode whenever possible to improve performance and to create more maintainable animations (because actors inherit assembly keys). For example, you have an assembly with 10,000 parts. To change the opacity of the entire assembly during an animation, enable assembly selection mode, select the assembly, and change the opacity. This creates one animation key. The alternative is to use default mode, select the assembly (which selects all 10,000 parts), and change the opacity. This creates 10,000 keys. The performance with one key is better than with 10,000 keys. In addition, if you add another part to the assembly, the assembly key applies to the new part automatically. You can also use assembly selection mode to implement compound motion, where actors move in more than one direction. A common example of compound motion is when you combine translation of an assembly of nuts or bolts with rotation of the individual nuts or bolts. This allows the nuts or bolts to rotate around their own axes while the entire group of nuts or bolts moves. **Note:** The properties available for an assembly might differ from the properties available for individual geometry actors.
	Show Actors with Kinematic Links Only	Lists in the Assembly tree only actors with kinematic links. See *Kinematic Commands*.
	Create Selection Set	Creates a selection set containing the selected actors. Selecting a selection set selects all actors in the set, and the Properties pane displays properties common to all actors in the set. Use selection sets to operate on the same actors repeatedly. Selection sets are listed in the Assembly pane. When you create a selection set, its name is selected so you can type a different name.
	Create Hotspot	Creates a hotspot containing the selected actors. Hotspots are groups of actors, similar to selection sets, with shared highlight, tooltip, and link properties that can supersede those of the individual actors. Although hotspots can be active in the viewport, their primary purpose is for defining custom hotspots in vector output (see *Hotspots Tab*). Hotspots can contain geometry actors and most collaborative actors (not ground, cutting planes, and other non-vectorizable actors). **Notes:** Hotspots are always listed in the Assembly pane, even when the hotspot contains collaborative actors. To create a hotspot: 1. Select one or more actors. 2. Click **Create Hotspot**. The new hotspot appears under **Hotspots** in the Assembly tree, and hotspot properties appear in the Properties pane. See *Properties*. 3. Optionally type the hotspot name or press **Enter** to accept the default. 4. Specify hotspot properties in the Properties pane.

Icon	Command Name	Description
	Sort Alphabetically	Sorts the tree by alphabetical order. By default, the actor order for SOLIDWORKSassemblies matches the CAD system.
	Configure Columns	Displays the **Configure Columns** dialog box, where you select columns to display. See *Configure Columns*.
	Search Actors	Displays the **Search** pane, where you can search for actors. See *Search*. Click ▾ to access the **Search Next Actor** and **Search Previous Actor** commands, which find the next or previous actor using the current search criteria.
	Select Actors	Displays the **Select** pane, where you can select actors using advanced capabilities. See *Select*.

Collaboration Pane Icons

This section describes the icons used in the collaboration pane.

To show or hide an actor in the viewport, select or clear the check box next to the actor name.

Tip: You can also hide an actor in the viewport by selecting it and pressing **H**. Click an actor name to select the actor. Right-click an actor to access functions such as copy, paste, and delete.

Note: If a node has no actors, you cannot expand or select it.

Icon	Command Name	Description
	Annotations	Lists the scene annotations, such as labels and links. See *Annotations Commands*.
	Callouts	Lists callouts. You can create BOM IDs and callouts automatically from the BOM workshop. See *Annotations Commands* and *Definition Tab*.
	Cameras	Lists camera actors. Cameras let you view your scene from different perspectives. The `Camera` actor is defined by default and cannot be deleted. Create additional cameras with **Add Camera**.
	Coordinate systems	Lists user-defined coordinate systems. See *Measurements Commands*.
	Cutting planes	Lists cutting planes. See *Cutting Planes Commands*.
	Environment	Lists the following environment actors: • *Compass* • *Ground* **Note:** To select these actors (for example, to edit their properties in the Properties pane), click **Compass** or **Ground** in the Collaboration pane. You can also select these actors in the viewport by dragging a selection box, but only if they are the only actors selected.
	Intersection lines	Lists intersection lines saved from a clash test. See *Clearance Checking*.
	Lights	Lists lights. See *Lighting Commands*.
	Magnetic lines	Lists magnetic lines. See *Tools Commands*.
	Markups	Lists scene markup actors, such as arrows, redlines, circles, and polylines. See *Markups Commands*.
	Measurements	Lists scene measurement actors. See *Measurements Commands*.

Icon	Command Name	Description
	Panels	Lists 2D and 3D panels, including the BOM table. See *Panels Commands* and *BOM Workshop*.
	Paths	Lists associative and non-associative paths. See *Paths Commands*.
	Selection sets	Lists the selection sets containing at least one collaborative actor. See *Assembly Pane*.

Right-click Commands

Right-click group or actor to display a context menu.

Note: You can also copy, cut, and paste collaborative actors with **Ctrl+C**, **Ctrl+X**, and **Ctrl+V**, respectively. See *About Copy/Paste* for details.

Command Name	Description
Delete Actors	Deletes the selected actors. **Important:** Deleting an actor removes it from all views. Consider hiding instead of deleting actors. **Tip:** To delete all actors of the same type, right-click the parent node (such as **Annotations** or **Callouts**) and click **Delete Actors**.
Rename Actor	Renames the selected actor.
Add Actors to Selection Set	(Available when you right-click a selection set.) Adds the selected actors to the selection set.
Remove Actors from Selection Set	(Available when you right-click an actor under a selection set.) Removes the selected actors from the selection set.
Delete Selection Set	(Available when you right-click a selection set.) Deletes the selected selection sets.
Select Actors with Broken Associations	Selects all collaborative actors whose associated geometry actors have been deleted. For details about associativity, see *About Actors and Associativity*. For example, updating a Composer document with a CAD file with deleted geometry can result in collaborative actors, such as measurements and labels, with broken associations. Use this command to select these collaborative actors and then delete them or associate them with different geometry actors.
Expand All	Displays all tree nodes.
Collapse All	Displays only top-level tree nodes.

Layers Pane

The Layers pane lets you manage layers, which capture actor visibility (including).

Layers are views that capture actor visibility; actor invisibility is not captured. After each format conversion, Composer creates one layer that captures the native CAD visibility states.

To display the Layers pane, click **Window** > **Show/Hide** > **Layers**.

Toolbar Commands

Toolbar commands let you create and delete layers.

Icon	Command Name	Description
	Create Layer	Creates a layer.
	Delete Layers	Deletes the selected layers.

Right-Click Commands

Right-click a layer to display additional commands.

Note: To apply a layer to the current view, double-click the layer. You can also press **Space Bar** to display the next layer.

Icon	Command Name	Description
N/A	**Rename Layer**	Renames the selected layer.
	Delete Layers	Deletes the selected layers.
N/A	**Delete All Layers**	Deletes all user layers.

Markers Pane

The Markers pane lets you manage animation markers and milestones.

Use markers to flag significant points in your animation, and then control your animation using these markers. For example, you can play an animation until the next marker by defining a **playmarkersequence://** event link. See *Create and Handle Animation Markers*.

Create milestones to identify key moments in the timeline, and then use these milestones to produce a set of images illustrating the 3D scene at given moments in time. See *Create and Handle Milestones*.

To display the Markers pane, click **Window** > **Show/Hide** > **Markers**.

Note: The Markers pane is active in Animation mode only (not View mode).

Toolbar Commands

Toolbar commands let you manage markers and milestones.

Icon	Command Name	Description
	Create Marker	Creates a marker at the current timebar location. **Tip:** You can also create a marker by clicking in the marker bar of the timeline.
	Create Milestone	Creates a milestone at the current timebar location. **Tip:** You can also create a milestone by clicking in the marker bar of the timeline.
	Delete Markers	Deletes the selected markers or milestones.
	Previous Marker	Moves the timebar to the previous marker.
	Next Marker	Moves the timebar to the next marker.
	Play Until Previous Marker	Plays the animation backwards from the current timebar position to the previous marker.
	Play Until Next Marker	Plays the animation from the current timebar position to the next marker. You can also press **Space Bar** to play until the next marker.
	Show/Hide Milestones	Shows or hides all milestones in the Markers pane. Milestones remain visible in the Marker bar of the timeline.

Right-Click Commands

Right-click a marker to display additional commands.

Note: To move a marker in your animation, drag it in the timeline.

Icon	Command Name	Description
N/A	**Rename Marker**	Renames the selected marker.
	Delete Markers	Deletes the selected markers.

Icon	Command Name	Description
N/A	**Delete All Markers**	Deletes all markers.

Views Pane

The Views pane lets you manage the views of the active document.

To display the Views pane, click **Window** > **Show/Hide** > **Views**.

Toolbar Commands

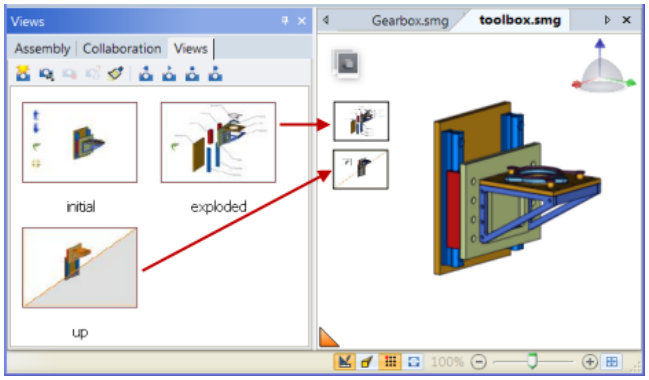
Toolbar commands let you manage views.

Icon	Command Name	Description
	Create View	Creates a view that captures the entire viewport state. This command is equivalent to creating a view in the Views workshop with all items captured (**Zoom fit all** and **BOM Description** settings do not matter). **Tip:** To change the order of views in the Views pane, drag a view to a new location.
	Create Camera View	Creates a custom view that captures camera position only. This command is equivalent to creating a view in the Views workshop with only **Camera** selected.
	Update View	Updates all captured items in the selected views using the current scene. This command is equivalent to updating a view in the Views workshop after clicking **Retrieve View Settings**. **Note:** Only the properties of visible objects are stored in views.
	Update Views with Selected Actors	Updates the selected views with all properties and visibility of the selected actors. This command is equivalent to updating views in the Views workshop with the following settings: • **Actors** • **Apply to**: **Current selection** • **Visibility** • **Properties**: **All** **Note:** Only the properties of visible objects are stored in views. **Tip:** To update views according to the changes performed on selected assemblies, first select **UpdateViewsWithSelectedAssemblies** in the **Advanced Properties** page (**Document Properties** dialog box).
	Create View Collection	Creates collections to organize views in the Views pane.
	Redraw All Views	Refreshes all view thumbnail images, which is useful after updating a model.
	Go to Previous View	Displays the previous view.
	Play Views	Displays views one by one. To stop, click **Stop Views** or press **Esc**.
	Stop Views	Stops playing views.
	Go to Next View	Displays the next view. You can also press **Space Bar** to display the next view.

Right-Click Commands

Right-click a view to display additional commands.

Icon	Command Name	Description
	Update View	See toolbar command.
	Update Views with Selected Actors	See toolbar command.
N/A	**Delete Unused Properties**	Removes all properties that duplicate the neutral (default) values from all normal views. This command does not affect custom views. Use this command before publishing documents to reduce file size and increase performance. **Notes:** Using this command during document development can affect view behavior. For example: **1.** Start with an actor with blue neutral color. Neutral properties are part of the actor definition and are not stored in view definitions. **2.** Make the actor red. **3.** Create a view. The view stores the non-neutral red color property. The neutral color is still blue. **4.** Set red as the neutral color (**Set as Neutral Properties** command). **5.** Right-click in the Views pane click **Delete Unused Properties**. Because the view's color property matches the neutral value (both red), the red property is deleted from the view definition. **6.** Make the actor green and set green as the neutral color, but do not update the view definition. **7.** Make the actor purple without updating the view definition. **8.** Activate the view (for example, drag it into the viewport), and click **No** when prompted to create a new view. The actor turns green because the view does not define a color to override the neutral value set in step 6. However, if you skip step 5, the actor turns red because the view captured the non-neutral red property in step 3.
N/A	**Add Collection**	Creates a new collection.
N/A	**Delete Collection**	Deletes the selected collection. When you delete a collection, all the views inside the collection are added to the collection above it.
N/A	**Rename Collection**	Renames the collection.
N/A	**Activate Collection**	Activates the collection. Any new view created through **Create View**, **Create Camera View**, or through the Views workshop is added to the active collection.
N/A	**Deactivate Collection**	Deactivates the collection. If any collection is deactivated, then the first collection is activated by default. There is always one active collection in the Views pane. **Note:** Deactivating a collection does not delete any views.
N/A	**Expand All**	Expands all collections.
N/A	**Collapse All**	Collapses all collections.
N/A	**Copy Views**	Copies the selected views, which you can then paste to create new views.
N/A	**Paste Views**	Pastes the previously copied views. **Note:** You cannot paste views outside of Composer.
N/A	**Merge Views**	Creates a new view by merging the selected views. If two views have the same properties with different values, the values of the first selected view are used. To create a new view by merging views, select two or more views, right-click the selection, and then click **Merge Views**. Merging normal and custom views follow the same rules.

Icon	Command Name	Description
		Tips: • You can also merge views by dragging one view onto another. When you drag **View A** onto **View B**, **View B** is renamed **View B + View A**. • Use empty views as a starting point for creating merged views.
	Create Empty View	Creates a blank view to use as a starting point for merging views. Create an empty view and then drag views onto the empty view.
	Delete Views	Deletes the selected views.
N/A	**Delete All Views**	Deletes all views.
N/A	**Rename View**	Renames the selected view.
N/A	**Export Views**	Exports the selected views to a `.smgView` file for reuse in other projects.
N/A	**Import Views**	Imports views into the active document. Actor identification is based on GUIDs (as specified by `Ident` in the `.smgView` file). In the Import Views dialog box, select **Force resolution** to match with some portion of the GUID. For example, if the a view GUID is a.b.c, you can apply it to the sub-product "c" only.
N/A	**Lock Views**	Locks the selected views. You cannot modify the View properties if the view is locked.
N/A	**Unlock Views**	Unlocks the selected views.
N/A	**Go to View**	Displays the selected view in the viewport. **Tip:** You can also go to a view by double-clicking it or dragging it into the viewport.
N/A	**Create Image 2D Panel**	Creates thumbnail images linked to the selected views by creating Image 2D panels with `view://` event links. Panels are placed in the upper-left corner of the viewport or paper space. To update the panel image when the view changes, select the panel and click **Update** in the High Resolution Image workshop. See *High Resolution Image Workshop*. To specify a completely different image, change the panel's **Map path** property (Properties pane). **Tip:** You can also create an Image 2D panel by **Ctrl**+dragging a view into the viewport. 
N/A	**Create Link to View**	Links the selected actors to the selected view by creating `view://` event links. **Tip:** You can also link to a view by **Ctrl**+dragging a view onto an actor.

Icon	Command Name	Description
	View Mode	Switches between view and animation modes. **Tip:** You can also change modes by clicking the icon in the upper-left corner of the viewport.
N/A	**Enlarge Thumbnails**	Makes the view thumbnails larger. You can also press + to enlarge thumbnails.
N/A	**Reduce Thumbnails**	Makes the view thumbnails smaller. You can also press - to reduce thumbnails.

Properties Pane

The Properties pane lets you view and edit properties of selected actors, such as color, opacity, and font.

To display the Properties pane, click **Window** > **Show/Hide** > **Properties**.

Icon	Command Name	Description
	Sort by Category	Sorts properties by category.
	Sort Alphabetically	Sorts properties alphabetically.
	Set as Neutral Properties	Sets the values of selected properties as the new neutral values. If no properties are selected, sets all current property values as neutral.
	Restore Neutral Properties	Restores the neutral properties for all selected properties. If no properties are selected, restores all neutral property values.
	Repeat Last Property Change	Applies the last property change to the current selection. For example, to apply the same opacity to multiple actors, you can change an actor's opacity and then select a different actor and click this command.
	Copy Appearance Properties	Copies the following properties between actors: • All actors: **Color**, **Opacity**, **Texture** • Geometry actors: **Shininess**, **Emission**, **Environment effect** • Collaborative actors: All appearance properties, including **Attach**, **Font**, **Border**, **Shape**, and **Background**.
	Manage Meta-Properties	Adds or removes CAD metadata or user-defined properties to the selection, such as revision notes and author. You can apply meta-properties to parts or assemblies. See *Meta-Properties*.

Information Pane

The Information pane offers an easy-to-read default format for viewing the meta-properties of selected actors. You cannot modify meta-properties in this pane (as they are for information purposes only), but you can customize what is displayed and how it is displayed.

To display the Information pane, click **Window** > **Show/Hide** > **Information**.

To customize the display of the **Information** pane according to your needs, use the Composer API. For more information, see the *Composer Programming Guide: Application Programming Interfaces: Composer API: Application: Methods* and *Composer Programming Guide: Application Programming Interfaces: Composer Player API: Application: Methods*. Also see the example for using the Information panel provided in the *Composer Programming Guide*.

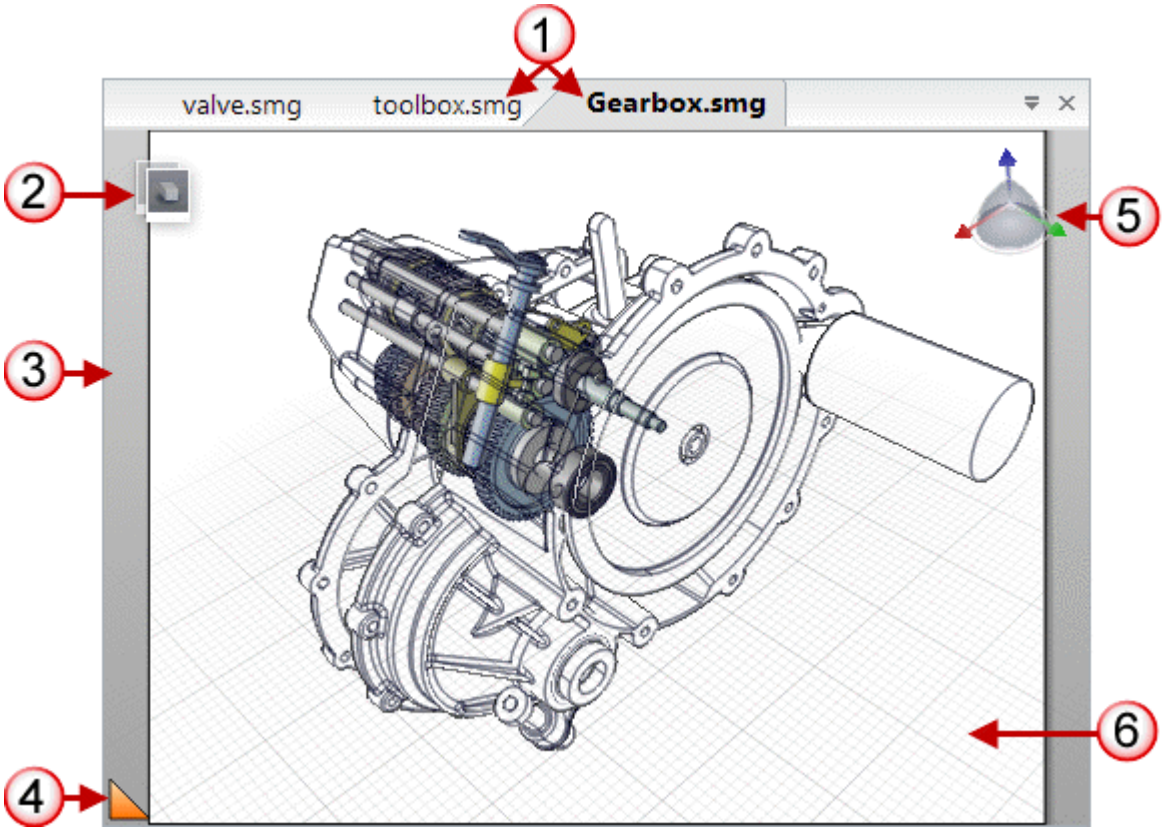
Navigating the Viewport

The viewport is the main Composer pane. It displays the 3D scene, which is the stage for all Composer actors (geometry, collaboration, camera, lighting, and so on).

About the Viewport

The viewport is the main Composer pane. It displays the 3D scene, which is the stage for all Composer actors (geometry, collaboration, camera, lighting, and so on).

The viewport lets you visualize one or more models in the same window or in separate windows using the multi-document interface with document tabs.



Number	Viewport Element	Description
1	Document Tabs	The Composer multi-document interface lets you open multiple documents in separate tabs. To activate a document, click its tab. If the tab is hidden, click **Active Files** (upper-right corner of the viewport) and select a document. **Tips:** • You can also select and organize document windows from the Window ribbon tab. See *Window Tab*. • Right-click a tab to **Save** or **Close** a document, or to **Cascade** your document windows.

Number	Viewport Element	Description
2	Mode Icon	Indicates the Composer working mode. To switch modes, click the icon. **View mode** Displays snapshots of the viewport. Changes to actor properties and position do not affect animations. For details about views, see *Views Pane*. **Animation mode** Displays scene animations.Changes to actor properties and position occur at the time indicated by the timebar in the Timeline. For details about animations, see *Timeline*.
3	Paper Space	Paper space shows how your scene fits on paper of a specified size. Dark gray areas indicate viewport space outside the paper margins. Select the paper size from *(Default) Document Properties - Paper Space*. Commands to display and navigate the paper space are located on the status bar. See *Status Bar* and *Displaying and Navigating the Paper Space*.
4	Active Viewport Pane	The orange triangle indicates the active viewport pane, which is useful when you have multiple panes. See *Window Tab*.
5	Compass	The compass lets you select standard orthographic camera views. The red, green, and blue axes indicate the X, Y, and Z directions, respectively. Clicking faces or axes of the compass rotates the viewport camera to that location: left, right, front, back, top, bottom.As you rotate, the compass rotates as well. The compass is listed under Environment in the Collaboration pane. See *Collaboration Pane*. You can change compass properties in the Properties pane. See *Compass Properties*.
6	Ground	The ground actor enhances your 3D scene by providing a reference plane for your model. You can augment the ground with a grid, mirror, or shadows. The ground actor is listed under Environment in the Collaboration pane. You can change ground properties in the Properties pane or manipulate the ground in the viewport by selecting it and dragging its handles. See *Ground Properties*.

Navigating the Viewport

You can navigate the viewport using the mouse.

For details about navigation, see *Navigate Commands*.

Note: SpaceMouse Enterprise™ from 3Dconnexion® can be used, in addition to the mouse, to perform graphic manipulations (zoom, pan, rotate, etc.) with use of the SpaceMouse™ driver only.

Use the following mouse buttons to navigate the viewport.

Mouse Button	Description
Left-click	Selects an actor. To add to the selection, **Ctrl+click** additional actors. To toggle a selection, **Shift+click** an actor.
Right-click	Rotates the camera. Clicking a geometry actor and dragging rotates the camera around the clicked point. Otherwise, rotation is around the center of the viewport. You can also rotate the camera by pressing **Shift+arrow keys**. • To rotate freely, without respect to the orientation of the vertical axis, press **Ctrl** while dragging. • To rotate the view point from which you observe the model, press **Shift** while dragging. • To roll about the clicked point or center of the viewport, press **Alt** while dragging. You can also roll the camera by pressing **Alt+arrow keys**.
Wheel scroll	Zooms the model in or out by moving the camera. The zoom focal point is the mouse pointer location. To zoom the paper space, press **Ctrl** while zooming.
Wheel-click	Pans the camera. You can also pan the camera by pressing **Ctrl+arrow keys**. To pan the paper space, press **Ctrl** while panning.

Displaying and Navigating the Paper Space

The paper space lets you paper margins in the viewport. You can display the paper space and navigate it.

1. In the status bar, click **Show/Hide Paper** .

   The paper space is displayed in the viewport.

2. To navigate the paper space, perform either of the following:

To...	Do this...
Zoom the paper space	• In the viewport, press **Ctrl** while rolling the mouse wheel. • Or in the status bar, drag the **Zoom Paper** slider or click or .
Pan the paper space	Press **Ctrl** while panning the viewport.
Reset the paper space	• Click **Fit Paper to Viewport** in the status bar. • Or double-click in the viewport outside the paper space.

Working in Workshops

The Workshops pane provide access to Composer feature sets, called workshops.

Working in Workshops

You can use workshops to create different output formats and perform other operations.

To display the Workshops pane, perform either of the following operations:

- Click **Window** > **Show/Hide** > **Workshops**.
- Click a workshop on the Workshops tab.

Animation Library Workshop

The Animation Library workshop lets you create simple animations quickly, using a library of pre-defined, generic animations.

Animations you create in the Animation Library are captured on the timeline.

To display this workshop, click **Workshops** > **Publishing** > **Animation Library** > .

Select an actor, then the animation to apply to it, and then click **Create**.

Templates

This area lets you specify which animation template to use for the selected actor or actors.

Command Name	Description
Group	Specifies the group of animation templates in which to select an animation. Pre-defined groups are **Highlight** and **Motion**. If some custom groups of animation templates are available in your animation library (on your Composer user profile), they are listed here. See *Custom Animations*.
Animation	Specifies the animation to use (from the selected group of animation templates). For pre-defined groups, available animations are: • For the **Highlight** group: **Enhance**, **Focus**, **Validated**, **Warning**. • For the **Motion** group: **Install**, **Remove**, **Roll**, **Screw**, **Unscrew**, **Untighten**.
Create	Creates the animation for the selected actors. Make sure that you have edited the animation properties, if required, before clicking this button.
Update Motion	Updates the properties of a single animation block currently selected in the timeline.
Update Selection	Updates the properties of a single animation block currently selected in the timeline. Use this command to add actors to, delete actors from, or replace actors in the step/pre-defined motion.

Properties

For each motion of the animation, you can define camera properties, and customize motion properties.

Camera Properties

You can create camera keys in animation blocks, at the start and end of the step. This is helpful to define the behavior of the camera throughout the step.

Notes:

- You can update the camera properties of an existing animation block that has no camera keys, after selecting the corresponding step on the timeline.
- Camera properties can be only be applied to a single animation block at once. These options are disabled when several steps are selected in the timeline.

Camera Centering Mode	Description
Auto Centering	Inserts camera keys at the start and at the end of the step. Throughout the step, the camera remains centered according to the actors involved in the step, zooming in or out to take into account the entire motion. This ensures that the entire motion remains visible at all times throughout the step. If you later modify the step in such a way that it has an impact on the camera, the camera keys will be updated accordingly. **Note:** This mode only influences the zoom factor. The camera orientation does not change.
Manual Centering	Inserts camera keys at the start and at the end of the step, based on the orientation and zoom factor of the camera on the viewport. Throughout the step, you are free to change this orientation and zoom factor.
None (No Centering)	No camera keys are created. **Note:** If you select this mode for a step with existing camera keys, they are removed.

Motion Properties

An animation is composed of different motions. This area lets you customize the properties of each motion of the selected animation. All motion properties have a start time, an end-time, and other parameters.

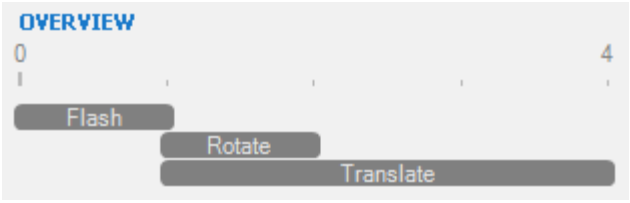
Note: The properties listed below are all existing properties. All motions have different properties, and therefore, the available properties depend on the animation you selected.

Motion Property Category	Parameters (other than Start Time and End Time)
DisplayImage: Displays an image in the viewport, at a specified location.	• **Top**: Distance of image from the top of the viewport • **Left**: Distance of image from the left of the viewport • **Size**: Image size (with locked aspect ratio) • **Picture**: Image path
DisplayText: Displays a text panel in the viewport, at a specified location.	• **Top**: Distance of image from the top of the viewport • **Left**: Distance of image from the left of the viewport • **Text**: Text to display • **Font Size**: Size of the font to use for the text • **Font Family**: Family of the font to use for the text • **Font Color**: Color of the font to use for the text • **Background Color**: Color to use in the text background
Flash: Highlights selected actors.	• **Color**: Color to use when flashing (can be set to Undefined) • **Intensity**: Intensity of the emission • **Repetition**: Number of times to flash
Rotate: Rotates selected actors.	• **Axis (X, Y, Z)**: Rotation axis. Instead of entering the values, you can click **Pick** to select the position in the viewport. You can use Alt to pick the center of an axis, and Shift to revert the picked axis.

Motion Property Category	Parameters (other than Start Time and End Time)
	• **Angle**: Rotation angle
Scale: Re-scales selected actors from the pivot origin.	• **Scale Ratio**: Scale ratio of selected actor • **Repetition**: Number of times to apply scale ratio to selected actor **Notes:** - The pivot definition must not be animated in the time. Define the pivot of the object at time 0, before the step. - The step can be applied on a selection of actors. The selected actors must not have any parenting relation (otherwise, if a child actor and its parent actor are both animated by a Scale or Translate motion, the child actor will move twice, once throught its parent's motion, once through its own motion).
SetColor: Changes the color of the selected actors.	• **Color**: Color of selected actor during animation (can be set to Undefined)
SetTransparency: Changes the opacity of the selected actors.	• **Transparency**: Opacity of selected actor during animation
Transform: Moves the selected actors freely.	• **Position (X, Y, Z)**: Final position of selected actor. Instead of entering the values, you can click **Pick** to select the position in the viewport. You can use Alt to pick the center of an axis, and Shift to revert the picked axis.
Translate: Translates the selected actors.	• **Axis (X, Y, Z)**: Translation axis, that is the normalized vector along which the translation is applied. Click **Pick Axis** to select the axis in the 3D. Click **Pick Point** to select a point in the 3D. This calculates a vector in the world coordinate system, between this point and the origin of the pivot of the selected actor or actors. **Notes:** - If several actors are selected, and if all actors have the same origin, then the common pivot origin is used. Otherwise, the center of the bounding box is used. - The pivot definition must not be animated in the time. Define the pivot of the object at time 0, before the step. - The step can be applied on a selection of actors. The selected actors must not have any parenting relation (otherwise, if a child actor and its parent actor are both animated by a Scale or Translate motion, the child actor will move twice, once throught its parent's motion, once through its own motion). • **Distance**: Translation distance

Overview

Provides a graphical overview of the chronology of motions in the animation, and of the global duration of the animation.


OVERVIEW
0
4
Flash
Rotate
Translate

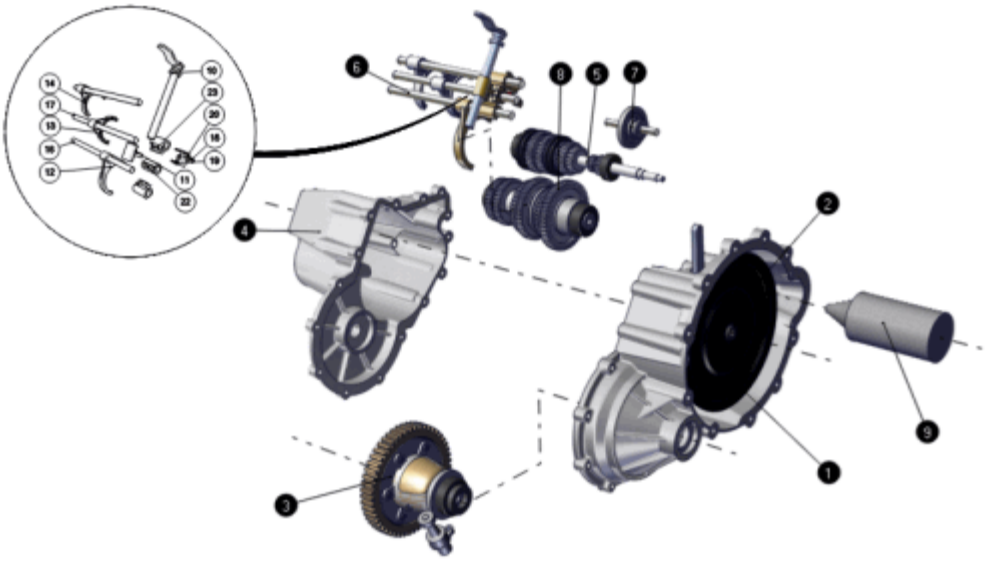
BOM Workshop

The BOM workshop lets you manage the bill of materials (BOM) list and table. A BOM is a list of parts, which is an essential part of the design and manufacture of most products.

To display this workshop, click **Workshops** > **Publishing** > **BOM** > .

Main Area

The main area of the BOM workshop lets you store settings using profiles, manage BOM IDs, callouts and options.



Description	BOM Id	Qty
clutch	1	1
Clutch Case	2	1
differential	3	1
Gear box	4	1
main shaft	5	1

Description	BOM Id	Qty
mechanism	6	1
reverse shaft	7	1
second shaft	8	1
Starter(rough)	9	1

Profile

Profiles store your settings for future use. For details, see *About Profiles for Workshop Settings*.

BOM IDs

Icon	Command Name	Description
N/A	**Apply to**	Specifies the scope for generating or resetting BOM IDs: • **Visible geometry** - Generates or resets IDs for all geometry (geometry nodes in the *Assembly tree*) visible in the viewport. • **Selection** - Generates or resets IDs for the selected geometry, parts, or assemblies. **Tip:** Use the *Select pane* to select actors based on level in the assembly. • **All geometry** - Generates or resets IDs for all geometry. • **Visible parts** - Generates or resets IDs for all parts (part nodes in the Assembly tree) visible in the viewport.

Icon	Command Name	Description
		• **All parts** - Generates or resets IDs for all parts.
	Generate BOM IDs	Creates BOM IDs for the selected **Apply to** scope. Set appropriate **Definition** and **BOM ID Format** options before generating BOM IDs.
	Reset BOM IDs	Deletes BOM IDs for the selected **Apply to** scope.
N/A	**Assign Manually**	Lets you assign BOM IDs manually. To assign IDs: **1.** Set appropriate **Definition** and **BOM ID Format** options. **2.** Click **Assign Manually**. **3.** Click callouts or geometry actors in the viewport. **4.** Press **Esc** to stop making assignments.

Callouts

Icon	Command Name	Description
	Create Callouts	Creates callouts for the selected actors. Set appropriate **Callouts** options before creating callouts. **Note:** When no callouts exist, the BOM table has entries for all geometry actors with BOM IDs. When callouts exist, the BOM table contains only actors with callouts. To display all actors regardless of callout status, create callouts for all actors and set callout opacity to 0 (transparent) for callouts you want hidden.
	Delete Visible Callouts	Deletes all visible callouts.

Options

Tab Name	Description
Definition	See *Definition*.
BOM ID Format	See *BOM ID Format*.
Callouts	See *Callouts*.

BOM and Callout Visibility

Icon	Command Name	Description
	Show/Hide BOM Table	Toggles visibility of the BOM table in the model. You can also display the BOM table by selecting **Home** > **Visibility** > **BOM Table** in the ribbon or enabling **Panels** > **BOM** in the Collaboration pane. **Note:** At least one BOM ID must be assigned for the BOM table to appear in the viewport.
	Show/Hide Callouts	Toggles visibility of all callouts in the model.

Definition Tab

The Definition tab lets you specify how BOM IDs are assigned to geometry actors.

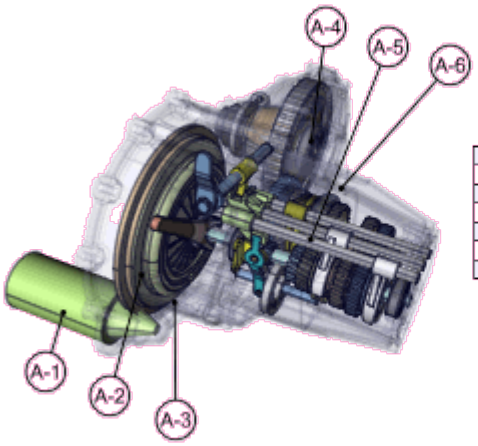
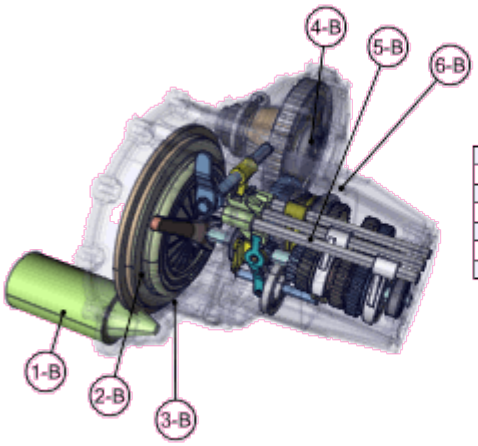
Command Name	Description
Parent level	Specifies whether to create the BOM description from the actor itself (level 0) or from a parent.
Property name	Specifies the property (**Label** or **Name**) or meta-property used as the BOM description.
Compare property	Assigns the same BOM ID to actors by comparing **Property name** values. Select one or more options: • **Skip characters from right** - Ignores the specified number of characters when comparing property values. For example, specify 2 to match Bolt-A1 and Bolt-B1. • **Ignore numerical suffix** - Ignores number suffixes when comparing property values. For example, select this option to match Bolt-11 and Bolt-456. • **Match case** - Considers case when comparing property values.
Compare geometry	Assigns the same BOM ID to actors by comparing geometry (meshing). Select one of the following: • **Exact** - Actors match if they have the same number of triangles, if those triangles have the same index, and if the meshing points fit. Two actors that come from the same CAD or are copies are always exact matches. • **By similarity** - Actors can have different meshings so meshing points are not compared. Choose from **low** to **high** matching criteria. Select **Check coordinate system** to also check the point coordinates.
Assign unique BOM IDs	Assigns unique IDs to all actors. Each BOM ID has a quantity (**Qty**) of one (1).

BOM ID Format Tab

The BOM ID Format tab lets you define BOM ID naming rules.

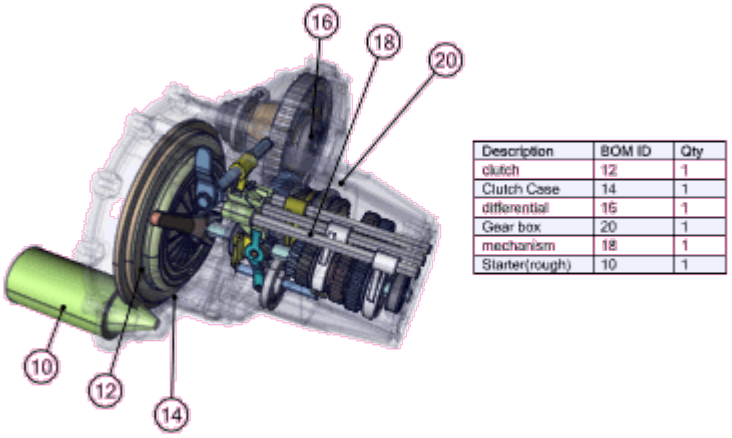
These rules are obeyed when you generate BOM IDs automatically (**Generate BOM IDs**) or manually (**Assign Manually**).

Tip: To create grouped (nested) BOM numbering, use the **Select Actors** command to select different parent/child levels, then generate BOM IDs on the current selection using different prefix, start, and increment values. See *Select Pane*.

Command Name	Description
Prefix	Defines a BOM ID prefix. Specify any combination of alphabetic, numeric, or other characters.  **Prefix** = A-
Suffix	Defines a BOM ID suffix. Specify any combination of alphabetic, numeric, or other characters.  **Suffix** = -B
Data type	Defines the BOM ID data format: **Numeric** (1, 2, ...) or **Alphabetic** (A, B, ..., Z, AA, AB, ...).
Start	Defines the first BOM ID value. Specify a number when **Data type** is **Numeric** or a letter when **Data type** is **Alphabetic**.

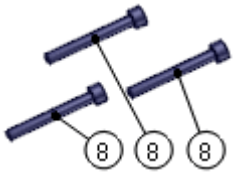
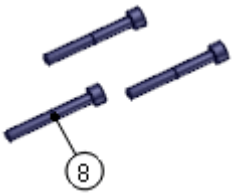
Description	BOM ID	Qty
clutch	A-2	1
Clutch Case	A-3	1
differential	A-4	1
Gear box	A-6	1
mechanism	A-5	1
Starter(rough)	A-1	1

Description	BOM ID	Qty
clutch	2-B	1
Clutch Case	3-B	1
differential	4-B	1
Gear box	6-B	1
mechanism	5-B	1
Starter(rough)	1-B	1

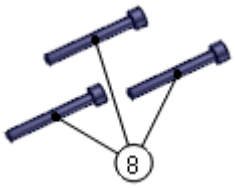
Command Name	Description
Increment	Defines the step value.  Description | BOM ID | Qty clutch | 12 | 1 Clutch Case | 14 | 1 differential | 15 | 1 Gear box | 20 | 1 mechanism | 18 | 1 Starter(rough) | 10 | 1 **Start** = 10, **Increment** = 2

Callouts Tab

The Callouts tab lets you define how BOM callouts are created.

Command Name	Description
Create	Specifies how callouts are generated: • **One callout per instance** - Creates one callout per actor.  • **One callout per BOM ID** - Creates one callout for all actors with the same BOM ID. The annotation is anchored on the first actor with this BOM ID.  • **One multi-callout per BOM ID** - Creates one callout linked to all actors by a line.

Command Name	Description

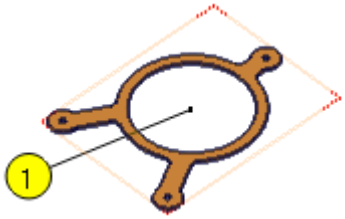


Note: The BOM workshop is the only way to create callouts on assemblies. (You can create part callouts with the **Callout** command. See *Annotations Commands*.) By default, assembly callouts are black and part callouts are white.

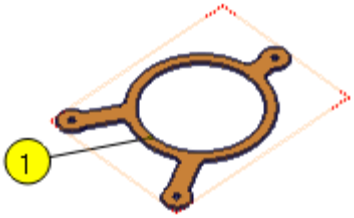
Tip: Set callout alignment with the **Auto alignment** callout property (Properties pane). Many arrangements are supported, such as perimetric, circle, and left.

Attach point Specifies where callouts attach to actors:

- **Center of the bounding box** - The callout attach point need not touch the actor.



- **Closest point to the center** - The callout attach point is on the actor at the closest point to the center of the bounding box.



Clearance Checking Workshop

The Clearance Checking workshop performs static clash detection, clearance checking, and minimal distance tests.

Use this workshop to qualify service and assembly procedures.

To display this workshop, click **Workshops** > **Geometry** > **Clearance Checking** > .

Note: This workshop requires a Composer Check license.

Working set

The working set lets you specify which actors participate in the test.

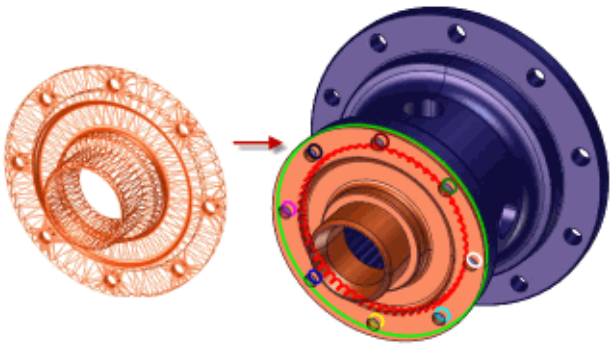
Note: **Working set** selections are not saved in profiles.

Command Name	Description
Working set	Specifies which actors participate in the test. • **Check selection** - Checks only actors in the current selection, selection set, or hotspot. • **Selection versus all** - Checks actors in the current selection, selection set, or hotspot against all other actors. • **Selection 1 versus Selection 2** - Checks actors in the current selection, selection set, or hotspot against the actors in another selection.

Working mode

These options specify the clearance checking scope.

In this illustration, both **On visible actors only** and **Full check** are selected.



Command Name	Description
On visible actors only	Tests visible actors only. When cleared, performs tests on all actors.

Command Name	Description
Full check	Analyzes clashes for all triangles of the selection so that all intersection lines can be calculated. When cleared, clash detection stops as soon as two triangles collide. **Note: Full check** is time and memory intensive.

Control type

Control type lets you specify which test to perform.

Command Name	Description
Control type	Specifies which test to perform: • **Clash test** - Identifies intersections and contacts between selected geometry actors taking into account the difference between CAD models and the geometry. Some displayed intersections might be contacts based on the precision on the models. The value of the precision is the chordal error (see *Refinement*). • **Clearance checking** - Runs the analysis using the specified minimal distance between actors. The analysis detects pairs of collided actors (closer than the minimal distance). • **Minimal distance** - Calculates the minimal distance between various actors. The analysis identifies the actors in collision and the pair of closest actors in the selection. Precision lets you set the determination step between intersections and contacts. This value is computed according to your model quality settings (see *Refinement*): a higher quality setting increases precision, a lower one decreases it.

Report

These options are available with the clearance report.

Icon	Command Name	Description
	Compute	Performs the selected test.
	Save Results	Saves results in XML, HTML, Excel, or CSV format.
	Load Results	Loads a previously saved file of clearance results to avoid recalculating.
	View/Hide Result	Displays or hides results.
	Show Selected Result Only with Ghost	Ghosts the selected results.
	Build Collaboration	Creates intersection-line collaborative actors for the selected results. See also **Multi-line building**.
	Clear All	Clears the clearance checking session.
	Multi-line building	Creates an intersection-line collaborative actor for each intersection between two actors. To create one intersection line with all intersections between actors, clear this option.
	Result Columns	Displays the contacts and intersections. Click a result to see the actors in the scene. Right-click a result and click **Fill data** to add comments or select a **Status** (**Undefined**, **Relevant**, or **Irrelevant**).

Filters Workshop

The Filters workshop lets you locate geometry and collaborative actors based on their properties.

To display this workshop, click **Workshops** > **Properties** > **Filters** .

Note: You cannot use the *Text pane* to specify string property values. You can embed property values by typing property keywords or by copying keywords generated by the Text pane.

Tips: To find actors according to:

- their type (measurements, labels, geometry, and so on): use the **ClassName** property with string operators.
- their netGUID (or GUID): use the NetGUID property with string operators and regular expression.

Filters are saved as profiles. For details, see *Profiles*.

Filtering Commands

The following table describes the filtering commands available in the Filters workshop.

Icon	Command Name	Description
N/A	**Filter**	Defines the filter scope: • **Selection** - Filters the **Current** selection, or a predefined selection set or hotspot. • **Visible actors** _ Searches visible geometry actors only. • **All actors** - Searches all actors in the open document.
	Select Matching Actors	Selects matching actors in the current view.
	Show Matching Actors	Shows matching actors only.
	Show Matching Actors and Ghost Others	Shows matching actors and displays all other actors in ghost mode.
	Sort by Category	Sorts properties by category.
	Sort Alphabetically	Sorts properties alphabetically.
	Show Filter Properties Only	Shows only properties defined in the current filter.
	Show Filter and Selection Properties	Shows all properties from the current filter and the current selection.
	Show All Properties	Shows all properties available through filters.
∩	**Intersection Operator**	Enables intersection matching mode (AND operator). Actors must match *all* of the specified filter properties.
∪	**Union Operator**	Enables union matching mode (OR operator). Actors can match *any* of the specified filter properties.

Icon	Command Name	Description
	Duplicate Selected Operators	Duplicates the selected operator to add filtering criteria on the same property. For example, to search for actors with either of 2 colors, select the **Color [Actor]** property and click **Duplicate Selected Operators**. You now have 2 **Color [Actor]** properties you can set.
	Case Sensitive Mode	Distinguishes between uppercase (capital) and lowercase letters. **Note:** This mode is a user setting and is not stored in filter profiles. To include case-sensitive expressions in filter profiles, use the ≡ and ≢ operators.

Filtering Operators

The following table describes the filtering operators which are available.

Operator	Numeric	Description	Case Sensitivity
∃	n/a	Checks if the destination exists. Used in paths or links only.	Operating-system dependent
∄	n/a	Checks if the destination does not exist. Used in paths or links only.	Operating-system dependent
=	equal	equal	Obeys **Case Sensitive Mode**
≠	not equal	not equal	Obeys **Case Sensitive Mode**
<	less than	less than	Obeys **Case Sensitive Mode**
≤	less than or equal to	less than or equal to	Obeys **Case Sensitive Mode**
>	greater than	greater than	Obeys **Case Sensitive Mode**
≥	greater than or equal to	greater than or equal to	Obeys **Case Sensitive Mode**
≡	n/a	equal (case sensitive)	Case sensitive
≢	n/a	not equal (case sensitive)	Case sensitive
contains	n/a	contains a substring	Obeys **Case Sensitive Mode**
wildcard expr.	n/a	The search string is a wildcard expression. The wildcard character (*) matches any string. For example, *PN65* searches for any string containing "PN65".	Obeys **Case Sensitive Mode**
reg. expr.	n/a	Checks a regular expression. For more information about regular expressions, see *Reference Information: Regular Expression Syntax* .	Obeys **Case Sensitive Mode**
is used	Valid for any property type. It checks that the property is available for an actor, for example, to find all the actors containing certain meta-properties.		n/a

Getting Started Workshop

The Getting Started workshop lets you open Composer Help, release notes, recently used files, and sample models.

To display this workshop, click **Workshops** > **Start** > **Getting Started** .

Command Name	Description
Help	Click an item in this list to display: • the Help Topics • the Getting Started • the Release Notes
Open	Click an item in this list to open: • a recently-used file • another file • a sample • a model **Note:** Clicking a file under **Open** opens the file and dismisses the Workshops pane.

High Resolution Image Workshop

The High Resolution Image workshop lets you generate high resolution raster images (BMP, JPEG, TIFF, PNG) of your scene.

To display this workshop, click **Workshops >Publishing >High Resolution Image** .

Raster images are made up of pixels, with each pixel assigned a color, position, and opacity (when using alpha channels). Raster images have the following advantages over vector images:

- They accurately show subtle changes in lighting, shading, and coloring.
- You can control the DPI (Dots Per Inch).

However, unlike vector graphics images, raster images lose quality when scaled, and you cannot edit the objects that make up the image. This workshop generates high resolution raster images up to 8000x8000 pixels. Image resolution describes the amount of image detail. Higher resolution has more detail but produces larger files.

Note: The High Resolution Image workshop applies on-demand rendering effects, such as depth of field and shadows, when generating image files and detail views. If you do not want these effects, turn them off before generating workshop output.

Main Area

The main area of the High Resolution workshop lets you store settings using profiles and manage high resolution.

Profile

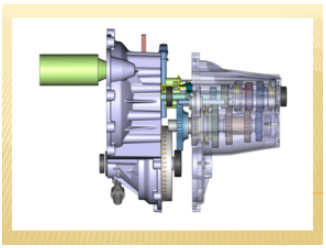
Profiles store your settings for future use. For details, see *About Profiles for Workshop Settings*.

High resolution

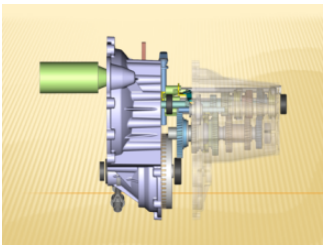
Command Name	Description
Detail view	(Available when **High resolution** is selected.) Defines a portion of your scene to save as an image file or to capture as an Image 2D panel. 1. Select **Detail view**. The **Image area** crop box appears in the viewport. 2. Move or resize the image area as needed. **Tip:** To change the image shape, modify **Shape** (Properties pane). 3. To limit the image to specific actors, select one or more actors. When no actors are selected, the image will contain everything within the image area. **Tip:** To resize the image area to fit selected actors, click (upper-right corner of the image area). You can also select actors before clicking **Detail view** to fit the image area to the selection. 4. To change the image resolution, specify **Pixels** or **DPI** on the High Resolution tab. 5. Do one of the following:

Command Name	Description
	• To save the image area to a file, click **Save As** . • To create an Image 2D panel, click **Create** . **Note:** You cannot control the zoom of the detail view. You can resize the panel after it is created, but scaling a raster image affects image quality. To create a detail view Image 2D panel with zoom, use Digger. See *Digger Commands* **6.** To dismiss the image area, click (upper-right corner of the image area) or clear **Detail view**.
Create	(Available when **Detail view** is selected.) Creates the detail view and adds it to the 3D scene as an Image 2D panel.
Update	(Available when **Detail view** is cleared and an Image 2D detail view is selected in the viewport.) Updates one or more detail views with changes in your 3D scene or different detail view options.
Preview	(Available when **Detail view** is cleared and no Image 2D panel is selected.) Generates a JPEG preview image using your current workshop settings and displays it in your computer's JPEG-viewer application.
Save As	Saves the active viewport pane (or a portion of it when **Detail view** is selected) as a raster image using the current workshop settings. In the Save As dialog box, choose from the following formats: • Bitmap (.bmp) • Jpeg (.jpg, .jpeg, .jpe) • Tiff (.tif, .tiff) • **Png (.png)** When generating BMP, TIFF, or PNG images with **Alpha channel** selected, images are 32 bits (24-bit true color + 8-bit alpha). Otherwise, images are 24 bits (true color). **Important:** When creating one image file, **File name** in the **Save As** dialog box specifies the file name. When creating multiple images (animations or views), see *Multiple Tab* for naming convention details. The **Save As** dialog box does not consider multiple-image file naming when checking for existing files. Use caution to avoid overwriting files unintentionally. **Tip:** Before saving your image, you can click **Preview** to validate your workshop settings.
High resolution	Enables high resolution image generation. Set options from the *High Resolution Tab* tab. When cleared, generates a standard image. Standard images use the viewport resolution, like a copy/paste of the image to the clipboard.
Anti-aliasing	Enables anti-aliasing. Set options from the *Anti-Aliasing Tab*.
Alpha channel	Generates images with transparent backgrounds by including an alpha channel. Alpha channels simplify image compositing but increases file size. When selected, saved images are 32 bits (24-bit true color + 8-bit alpha). When cleared, images are 24 bits. In this example, images are inserted into a PowerPoint slide:

Command Name	Description



Alpha channel disabled



Alpha channel enabled

Notes:

- This option applies to PNG, TIFF, and BMP images. JPEG does not support alpha channels.
- When generating images with **Alpha channel** and **Anti-aliasing** selected but without Hardware anti-aliasing, text 2D panels are not anti-aliased. See *High quality rendering / On demand*.

High Resolution Tab

The High Resolution tab lets you set high-resolution image options such as size and quality.

Notes:

- The **High resolution** option must be enabled.
- Higher resolution images produce larger files.

Command Name	Description
Pixels	Specifies width and height in pixels of the output image (or the detail-view image when **Detail view** is selected). To specify image size, specify values for two of the following: **Pixels**, **DPI**, and **Size (mm)**. Composer computes the third set of values. Under **Auto**, select the computed property. When **Use document's paper** is selected, **Size (mm)** is always **Auto** and set to the paper size (or the detail-view size when **Detail view** is selected). To maintain the document's paper-space ratio, which ensures proper scaling of your scene, you can specify only **Width** or **Height** (not both) depending on **Aspect ratio**.
DPI	Specifies width and height in Dots Per Inch (DPI) of the output image (or the detail-view image when **Detail view** is selected). The DPI is the number of dots of ink on a printed page or pixels on a computer screen in a linear one-inch space.
Size (mm)	(Available when **Use document's paper** is cleared.) Specifies width and height in millimeters of the output image (or the detail-view image when **Detail view** is selected). When **Use document's paper** is selected, **Size (mm)** is the paper-space size (or the image-area size when **Detail view** is selected).
Aspect ratio	Specifies whether **Width** or **Height** is editable. The other value is calculated based on the paper-space height-to-width ratio (or the image-area height-to-width ratio when **Detail view** is selected).
Use document's paper	Defines **Size (mm)** as the document paper-space size (or the image-area size when **Detail view** is selected). To specify a different size while maintaining the paper-space aspect ratio, clear this option.
Remove ground	Removes the ground (if displayed) from the output image.
White background	Sets the background to white in the output image.

JPEG settings

When generating JPEG images, you can control image quality and file size. Higher quality images produce larger files.

Command Name	Description
Quality	Specifies the output image quality. Move the slider to select from low to high quality.
Desired file size (KB)	Specifies the desired image file size in kilobytes (KB). Composer adjusts the quality as needed. To see the actual file size, click **Compute**.
Compute	Calculates the output file size in KB.

Anti-Aliasing Tab

Anti-aliasing smooths rough edges (jaggies) to give the appearance of higher resolution by taking into account how much an ideal edge overlaps adjacent pixels.

Command Name	Description
Anti-Aliasing	Specifies the anti-aliasing technique: • **Jittering** - The jittering method is higher quality but takes too long for real-time rendering. Use jittering for single image generation when high quality is required. • **Multisample** - Multisample anti-aliasing (MSAA) is a technique used in computer graphics to improve image quality.
Number of passes	(Available when **Jittering** is selected.) Specifies the number of internal renderings made to create the effect. More passes take longer to perform but produce better results.
Radius	(Available when **Jittering** is selected.) Specifies the portion of a scene that appears sharp. The image becomes blurred as you move away from the focal point. The higher the value, the larger the depth of field (less blur).

Multiple Tab

The Multiple tab lets you generate multiple high resolution raster images from your animation, views, or both.

Note: The **High resolution** option must be enabled.

Command Name	Description
Animation	Creates multiple images from an animation. Specify the image frequency as one of the following: • Frames between two images • Images per second Image files are named `<filename>`_anim `<n><type><` , where: • `<filename>` is the file name you specify in the **Save As** dialog box (when you click **Save As**). • `<n>` is the image index based on the frequency and range you specify. For example, when you specify 30 images per second starting at 5 seconds, the image indexes are 150, 151, and so on. • `<type>` is the format extension, as determined by **Save as type** in the **Save As** dialog box.
Range	(Available when **Animation** is selected.) Specifies the animation segment to capture: • **All** - The entire animation • **Selection** - The selected timeline segment

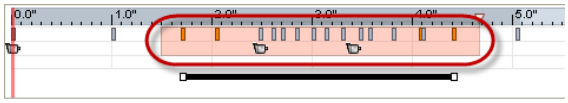
Command Name	Description
	 • **Seconds** - The specified range in seconds
Markers	Creates one image per marker in the timeline.
Milestones	Creates one image per milestone in the timeline.
Views	Creates images for all views (see *Views pane*). To create images for the current view only, clear this option.
360° Capture	Captures a defined number of images of the model along a vertical axis performing a 360° clockwise rotation. The vertical axis determines the orientation of the camera. The vertical axis used in the one defined in the viewport properties (see *Viewport Properties*). • If Z is defined as the vertical axis, then the rotation plane will be XY. • If Y is defined as the vertical axis, then the rotation plane will be XZ. • If X is defined as the vertical axis, then the rotation plane will be YZ. Enter the number of images you want to capture along the 360° path in the **Number of Images** box.
File-name template	(Available when **Markers**, **Milestones**, **Views**, or **360° Capture** is selected.) Specifies the naming convention for image files. You can specify valid file-name characters and the following case-sensitive keywords: `%filename%` The file name specified by **File name** in the **Save As** dialog box. `%viewname%` The view name, as listed in the Views pane. **Note:** Not applicable to **360° Capture**. `%markername%` The marker name, as listed in the timeline and in the Markers pane. **Note:** Not applicable to **360° Capture**. `%index%` A counter from 1 to the number of views. Index values have the same number of characters (1-9, 01-99, 001-999) for all files created. `%collectionname%` The collection name, as listed in the Views pane. `%collectionindex%` The collection index, as listed in the Views pane. For example, when **File-name template** is `%filename%_%index%` and you specify `Gearbox` in the **Save As** dialog box, the resulting file names for a document with three views are: `Gearbox_1.*`, `Gearbox_2.*`, `Gearbox_3.*` (where `.*` is the format extension). **Notes:** • The **Save As** dialog box does not consider **File-name template** when checking for existing files. Use caution to avoid overwriting files unintentionally. • Do not specify file-name extensions in **File-name template**. Extensions are determined by **Save as type** in the **Save As** dialog box. • When **File-name template** does not contain `%filename%`, **File name** in the **Save As** dialog box is still required but is not used in the file names. • When **File-name template** is blank: - files generated from markers are named `%filename%_%markername%`. - files generated from milestones are named `%filename%_view`. - files generated from views are named `%filename%_%viewname%`. **Tip:** Click **?** at the right of the **File-name template** box to display a tooltip listing available keywords.

Image Library Workshop

The Image Library contains images from which you can create image 2D panels.
See *Panels Commands*.

For example, use the screwdriver images to illustrate assembly and disassembly operations.

You can also navigate to folders containing your own images from the Image Library.

Note: The size of the image depends on the size of the paper space. Consequently, images imported from the image library always keep the same size, independently of the size of the Composer window.

Interactive Collision Detection Workshop

The Interactive Collision Detection workshop checks whether actors collide with other actors during an animation or when moving a selection.

To display this workshop, click **Workshops** > **Interactive Collision Detection** > .

Collisions represent serviceability issues that should be corrected. For example, a collision results when a bolt cannot be removed from an assembly because the access hole is misaligned.

Note: This workshop requires a Composer Check license.

Working set

The working set lets you specify which actors participate in the test.

Command Name	Description
Selection 1	Specifies the moving actors: • **Current** - The current selection • **Moving** - An animation's moving actors • *Selection set* - A named selection set or hotspot
Selection 2	Specifies the actors for which to detect collisions: • **All** - All other actors (not in **Selection 1**) • **Current** - The current selection • **None** • *Selection set* - A named selection set or hotspot
Auto clash in Selection 1	Detects if the current selection already contains collided actors.
On visible actors only	Runs the analysis on visible actors only.

Geometrical transformation

Compute or clear the geometrical transformation.

Command Name	Description
Compute	Performs a precalculation to accelerate future calculations. You must precalculate before activating interactive collision detection.
Clear	Removes the precalculation from memory.

Run application

Activate or stop interactive collision detection.

Command Name	Description
Activate	Activates interactive collision detection. You must perform a precalculation (click **Compute**) before you can activate interactive collision detection. Once activated, run the animation to check for collisions.

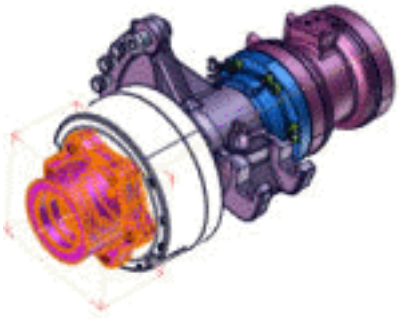
Command Name	Description
Stop	Disables interactive collision detection.

Display mode

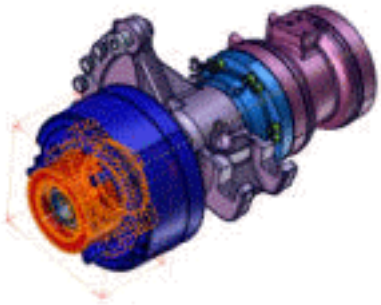
These options let you control the display mode for collisions.

Command Name	Description
Display mode	Specifies how collisions are displayed:

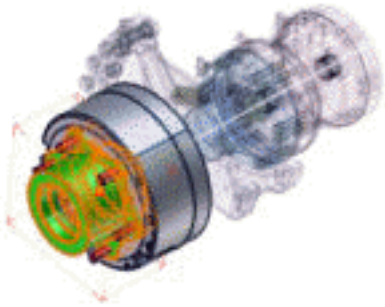
- Lite - Collided parts are illuminated.



- Color - Collided parts are red (Selection 1) and blue (Selection 2).



- Ghost - Collided parts are displayed. Other parts are displayed in ghost mode.

Command Name	Description
	
Stop if clash	Stops the displacement when a clash occurs during an animation or when the selection is moved in displacement mode. Kinematic conditions are considered.
Zoom in clash	(Available when **Stop if clash** is selected.) Stops the animation and zooms to the clash area when a clash occurs.

Model Browser Workshop

The Model Browser lets you browse the file system for Composer files.

To display this workshop, click **Workshops>Start>Model Browser** .

You can:

- Double-click a model or drag it to the left pane to open it.
- Drag a model to the viewport to merge it with the current view.

Tip: The **Choose a Sample** link in the Getting Started workshop displays the Composer samples folder (`<install_dir>\Samples`) in the Model Browser. Among other samples, 3D tools are available for you to include in your experience. Some of these tools come with a set of predefined views to facilitate their use.

Simplification Workshop

Simplification reduces the size and improves the graphical performance of your models.

Simplification Workshop

Simplification reduces the size and improves the graphical performance of your models.

Important: You cannot undo simplifications once you click **Apply All Modifications**.

To display this workshop, click **Workshops** > **Geometry** > **Simplification** .

Main Area

The main area of the Simplification workshop lets you store settings using profiles and manage high resolution.

Profile

Profiles store your settings for future use. For details, see *About Profiles for Workshop Settings*.

Command Name	Description
Reinitialize	Resets the model to the beginning state (before decimation or occlusion). **Note:** Not applicable to clones detection.
Refresh	Displays the decimation or occlusion results in the model. Composer updates the model automatically when you perform decimation or occlusion, so refreshing manually is generally not required. **Note:** Not applicable to clones detection.
Apply All Modifications	Permanently applies decimation or occlusion results to your model. **Important:** You cannot undo simplifications once you click **Apply All Modifications**. **Note:** Not applicable to clones detection.
Analyze	Specifies the scope for simplification: • **Visible actors** • **Selection** • **All actors** The progress bar showsdecimation or occlusionanalysis progress. **Note:** Not applicable to clones detection.

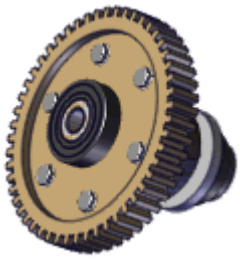
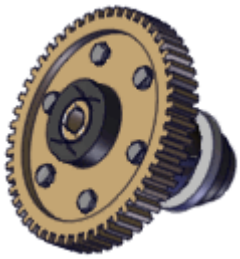
Decimation Tab

Decimation reduces the number of triangles in the model, which in most cases (but not always) ends up in reducing file size.

Decimation degrades model geometry, but small amounts of decimation can typically be applied with altering the visual quality.

Note: Decimation removes tessellation vertices without affecting accuracy. To protect your document by moving vertices, which affects model accuracy, use **3D Secure Brush** or the **Reduce accuracy** option. See *Secure 3D Brush* and *Security*.

Important: You cannot undo simplifications once you click **Apply All Modifications**.

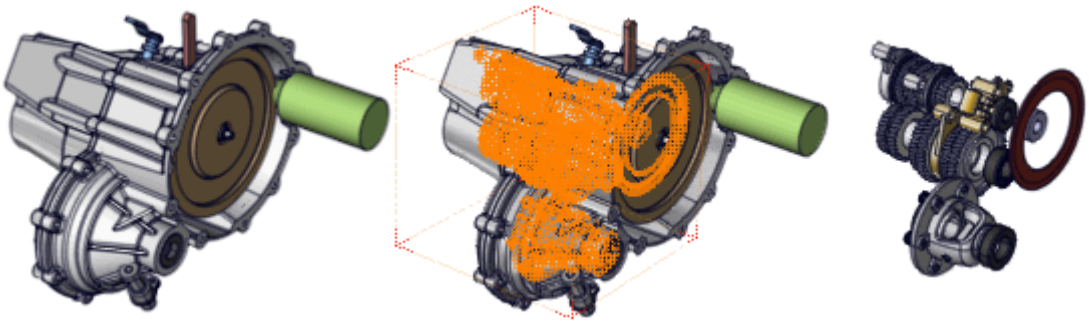
		
Original Model File Size: 180 KB	50% Reduction File Size: 90 KB	90% Reduction File Size: 18 KB

Command Name	Description
Prepare decimation	Calculates the initial display state of all actors. For large models, this can take considerable time. Once initialized, applying different decimation scenarios is relatively fast. **Note:** If you do not click **Initialize** before running a decimation, initialization is performed automatically.
Distribution function	Specifies how to simplify the model: • **Constant** (constant distribution) - Applies the same reduction ratio to each actor. • **Cost** (cost repartition) - Applies the reduction ratio to actors in the scene differently to reduce fine details first. This method generally gives better visual results.
Reduction slider	Specifies what percent of the total number of triangles should remain after decimation. For example, if your model has 100,000 triangles and you specify 70%, the result is 70,000 triangles. When you change the percentage, the scene updates with the effect of the decimation (see **Auto refresh**) and **Expected size** updates to show the anticipated resulting file size. Choose a reduction percentage that balances model quality and file size. **Note:** The requested (reduced) and total number of triangles appear under **Statistics**. **Tip:** You can selectively decimate portions of your model to retain detail for some parts while reducing detail for others. Before specifying the reduction percentage , select parts in your model and select **Selection** for **Analyze**.
Auto refresh	Updates the scene with decimation modifications in real time as you drag the reduction slider. When this option is cleared, the scene updates only when you drop the slider. **Note:** If auto-refresh calculation time is excessive, the scene updates only when you drop the slider.
Expected size	Shows the expected file size after decimating by the selected reduction percentage. You can also type a desired file size and press **Enter**. Composer applies the reduction percentage required to come close to your requested file size.

Occlusion Tab

Occlusion removes parts from the model based on size or whether the parts are internal and therefore not visible.

Important: You cannot undo simplifications once you click **Apply All Modifications**.



Original Model

Internal Parts Detected

Command Name	Description
Remove small parts	Removes parts smaller than the specified percentage of the total scene size. The calculation uses the volume of a bounding box, not the actual part volume. For example, if you specify 10%, only parts that fit in a bounding box that is 10% of the entire scene are removed.
Remove internal parts	Removes parts that are internal and therefore not visible.
Apply to	(Available when **Remove internal parts** is selected.) Runs occlusion on: • **Current viewport** • **Views** • **Animation** • **All** **Note:** Actors with opacity, displacement, or texture-with-transparency property keys are not considered for occlusion.
3D	(Available when **Remove internal parts** is selected.) Performs occlusion on the 3D model. Snapshots are taken from different points of view. For animation mode, snapshots are taken along the camera animation. Select one of the following: • **Speed** - Uses fewer camera positions resulting in faster computation. • **Quality** - Uses more camera positions. To perform occlusion on the 2D view, clear this option.
Cut triangles	(Available when **Remove internal parts** is selected.) Runs occlusion on actor triangles instead of actors. After analysis, you can remove hidden triangles. Outlines remain visible until the file is reopened.
Compute and Select	Performs the occlusion calculation and selects all actors that satisfy your criteria. Use the following icons to control the results: **Select Less/Occluded Actors** **Hide Less/Occluded Actors** **Show Only Less/Occluded Actors** **Back to Original State** **Remove Less/Occluded Actors**

Clones Detection Tab

Clone detection identifies parts with identical or similar geometry and converts duplicate geometries to instances (references). Clone detection reduces file size.

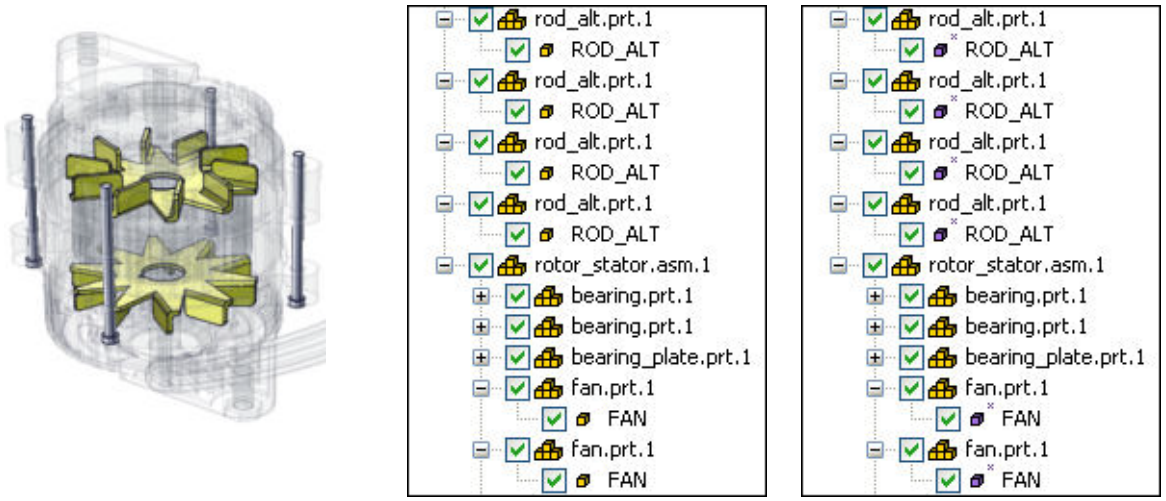
You can also initiate clone detection from **Geometry** > **Geometry** > **Detect Clones**.

For many file formats, Composer automatically detects clones during import:

- For SOLIDWORKS files, the **Detect Clones** algorithm is applied during file import.
- For other CAD formats and 3DXML, clone detection occurs only when the input files contain instance definitions.
- For non-CAD formats, clone detection does not occur during import.

When clone detection does not occur automatically during import, use the **Simplification - Clones Detection** workshop (or **Detect Clones** command). However, there are cases where clones cannot be detected. See *Clones Detection Example*.

In the following example, the two fans and four rods start as separate parts. After clone detection, they are instances ( ) of the same part.



Before After

Command Name	Description
Exact	Specifies that only identical geometries are clones. **Note:** Because clone detection checks both geometry and coordinate systems, identical geometries with different coordinate systems are not considered clones. The coordinate system checked is the one used to create the part.
By similarity	Specifies that similar but not identical geometries are clones. Select from **low** to **high** similarity.
Compute	Applies clone detection. **Important:** You cannot undo clone detection once applied.

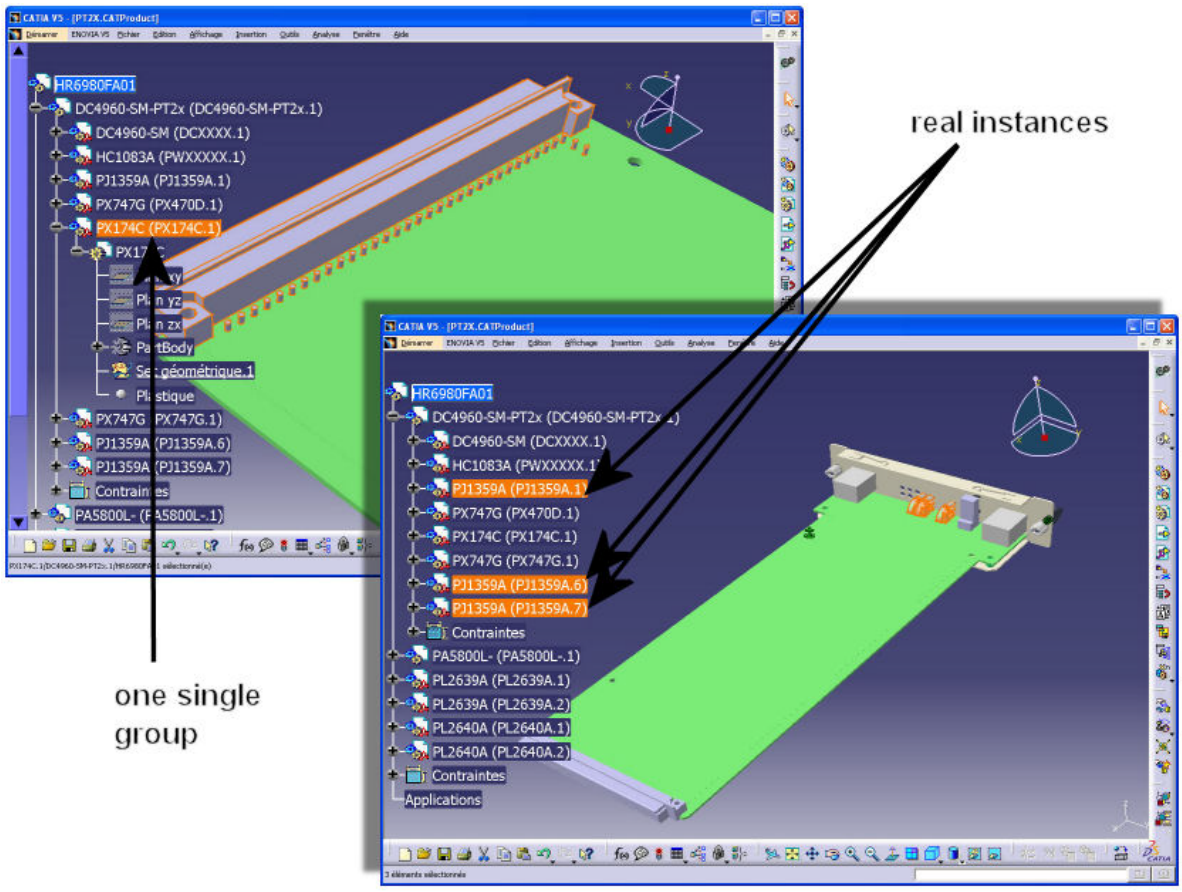
Statistics

The statistics at the bottom of the Simplification pane show how much reduction you have achieved.

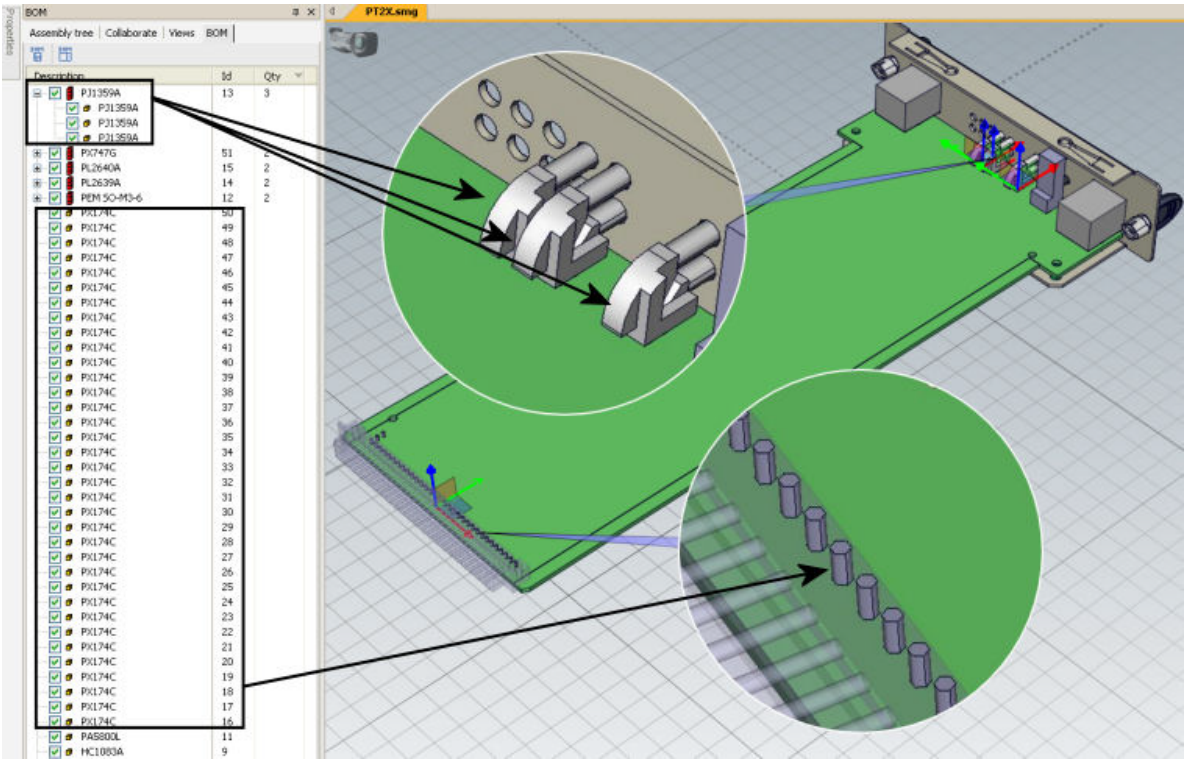
Command Name	Description
Total reduction ratio	Shows the amount of reduction achieved using the Decimation tab. 100% indicates no reduction.
Number of triangles	Shows the number of triangles used to display the actors. Composer renders all actors as a number of triangles (also called polygons).
Number of selected parts	Shows the number of geometry actors participating in the analysis, which is based on your **Analyze** selection.
Number of small/occluded	Shows the number of actors found using the Occlusion tab.

Clones Detection Example

This example illustrates why clones cannot always be detected.



PX174C is a CATPart that includes all the small pins. By contrast, PJ1359A is a CATPart referenced at different places in the main product. So point coordinates on the local coordinate system do not change.



When imported, Composer detects clones for PJ1359A (BOM ID 13) but not for all PX174C. The BOM workshop can detect that all PX174C have the same geometry if **Check coordinates system** is cleared. But instances are not created. An easy way to check is to add coordinate systems. Apply a coordinate system on each PJ1359A but just one for all PX174C.

Styles Workshop

The Styles workshop lets you create and manage styles.
Styles are sets of property definitions you apply to actors to easily implement consistent appearances and behaviors.

To display this work shop, click **Workshop** > **Properties** > **Styles** or **Styles** > **Show/Hide Styles Workshop** . You can subscribe actors to styles so that all subscribed actors update automatically when a style changes . For example, you can define a style to format all labels with blue background and red text. You can then automatically subscribe new label actors to this style or selectively apply the style as needed. Every style has a **Family** property that associates the style with an actor type. For example, to make a style for arrows, set **Family** to **Markups**. To make a style available for all actor types, set **Family** to **Generic**. Each actor family can have its own default style, which is applied by default to new actors in that family. When a family does not have a default style, the default **Generic** style is applied.

Notes:

- Use the Styles tab to view the style gallery, apply styles to actors, and subscribe actors to styles.
- Actor properties defined by styles are listed in the Properties pane in categories named **Style (subscribed): *style_name*** and are read-only. To change a subscribed property, you must change the style in the Styles workshop or unsubscribe the actor from the style.
- When no other styles are set as defaults, all actors use the **_Default Style** style . This style calls the built-in **Default style** style but can be modified by editing `< install_dir>\bin\_Default Style.smgStyleSet`.
- You cannot use the Text pane to specify string property values in the Styles workshop. You can embed property values by typing property keywords or by copying keywords generated by the Text pane.

Styles are saved as profiles. For details, see *Profiles*.

Icon	Command Name	Description
	Set as Default	Sets the current style as the default for the actor family specified by the **Family** property.
	Unset as Default	Clears the current style as the default for the actor family specified by the **Family** property.
	Unset All Defaults	Clears all style defaults.
	Refresh Previews	Updates the style preview images (as displayed on the Styles tab) by reloading the style image files, or when files do not exist, recalculating the previews based on style definitions.
	Sort by Category	Sorts properties by category.
	Sort Alphabetically	Sorts properties alphabetically.
	Show Style Properties Only	Lists only properties defined in the current style.
	Show Style and Selection Properties	Lists all properties from the current style and the current actor selection.
	Show All Properties	Lists all Composer properties.

Icon	Command Name	Description
	Real Time Refresh	Updates subscribed actors automatically as you make style changes. Clear this option when refresh performance is slow due to many subscriptions. When cleared: • Click **Refresh Scene** or **Refresh Entire Scene** to see style changes. • In the Properties pane, an asterisk (*) follows the style name: **Style (subscribed): *style_name****
	Refresh Scene	Updates the viewport with style changes made during this session when **Real Time Refresh** is cleared.
	Refresh Entire Scene	Updates the viewport with all style changes, including changes by other users (in other sessions) since the model was loaded.

Technical Illustration Workshop

The Technical Illustration workshop lets you create and publish vectorized images of your scene.

To display this workshop, click **Workshops** > **Publishing** > **Technical Illustration** > .

Vector graphics images portray images using shapes such as lines, polygons, and text. Vector images have advantages over raster images:

- You can scale images to any size without losing resolution.
- You can edit the objects that make up the image.

Unlike raster images, vector images are not suitable for showing subtle changes in lighting, shading, and coloring, and you cannot control the dots per inch (DPI).

Note: If your vector output contains unwanted gaps, try increasing model tesselation quality by reducing **Geometry compression** and reimporting your CAD files. See *[Default] Documentation Properties - Output*.

Main Area

The main area of the Technical Illustration workshop lets you store settings using profiles, manage vectorization, options, BOM and callout visibility.

Profile

Profiles store your settings for future use. For details, see *About Profiles for Workshop Settings*.

Vectorization

Command Name	Description
Detail view	Defines a portion of your scene to save as an image file or to capture as a Vector Image 2D panel. **1.** Select **Detail view**. The **Image area** crop box appears in the viewport. **2.** Move or resize the image area as needed. **Tip:** To change the image area shape, modify **Shape** (Properties pane). **3.** To limit the image to specific actors, select one or more actors. When no actors are selected, the image will contain everything within the image area. **Tip:** To resize the image area to fit selected actors, click (upper-right corner of the image area). You can also select actors before clicking **Detail view** to fit the image area to the selection. **4.** Do one of the following: • To save the image area to a file, click **Save As** . • To create a Vector Image 2D panel, click **Create** .

Command Name	Description
	5. To dismiss the image area, click (upper-right corner of the image area) or clear **Detail view**.
Create	(Available when **Detail view** is selected.) Creates a detail view and adds it to the 3D scene as a Vector image 2D panel.
Preview	(Available when **Detail view** is cleared and no Vector image 2D panel is selected.) Generates an SVG preview image using your current workshop settings and displays it in your Web browser (when the **ExternalVectorViewWindow** advanced property is selected - see *Advanced Settings*) or Composer. You can resize the Composer preview pane by dragging the viewport splitter bar. **Note:** **ExternalVectorViewWindow** is ignored on 64-bit operating systems. SVG previews are always displayed in Internet Explorer.
Update	(Available when **Detail view** is cleared and a Vector Image 2D detail view is selected in the viewport.) Updates one or more detail views with changes in your 3D scene or different detail view options. **Note:** Detail views are not updated with changes in camera orientation and actor visibility.
Save As	Saves the active viewport pane (or a portion of it when **Detail view** is selected) as a vector image using the current workshop settings. In the Save Vectorization As dialog box, choose from the following formats: • **SVG (.svg)** (Scalable Vector Graphics) - An XML format for describing two-dimensional vector graphics. **Tip:** If the SVG file is too large, you can convert it into the SVGZ compressed format using a standard file compression tool. • **EPS (.eps)** (Encapsulated PostScript) - A format commonly used to transfer images between applications. **Notes:** - When opening an EPS file in another application, users might need to substitute fonts referenced by the file with available PostScript fonts. - EPS files do not support transparency. Transparent features appear as opaque in EPS files. - EPS files do not support unicode text. • **CGM (.cgm)** (Computer Graphics Metafile)- A file format defined by ISO/IEC 8632 for 2D vector graphics, raster graphics, and text. **Tip:** Before saving your image, you can click **Preview** to validate your workshop settings.
Lines	Enables lines in vector output. Set options on the *Lines Tab* tab. **Note:** Clearing **Lines**, **Color regions**, and **Shadows** results in empty vector images.
Color regions	Retains colors in vector output. Set options on the *Color Regions Tab* tab.
Shadows	Generates shadow effects in vector output using ShadowCaster™ technology. Set options on the *Shadows Tab* tab.

Options

Tab Name	Description
Lines	(Available when the **Lines** check box is selected.) See *Lines Tab*.
Color Regions	(Available when the **Color regions** check box is selected.) See *Color Regions Tab*.
Shadows	(Available when the **Shadows** check box is selected.) See *Shadows Tab*.
Hotspots	See *Hotspots Tab*.
Options	See *Options Tab*.

BOM and callout visibility

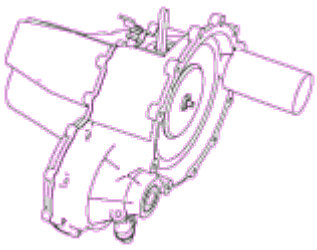
Icon	Command Name	Description
	Show or Hide BOM Table	Toggles visibility of the BOM table in the viewport.
	Show or Hide Callouts	Toggles visibility of callouts in the viewport.

Lines Tab

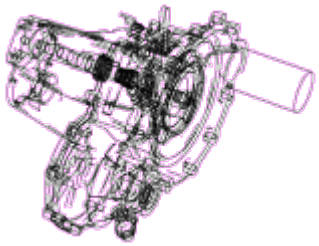
The Lines tab lets you specify what model lines to display (visible lines, hidden lines, outlines, silhouettes) and optimization methods such as hidden-line removal (HLR).

Note: The **Lines** vectorization option must be enabled.

Command Name	Description
Show visible lines	Includes outlines and silhouette lines for visible actors in the vector output. You can select **Same color for all actors** and choose a line color, or clear this option to use actor colors. You can configure visible line styles for rendering layers by enabling **Custom Render Mode** and setting the **Visible lines style for Technical Illustration** property. See *Mode Commands*.
Show hidden lines	Includes outlines for actors hidden by other actors (internal actors) in the vector output. You can select **Same color for all actors** and choose a line color, or clear this option to use actor colors.

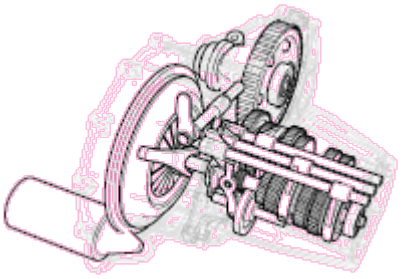
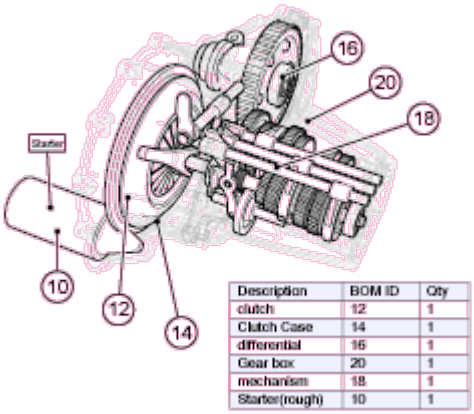
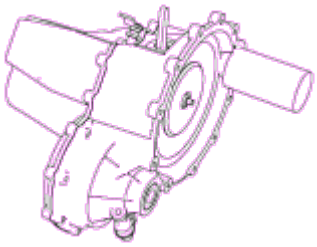
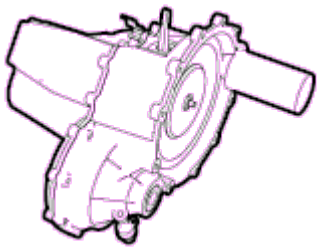


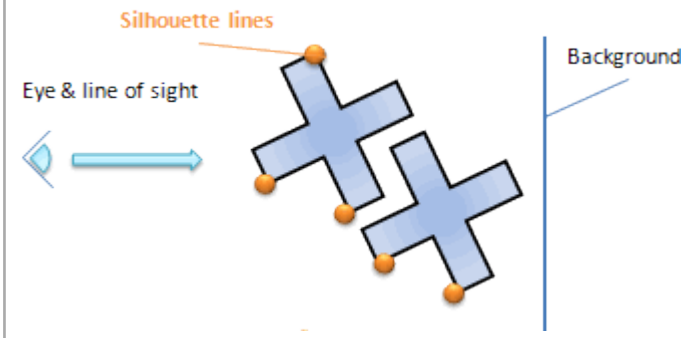
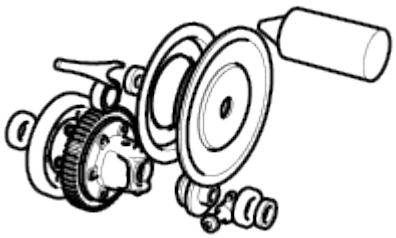
Disabled



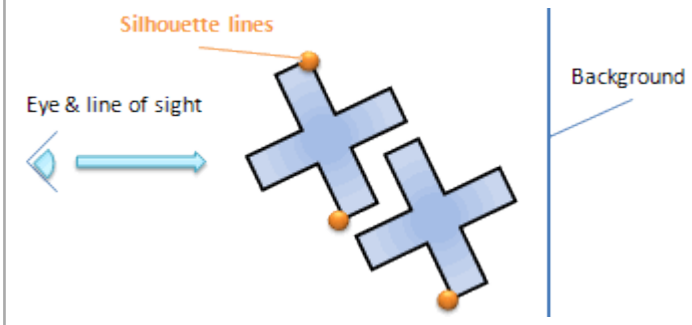
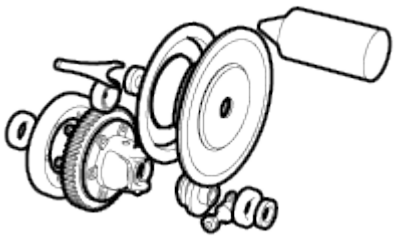
Enabled

Note: In **Custom Render Mode**, you can define a priority for the display of hidden lines. In this case, hidden lines are visible for rendering layers with higher priorities (even when **Show hidden lines** is cleared). Note that you can configure hidden line styles for rendering layers by setting the **Hidden lines style for Technical Illustration** property.

Command Name	Description
Show cutting lines	Includes cutting lines (from cutting planes) in the vector output. You can select **Same color for all actors** and choose a color, or clear this option to use actor colors. **Notes:** This option does not affect hatch lines: • Hatch lines, when displayed in the viewport, are always visible in vector output. • Hatch-line color is determined by the cutting plane **Cutting line** > **Color** property. • To include capped/hatched surfaces in vector output, **HardwareSupport.Advanced** (Application Preferences - Advanced Settings) must be enabled.
Show collaboration	Includes collaborative actors, such as arrows and labels, in the vector output. You can select **Same color for all actors** and choose a color, or clear this option to use the actor colors.  Disabled  Enabled
Global line width	Scales vectorized line weights by multiplying **Outline width**, **Silhouette width**, and collaborative actor line widths. For example, if **Global line width** is 3 and **Silhouette width** is 2, silhouette lines are 6 pt.
Outlines > **Style**	Specifies what outline style to use in vector output. For details, see *Mode Commands*.
Outlines > **Width**	Sets the width for outlines. Outline widths are calculated as follows: **Global line width** x **Outline width** For example, if **Global line width** is 3 and outline **Width** is 2, outlines are 6 pt.
Show silhouettes	Generates silhouette lines in addition to outlines.  Disabled  Enabled (**Model** silhouette)
Silhouettes > **Style**	(Available when **Show silhouettes** is selected.) Specifies how silhouette lines are generated: • **Crest** - Generates silhouettes for actor perimeters and significant actor edges.

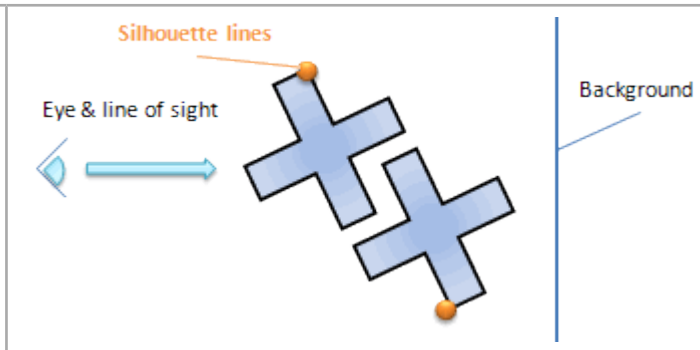
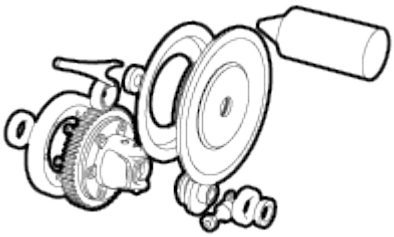
Command Name	Description
	Silhouette generation method: 
	Example: 

- **Per actor** - Generates silhouettes for actor perimeters.

Silhouette generation method	
Example	

- **Model** - Generates silhouettes for perimeters around contiguous actors (contiguous in the 2D vector output, not necessarily in the 3D scene).

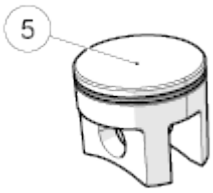
Silhouette generation method	

Command Name	Description
	
Example	

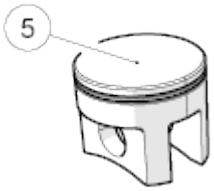
Silhouettes > **Width** — (Available when **Show silhouettes** is selected.) Sets the width for silhouette lines. Silhouette widths are calculated as follows: **Global line width** x **Silhouette width** For example, if **Global line width** is 3 and silhouette **Width** is 2, silhouette lines are 6 pt.

Shadow width — Generates gaps around overlapping actor outlines, which can improve image readability.

Attach shadow width — Generates gaps around attachment lines (such as callout lines), which can improve image readability.



1 pt



6 pts

Refinement — Sets the tolerance step between a vectorized line and the real 3D curve. A higher value improves the vectorized output but increases file size.

Bezier generation — Creates accurate bezier curves to smooth generated polylines. To create smaller vector files or to improve vectorization speed, clear this option.

Ellipses generation (ortho mode only) — (**Camera Perspective Mode** must be disabled.) Detects 3D circles and ellipses and traces them as elliptic objects (no segments), which can reduce vector file sizes. To improve vectorization speed or if artifacts appear, clear this option.

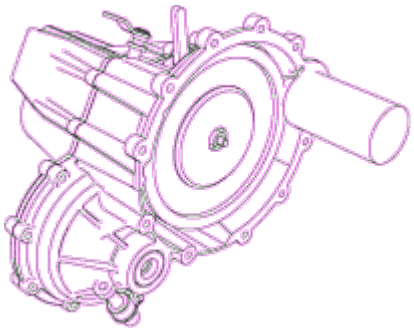
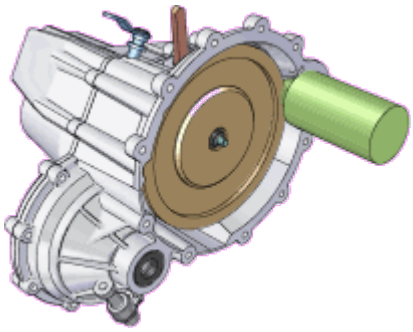
Back culling — Disables rendering of back faces (faces not visible from the currentcamera angle). Back culling increases rendering speed, but some front faces might disappear when model faces are not well oriented.

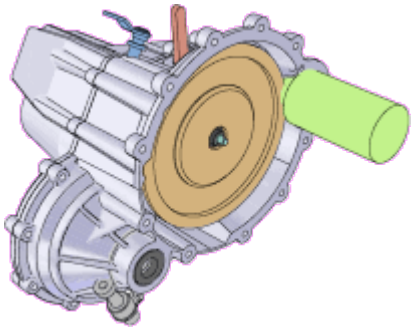
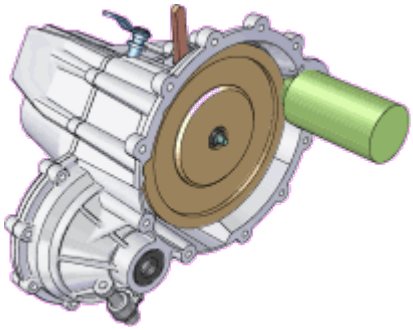
Occlusion culling — Detects hidden actors and prevents them from being rendered. Occlusion culling can increase vectorization speed (depending on your video card), but very small parts (as compared to the rest of the geometry) might be omitted. If parts are missing from your technical illustration, try increasing the size of your viewport or disable occlusion culling.

Color Regions Tab

The Color Regions tab lets you include color in your vector output.

Note: The **Color regions** vectorization option must be enabled.

No Color Regions	Color Regions
	

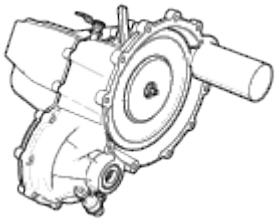
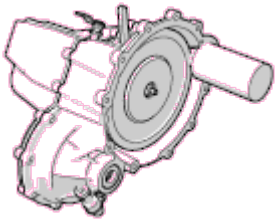
Command Name	Description
Light	Enables the lighting effect, which creates color variations. When disabled, colors are flat. Clearing this option might produce more predictable color assignments in your vector output.   Disabled Enabled
Compute regions per actor (time intensive)	Creates one group per actor, allowing more color variation. Each actor uses the same color palette. Color region calculation is performed using one process per actor instead of one process for the entire model, which can greatly increase processing time.
Color depth	Specifies the maximum number of colors, including black and white. Specify a value between 1 and 64. For example, specify 5 for black, white, and 3 additional colors. **Note:** Color palette calculation is complex and depends on a number of factors. For example, you might get very different results depending on whether **Light** is selected.
Level of detail	Specifies the maximum tolerance between a curve and its approximated line. If this option is unavailable, ensure that **HardwareSupport.Advanced** (Application Preferences - Advanced Settings) is selected. If the option is still unavailable, your video card likely does not support this feature. **Note:** If you find that when using the maximum level of detail, the vector output is not precise enough, you can try to specify a value above 100 for the **DetailLevel** option, in **Application Preferences** > **Advanced Settings** category. See *Advanced Settings*.

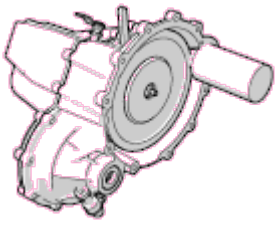
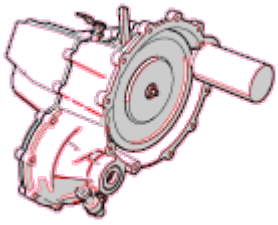
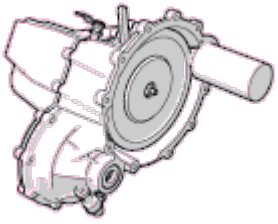
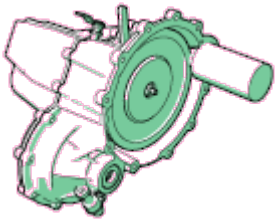
Shadows Tab

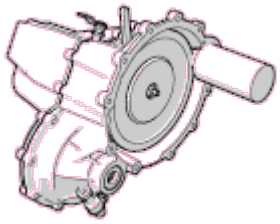
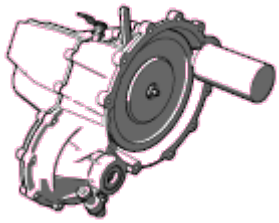
The Shadows tab let you manage shadows and contour lines in vector output.

Notes:

- The **Shadows** vectorization option must be enabled.
- To use shadows with color regions, clear **Compute regions per actor**.

No Shadows	Shadows
	

Command Name	Description
Contour	Generates shadow border lines of the specified color. **Note:** Contour lines are not visible when using color regions.  Disabled  Enabled, Red
Fill	Generates shadows of the specified color.  Black  Green
Transparency	(Available when **Fill** is selected.) Specifies the shadow transparency (0 = opaque, 100 = transparent).

Command Name	Description
	 80%  40%

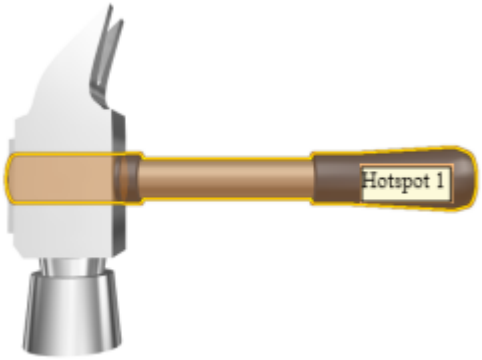
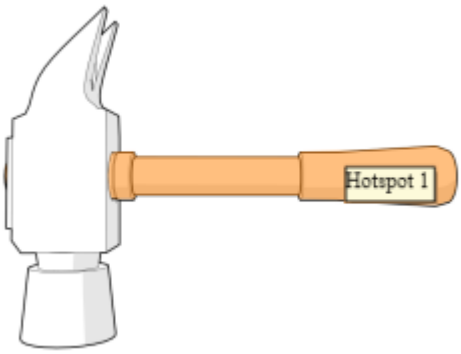
Hotspots Tab

The Hotspots tab lets you manage hotspots in vector output.

Hotspots are active areas in vector images created from Composer custom hotspots, event links, and BOM information.

Notes:

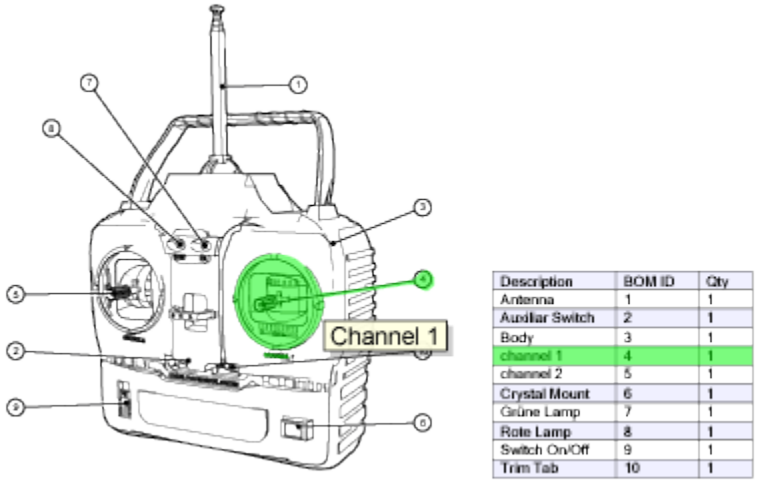
- In vector outputs, hotspots are highlighted only on the visible section of parts, and not on hidden sections. Therefore, the visualization is different in Composer and in the vector output.

Composer	Vector Output
	

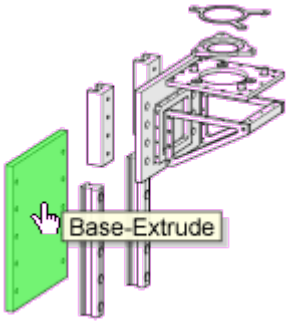
- Only **file://**, **http://**, and **ftp://** links are valid in vector output. Composer-specific URLs (such as **view://** and **play://**) are ignored.
- You can remove hotspot tooltips in SVG output using the **SvgOutput.ShowTooltip** advanced application preference. See *Advanced Settings*.

Command Name	Description
Generate hotspots from BOM IDs	Creates hotspots in vector output for actors with BOM IDs. The hotspot includes the actor, BOM table entry, and callout. **Notes:** • For actors, the hotspot tooltip is defined using the **Tooltip** property of the actor. • For assemblies, the hotspot tooltip is defined using the **Tooltip** property of the first actor in the assembly that has a tooltip defined. • The hotspot link is defined using the **Event** > **Link** property of the actor.

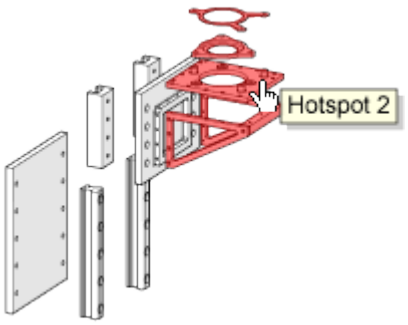
Command Name	Description
	Tip: To set properties for all actors with the same BOM ID, click a selection set in the BOM pane and set properties in the Properties pane. See *BOM pane*.



Generate hotspots from links Creates hotspots in vector output for actor links.



Export custom hotspots Creates hotspots in vector output from user-defined hotspots in the Composer document (**Create Hotspot** - see *Assembly Pane*).



Options Tab

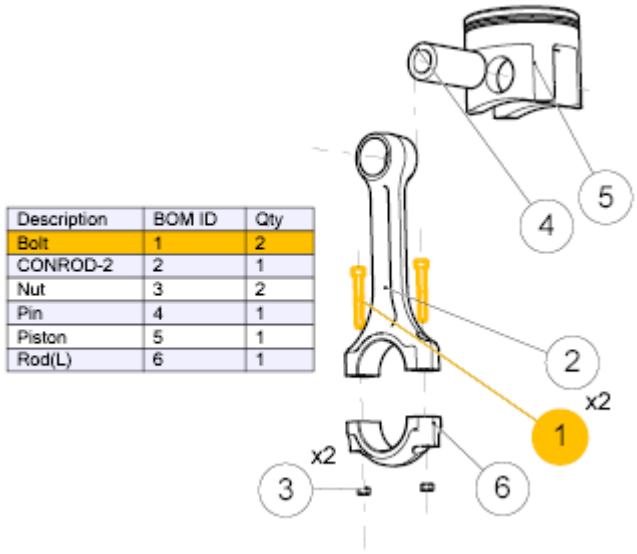
The Options tab lets you manage output page format, CGM options, and Tech Illustrator options.

Page setup

Command Name	Description
Use document's paper	Uses the document paper space to define the output page format. For details, see *Document Properties - Paper Space*. When this option is cleared, the **Format** and **Orientation** options define the page.
Format	(Available when **Use document's paper** is cleared.) Specifies the page format: • **Viewport ratio** - Defined by **Height** and the viewport width-to-height ratio. • **Custom** - Defined by **Width** and **Height**. • *Standard formats* - Standard formats such as **Letter** and **A4**.
Orientation	(Available when **Use document's paper** is cleared.) Specifies the paper orientation: • **Portrait** • **Landscape**

Advanced

Command Name	Description
Make groups (required for BOM table)	Creates groups, which are containers for related elements. You must enable this option to include BOM tables in your vector output.



High quality capping	Improves vectorization results of cutting-plane capping in complex models with small holes. For most models, clear this option to improve vectorization performance.

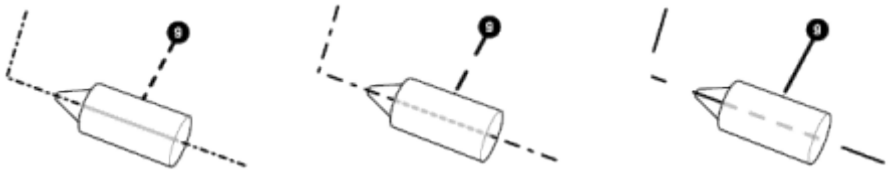
CGM options

Computer Graphics Metafile (CGM) is an ISO standard for vector and composite vector/raster images.

Command Name	Description
Profile	Specifies the CGM format to generate: • **WebCGM**- Web interoperability specification created by the W3C and CGM Open Consortium. • **S1000D (2.x)** - International specification for the procurement and production of technical publications, version 2.x. • **ATA2200** - Air Transport Association (ATA) iSpec 2200 specification for aircraft maintenance. • **S1000D (4.x)** - International specification for the procurement and production of technical publications, version 4.x. **Notes:** • CGM supports limited fonts. Visit the following website for additional information: *http://www.w3.org/TR/NOTE-cgm-970618* • In the case of **S1000D (4.x)**, if you choose to generate a companion file, you can customize hotspot properties to be compliant with S1000D 4.x in the CGM output and in the XML companion file. See *Hotspot Properties* for custom hotspots created from the Assembly pane or from the Collaboration pane, and see *Meta-Properties* for hotspots generated from BOM IDs.
Metafile name	Specifies the metafile name.
Generate companion file	Generates an XML file in addition to the CGM file.

SVG / EPS options

Command Name	Description
Dash scale	Specifies the appearance of dashed lines in SVG and EPS vector output. This option affects borders, attach lines, polylines, and other lines in your 3D scene with the **Type** property defined as a dashed line. Specify a value between 0.01 (small dashes) and 10 (large dashes). A value of 1 attempts to match the appearance in your 3D scene, but results can vary.



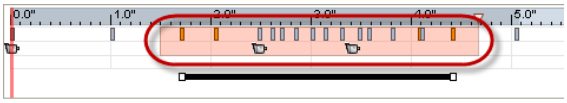
Dash scale = .5 Dash scale = 1 Dash scale = 3

Multiple Tab

The Multiple tab lets you generate multiple vector images from your animation, views, or both.

Important: The **Detail view** option must be cleared to be able to generate multiple images.

Command Name	Description
Animation	Creates multiple images from an animation. Specify the image frequency as one of the following: • Frames between two images

Command Name	Description
	• Images per second Image files are named `<filename>_anim <n><type><` , where: • `<filename>` is the file name you specify in the **Save As** dialog box (when you click **Save As**). • `<n>` is the image index based on the frequency and range you specify. For example, when you specify 30 images per second starting at 5 seconds, the image indexes are 150, 151, and so on. • `<type>` is the format extension, as determined by **Save as type** in the **Save As** dialog box.
Range	(Available when **Animation** is selected.) Specifies the animation segment to capture: • **All** - The entire animation • **Selection** - The selected timeline segment  • **Seconds** - The specified range in seconds
Markers	Creates one image per marker in the timeline.
Milestones	Creates one image per milestone in the timeline.
Views	Creates images for all views (see *Views pane*). To create images for the current view only, clear this option.
360° Capture	Captures a defined number of images of the model along a vertical axis performing a 360° clockwise rotation. The vertical axis determines the orientation of the camera. The vertical axis used in the one defined in the viewport properties (see *Viewport Properties*). • If Z is defined as the vertical axis, then the rotation plane will be XY. • If Y is defined as the vertical axis, then the rotation plane will be XZ. • If X is defined as the vertical axis, then the rotation plane will be YZ. Enter the number of images you want to capture along the 360° path in the **Number of Images** box.
File-name template	(Available when **Markers**, **Milestones**, **Views**, or **360° Capture** is selected.) Specifies the naming convention for image files. You can specify valid file-name characters and the following case-sensitive keywords: `%filename%` — The file name specified by **File name** in the **Save As** dialog box. `%viewname%` — The view name, as listed in the Views pane. **Note:** Not applicable to **360° Capture**. `%markername%` — The marker name, as listed in the timeline and in the Markers pane. **Note:** Not applicable to **360° Capture**. `%index%` — A counter from 1 to the number of views. Index values have the same number of characters (1-9, 01-99, 001-999) for all files created. `%collectionname%` — The collection name, as listed in the Views pane. `%collectionindex%` — The collection index, as listed in the Views pane. For example, when **File-name template** is `%filename%_%index%` and you specify `Gearbox` in the **Save As** dialog box, the resulting file names for a document with three views are: `Gearbox_1.*`, `Gearbox_2.*`, `Gearbox_3.*` (where `.*` is the format extension). **Notes:** • The **Save As** dialog box does not consider **File-name template** when checking for existing files. Use caution to avoid overwriting files unintentionally.

Command Name	Description
	• Do not specify file-name extensions in **File-name template**. Extensions are determined by **Save as type** in the **Save As** dialog box. • When **File-name template** does not contain `%filename%`, **File name** in the **Save As** dialog box is still required but is not used in the file names. • When **File-name template** is blank: - files generated from markers are named `%filename%_%markername%`. - files generated from milestones are named `%filename%_view`. - files generated from views are named `%filename%_%viewname%`. **Tip:** Click **?** at the right of the **File-name template** box to display a tooltip listing available keywords.

Textures Workshop

You can apply 2D images (such as materials and logos) to 3D actor surfaces.

To display this workshop, click **Workshops** > **Properties** > **Textures** .

Notes:

- You can select the following types of files as textures:
  - PNG (.png)
  - TIFF (.tif, .tiff)
  - Jpeg (.jpg, .jpeg, .jpe)
  - Targa (.tga)
  - Rgb (.rgb)
  - Bitmap (.bmp)
- Textures are applied to an entire actor, not just the face you apply it to. To apply a texture to one face (like a decal), explode the actor geometry. See *Geometry Tab*.
- The camera orientation determines the initial texture orientation. Although you can reposition a texture after applying it, consider setting the correct camera orientation before applying the texture.

Icon	Command Name	Description
	Texture Translation Mode	Changes texture position on an actor. To move a texture, click this command, drag the texture, and press **Esc** when done.
	Texture Rotation Mode	Changes texture orientation on an actor. To rotate a texture, click this command, drag the texture, and press **Esc** when done.
	Set Texture Projection Axis	Aligns textures normal to a face. **1.** Select one or more textured actors. **2.** Click this command. **3.** Hover over your model to see the normal indicator (red arrow), then click to select the normal to align to. You can also use this command without first selecting a texture: **1.** Click this command. **2.** Click a normal of a textured actor.
	Set Texture Projection Camera	Aligns textures to the current camera orientation. For example, use this command to make texture text readable.

Icon	Command Name	Description

Before After

To align textures to the camera orientation:

1. Select one or more textured actors.
2. Click this command.
3. Click anywhere in your model to apply the change.
4. Press **Esc** to exit the command.

You can also use this command without first selecting a texture:

1. Click this command.
2. Click a textured actor.
3. Press **Esc** to exit the command.

Video Workshop

The Video workshop lets you create AVI (`.avi`), FLV (`.flv`), MKV (`.mkv`), and MP4 (`.mp4`) video files of your animations.

To display this workshop, click **Workshops** > **Publishing** > **Video** > .

Profile

Profiles store your settings for future use.

For details, see *About Profiles for Workshop Settings*.

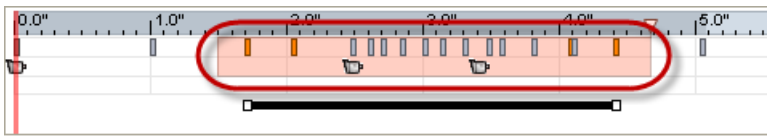
Video

This area lets you specify where you want to save the video.

Command Name	Description
Save Video As	Displays the **Save Video** dialog box that lets you save your animation in either AVI, FLV, MKV, or MP4 format. To interrupt video generation while it is running, press **Esc**. **Important:** If you choose the AVI format, after clicking **Save**, you can specify a video compression utility in the **Video Compression** dialog box. If you have 4K resolution or Full HD content with large-size animations, it is strongly recommended to use this video compression utility to ensure a sufficient quality for the resulting video. See *Video Compression*.

Video Output

The Video Output tab lets you set settings for your videos.

Command Name	Description
Change window resolution	Defines the height and width, in pixels, of the resulting video. Clear this option to use the current viewport size. **Note:** In case of odd-sized images (for example, 1264x535), the image will be cropped by one pixel (1264x534) to make it even-sized.
Range	Specifies the animation segment to capture: • **All** - The entire animation • **Selection** - The selected timeline segment  • **Seconds** - The specified range in seconds

Anti-Aliasing

The Anti-Aliasing tab lets you enable anti-aliasing and set settings for it.

Anti-Aliasing image output	Enables anti-aliasing during video creation.
Anti-Aliasing	Specifies the anti-aliasing technique: • **Jittering** - The jittering method is higher quality but takes too long for real-time rendering. Use jittering for single image generation when high quality is required. • **Multisample** - Multisample anti-aliasing (MSAA) is a technique used in computer graphics to improve image quality.
Number of passes	(Available when **Jittering** is selected.) Specifies the number of internal renderings made to create the effect. More passes take longer to perform but produce better results.
Radius	(Available when **Jittering** is selected.) Specifies the portion of a scene that appears sharp. The image becomes blurred as you move away from the focal point. The higher the value, the larger the depth of field (less blur).

Views Workshop

The Views workshop lets you create and update views.

To display this workshop, click **Workshops** > **Publishing** > **Views** > .

Profile

Profiles store your settings for future use.

For details, see *About Profiles for Workshop Settings*.

Views

You can create and update views.

Icon	Command Name	Description
	Create View	Creates a view according to the workshop settings. When you capture all items (**Zoom fit all** and **BOM Description** do not matter), a normal view is created. Otherwise, a custom view is created.
	Update Views with Selected Items	Updates the selected views with your **Select items to capture** selections. For example, you can update one or more views with new camera positions and actor properties without changing viewport properties. **Note:** Updating a custom view adds the selected items to the view definition. For example, when you update with **Viewport** selected a custom view that captures only camera position, the view definition now includes both **Camera** and **Viewport**.

Select items to capture

You can specify precisely which items you want to capture in a view.

Command Name	Description
Retrieve View Settings	Sets the capture properties to those of the view selected in the Views pane.
Camera	Captures camera position. **Tip:** You can also create a camera-only custom view with **Create Camera View** (Views pane).
Zoom fit all	(Available when **Camera** is selected.) Zooms the scene to fit the viewport.
Viewport	Captures viewport background properties, such as background color.
BOM Description	Captures BOM description overrides. To change a BOM description, click a row in the BOM tree, press **F2**, and then type a new name. See *BOM Pane*.
Digger	Captures Digger properties. See *Digger Commands*.
Hotspot properties	Captures hotspot properties. See *Toolbar Commands*.
Actors	Captures geometry and collaborative actor properties.
Apply to	(Available when **Actors** is selected.) Specifies which actors to capture: • **Selection** • **All**
Visibility	(Available when **Actors** is selected.) Captures actor visibility.

Command Name	Description
Properties	(Available when **Actors** is selected.) Specifies the actor properties to capture: • **None** • **All** • **Custom** - Select one or more of the following: - **Location** - Captures positions in the 3D scene. - **Opacity** - Captures transparency. - **Material** - Captures the following properties: **Color**, **Texture**, **Shininess**, **Emission**, **Environment effect**. - **Link** - Captures event definitions. - **Selected properties** - Captures the properties selected in the Properties pane.

Editing Actor Properties

You can view and edit properties of selected actors, such as color, opacity, and font in the **Properties** pane.

About Actor Properties

Each actor has neutral (default) properties that are initially defined by its original import file (CAD properties). You can modify properties and save changes as the new neutral values.

- When you select multiple actors, only their common properties are displayed.
- Use the **Ctrl** key to select multiple properties, which is useful when filtering animation keys on properties.
- Properties defined by styles are listed in property categories named **Style (subscribed): *style_name*** and are read-only. An asterisk (*) following the style name indicates that **Real Time Refresh** (Styles workshop) is disabled. See *Styles Workshop*.
- CAD metadata and user-defined properties are listed under **User properties**. For details, see *Meta-Properties*.
- All 2D measurements (such as border widths and 2D panel positions) are in millimeters. 3D measurements are in the document's units. See *Units*.
- You can set properties as read-only by defining DisableMatchingProperties (Application Preferences - Advanced Settings). See *Advanced Settings*.
- Most properties that cannot be animated are marked with . Properties dependent on other properties (for example, the annotation **Text** property) are also unanimatable but are not marked with . Keys for unanimatable properties are always created at time=0, regardless of the current timebar location, and apply to the entire animation.
- In animation mode, properties with at least one animation key are marked with . Changing the neutral property value has no effect on the animation.

Editing Actor Properties

You can view and edit properties of selected actors, such as color, opacity, and font in the **Properties** pane.

Note: Each actor has neutral (default) properties that are initially defined by its original import file (CAD properties). You can modify properties and save changes as the new neutral values.

1. Select an actor.

   The actor's properties are displayed in the **Properties** pane.

2. Edit the properties as appropriate.
3. **Optional:** Click the icons in the **Properties** toolbar to perform the operations described in the table below.

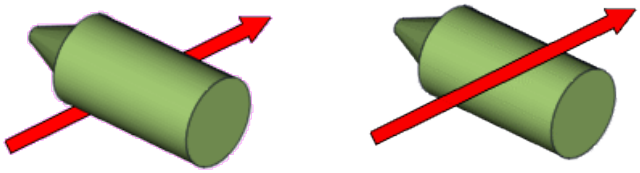
Option	Description
Sort by Category	Sorts properties by category.
Sort Alphabetically	Sorts properties alphabetically.
Set as Neutral Properties	Sets the values of selected properties as the new neutral values. If no properties are selected, sets all current property values as neutral.
Restore Neutral Properties	Restores the neutral properties for all selected properties. If no properties are selected, restores all neutral property values.
Repeat Last Property Change	Applies the last property change to the current selection. For example, to apply the same opacity to multiple actors, you can change an actor's opacity and then select a different actor and click this command.
Copy Appearance Properties	Copies the following properties between actors: • All actors: **Color**, **Opacity**, **Texture** • Geometry actors: **Shininess**, **Emission**, **Environment effect** • Collaborative actors: All appearance properties, including **Attach**, **Font**, **Border**, **Shape**, and **Background**. To copy appearance properties, see the step below.
Manage Meta-Properties	Adds or removes CAD metadata or user-defined properties to the selection, such as revision notes and author. You can apply meta-properties to parts or assemblies. For details, see Meta-Properties.

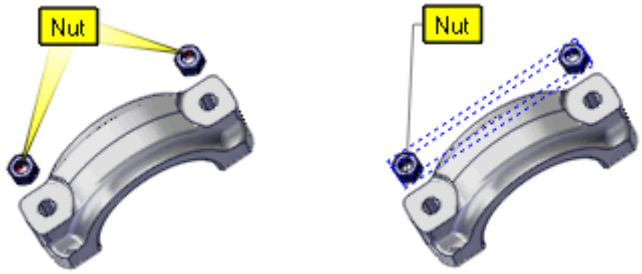
4. **Optional:** To copy appearance properties, perform the following operations:
   a. Select one or more actors to modify.
   b. Click **Copy Appearance Properties**. Your mouse pointer changes to an eye dropper when in the viewport.
   c. Click the actor whose appearance properties you are copying.

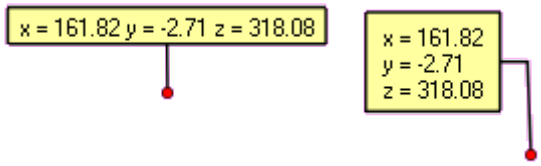
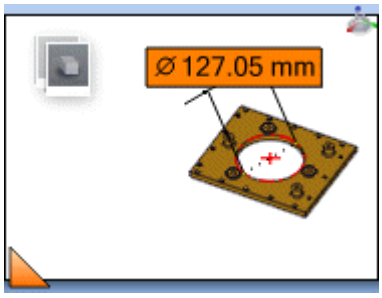
   The properties of the actor are applied to the selected actors.

Annotation Properties

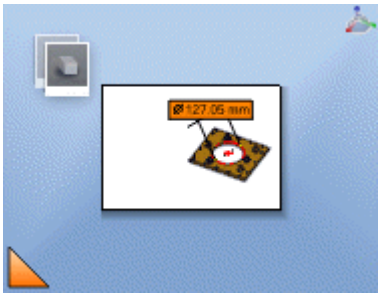
You can set annotation properties in the Properties pane.

Category	Property / Description	Available For
N/A	**Name** Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.	all
	Tooltip Specifies the tooltip text that appears when you hover over the actor. The default is the actor name, but you can select a different property or meta-property, or type a text string. To type text, which itself can contain properties, select **String** and use the **Tooltip string** property. **Note:** By default, labels attached to an actor display the actor's tooltip text. To change this behavior, modify the label's **Text** property.	all
	Tooltip string (Available when **Tooltip** is **String**.) Specifies the tooltip text. Type your text, optionally with property keywords. For geometry actors, click ... to display the **Text** pane, where you can type multiple lines of text and more easily embed properties. See *Text pane* for details on property keywords and the **Text** pane.	all
	Opacity Specifies the opacity, from 0 (transparent) to 255 (solid).	all
	Stay on top Makes the collaborative actor visible even when a geometry actor covers it.  Disabled Enabled	all
	Auto show Displays hidden annotation and measurement actors temporarily when you move the mouse pointer over the associated geometry actor. The annotation or measurement disappears when you hover over a different actor. **Note:** The Collaboration tree does not reflect this temporary change of visibility.	all
	Auto alignment Specifies positions for collaborative actors with respect to their associated geometry actors: **Perimetric**, **Circle**, **Rectangle**, **Bottom**, **Bottom and left**, **Bottom and right**,	all

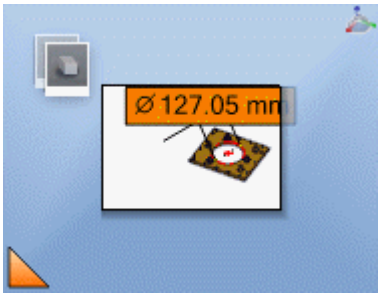
Category	Property / Description	Available For
	Bottom and top, **Top**, **Top and left**, **Top and right**, **Left**, **Left and right**, **Right**, **Free 2D**, **Free 3D**. **Notes:** • To align collaborative actors using magnetic lines, **Auto alignment** must be **Free 2D** or **Free 3D**. When dragged onto a magnetic line, an actor's **Auto alignment** is set to **Free 2D** automatically. • To ensure that cutting planes are applied to annotations, you must set **Auto alignment** to either **Free 2D** or to **Free 3D**.	
Auto hide	Specifies whether the annotation should be hidden if the anchor of the label or callout is hidden. • **Disable**: Disables **Auto hide**. • **Standard**: Enables **Auto hide** if the anchor of the annotation is hidden by any geometry (even the geometry linked by the annotation). • **Advanced**: Enables **Auto hide** if the anchor of the annotation is hidden by any geometry other than the linked object. **Note:** Depending on the number of annotations, the **Advanced** option may be slow. It is recommended to use it only when needed.	all
Draw style	(Available with **Attach** > **Type** is not **None**.) Specifies how annotations connect to their associated actors: • **Attach lines** - Draws a line to each actor. • **Bounding box** - Draws one line to a bounding box around the actors.  Attach lines Bounding box	all
Show inertia axes	Displays axis lines at each attach point to show actor orientation in the world coordinate system.	
Column format	Lists the x, y, and z coordinates vertically. To list the coordinates horizontally on one line, clear this property.	

Category	Property / Description	Available For
	 Disabled Enabled	
Text		
	Color Specifies the text color.	all
	Font Specifies the font family, style, and size of actor text. The default font family is your machine's default font or Arial depending on **Use default GUI font for text** (Application Preferences - Viewport). The default size is specified by **Font size** ([Default] Document Properties - Paper Space). **Notes:** • **Font** (size) and **Size** properties are linked. • When a font is not available in a vector image format, it is replaced by a default font. If the vector output is not acceptable, use a different font in Composer.	all
	Size Specifies the text size, in points. The default size is specified by **Font size** (in **[Default] Document Properties - Paper Space**). **Notes:** • **Font** (size) and **Size** properties are linked. • Because **Size** is stored as pixels in Composer files, changing your screen resolution (DPI) changes rendered text sizes.	all
	Size in paper space Defines the font size in the paper space. When you resize the viewport or zoom the paper space, the text scales accordingly. To define text size as fixed in the viewport, clear this property.  Before Zooming the Paper Space	all

Category	Property / Description	Available For



After: **Size in paper space** Enabled



After: **Size in paper space** Disabled

Note: You can specify the default value using **AnnotationRelativeComposer** (for Composer) or **AnnotationRelativePlayer** (for Composer Player) on the Application Preferences - Advanced Settings page.

Parent (level)

Specifies the actor whose **Text** value is used as the annotation text. You can choose the selected actor (level 0) or any parent. For example, you can select a part or its parent assembly.

Text

Specifies which property or meta-property is displayed as the actor's text.

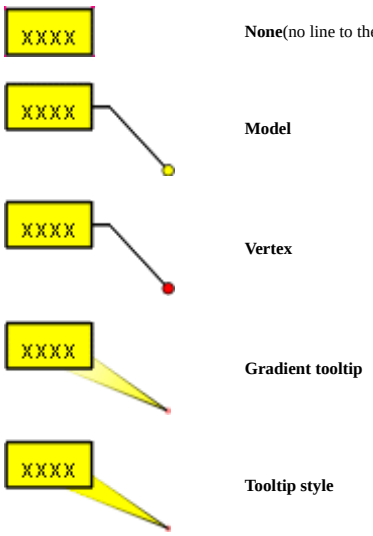
- For annotations other than coordinate labels: To type text, which itself can contain properties, select **String** and use the **Text string** property.*
- For coordinate labels: By default, this property is set to **None**. In this case, only the coordinates are displayed.

Text string

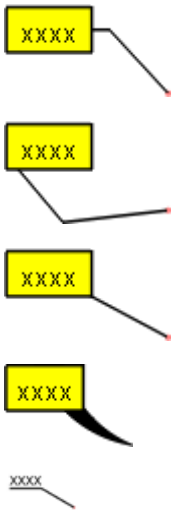
(Available when **Text** is **String**.) Specifies the text. To type multiple lines of text or to embed properties, click ... to display the **Text** pane. See *Text pane*.

Wrap

Wraps text. Selecting this option displays an anchor at the top right-hand corner of the annotation. Drag the anchor horizontally to change the width of the label, or specify it in the **Wrap** width field.

Category	Property / Description		Available For
	Wrap width	(Available when **Wrap** is enabled.) Specifies the width of the annotation, in millimeters.	
Callout exponent	**Quantity exponent**	Specifies the location of the BOM quantity on the callout: • **None** (no exponent) • **Top-right** • **Bottom-right** • **Top-left** • **Bottom-left** **Note:** To display quantities of 1, enable **ShowCalloutExponentX1** (Document Properties - Advanced Properties page). Example: Top-right exponent with font ratio of 75%: 	
	Font ratio	Specifies the size of the **Quantity exponent** text as a percentage of the callout text.	
	Exponent Shape	(Available when **Quantity exponent** is enabled.) Displays the quantity exponent with a circular background of the same color as the callout background.	
Attach	**Type**	Specifies the attachment line style. You can position the attach line by dragging the anchor at either endpoint.  **None**(no line to the attach point) **Model** **Vertex** **Gradient tooltip** **Tooltip style**	all

Category	Property / Description	Available For



Line

User(three anchors)

Simple

Arc tooltip

Basic

Note: If you select None as the attach type for labels and callouts, the attachment line will disappear. However, if you drag the attach anchor, the attachment line will reappear. To prevent this from happening, you can subscribe the annotation to a style. See *Apply a Style*.

Width

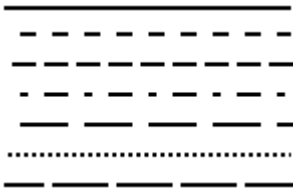
(Available when **AttachType** is **Line**, **Vertex**, **Model**, **Simple**, **User**, or **Arc tooltip**.) Specifies the width of the attach line, in millimeters.

Color

(Available when **AttachType** is **Line**, **Vertex**, **Model**, **Simple**, or **User**.) Specifies the attach color.

Line Type

(Available when **AttachType** is **Line**, **Vertex**, **Model**, **Simple**, or **User**.) Specifies the attach line type.



End

(Available when **Attach Type** is **Line**, **User**, or **Simple**.) Specifies the attach extremity symbol.

None

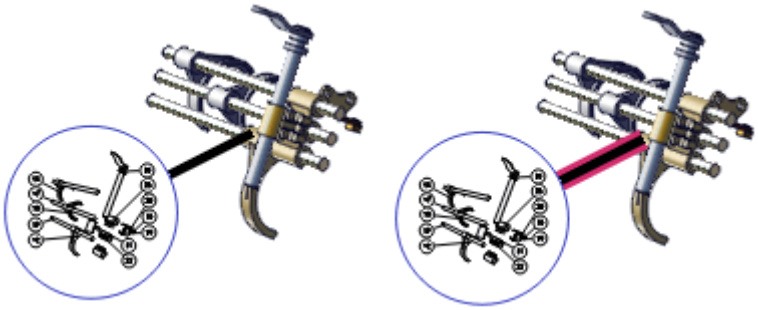
Bold arrow

Medium arrow

Thin arrow

Rhombus

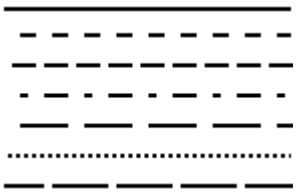
Category	Property / Description	Available For
	Round **Cross**	
	Size Specifies the size of the extremity, in millimeters.	
	Curvature (Available for **Arc tooltip** only.) Specifies the arc shape. For 2D panels only, you can change the curvature by dragging the curvature anchor in the viewport.	
Attach border	**Show** Displays an attach border. Not available for all attach types.	



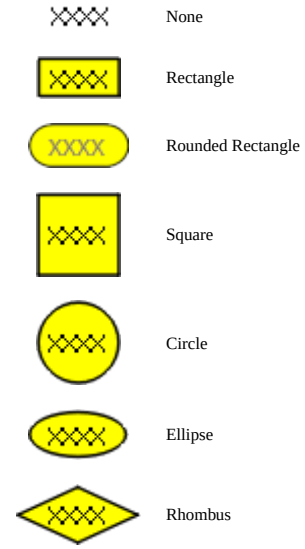
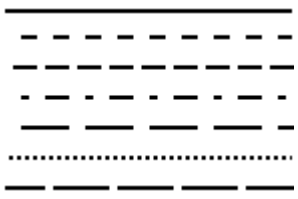
Without attach border — With attach border (pink)

Note: For annotations, **Border** settings override **Attach border** settings.

	Color Specifies the attach border color.	
	Opacity Specifies the border opacity, between 0 (transparent) and 255 (solid).	
	Type Specifies the border line type.	



	Width Specifies the attach border width, in millimeters.	

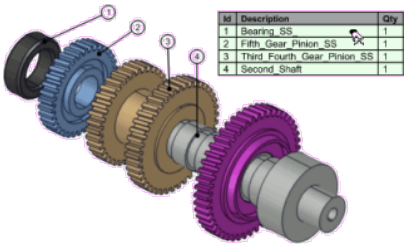
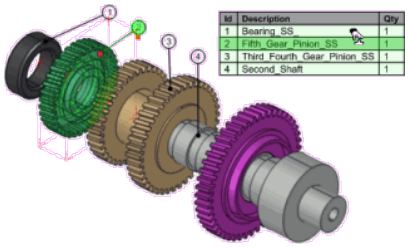
Category	Property / Description	Available For
Shape	**Shape** Specifies the annotation or label shape.  **Note:** When the label orientation is set to **Auto**, if a measurement value overlaps the leader line and you set its label's shape to **None**, some padding will be applied around the measurement value to ensure that it remains easy to read.	all
	Color Specifies the shape border color.	all
	Opacity Specifies the shape border opacity.	all
Line	**Width** Specifies the line width, in millimeters.	all
	Opacity Specifies the actor opacity (between 0 and 255).	all
	Color Specifies the line color.	all
	Type Specifies the line style. 	all

Category	Property / Description	Available For
Border	**Show** Displays the border.	all
	Width Specifies the border line width, in millimeters.	all
	Opacity Specifies the border opacity (between 0 and 255).	all
	Color Specifies the border color.	all
Event	**Link** Defines the action performed when a user clicks an actor or hotspot in the viewport or in vector image output (see the **Technical Illustration - Hotspots** tab). To create an event link: **1.** Click in the **Link** field and then click … **2.** In the **Select a Link** dialog box, select a link type in the **URL** field, specify an appropriate target for that type, and then click **OK**. See *Select a Link*. **3.** To test the event in the viewport, disable **Design Mode** (status bar) and then click the actor or hotspot.	all
	Pack linked resource (Available when the **Link** property specifies a **file://** URL.) Includes the linked file as part of the Composer document. To omit the file, clear this property and ensure that recipients of the document have the linked file in the same absolute path.	all
Measurement / GD&T	**Pre symbol, Middle symbol, Post symbol** Specifies the pre-, middle-, or post-position GD&T symbol. **None** **Straightness** **Flatness** **Circularity** **Cylindricity** **Line Profile** **Surface Profile** **Angularity** **Perpendicularity** **Parallelism** **Position**	

Category	Property / Description		Available For
		Concentricity	
		Symmetry	
		Circular Runout	
		Total Runout	
		Projected Tolerance Zone	
		Max. Material Condition	
		Min. Material Condition	
		Free State Variations	
		Diameter	
		Plus Minus	
		Plus	
		Minus	
		Equal	
		To be Defined	
	Pre string, Middle string, Post string	Specifies the pre-, middle-, or post-position string. 	

BOM Table Properties

You can set bill of materials (BOM) table properties in the Properties pane.

Category	Property / Description	
N/A	**Name**	Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
	Freeze	Prevents selection of the actor in the viewport. You can select the actor in the Collaboration pane. You can change property values, but you cannot move the actor by dragging it. Frozen actors are not attracted to magnetic lines. Choose one of the following: **No Freeze** — The actor is not frozen. **Freeze** — The actor is frozen in Composer Player and Composer. **Freeze only in player** — The actor is frozen in Composer Player only (and Composer when **Design Mode** is off).
	Opacity	Specifies the opacity, from 0 (transparent) to 255 (solid).
	Model highlighting	Highlights geometry actors and callouts when you hover over corresponding rows in the BOM table. To disable highlighting, clear this option.  Disabled  Enabled **Notes:** • The **Selection** > **Highlighting** application preference must also be enabled. • BOM highlighting is unidirectional: highlighting a geometry actor or callout does not highlight the corresponding row in the BOM table.
	Update	Updates the BOM table if an update does not occur automatically. To update the table, click **Proceed**.
Filter	**Filter on visible callouts**	Displays BOM table entries only for geometry actors with visible callouts. The BOM table updates automatically when callout visibility changes. **Note:** When no callouts are visible, the entire BOM table is displayed.

Category	Property / Description	
	BOM ID callouts	(Available when **Filter on visible callouts** is selected.) Displays BOM table entries only for geometry actors with visible callouts displaying the BOM ID (i.e. actors for which the **Text** property for the callout is set to **BOM ID**).
Text	**Font**	Specifies the font family, style, and maximum size of BOM table text. The actual font might be smaller depending on the table content and the space allocated for the table.
	Size	Specifies the text size, in points. The default size is specified by **Font size** (in **[Default] Document Properties - Paper Space**). **Notes:** • **Font** (size) and **Size** properties are linked. • Because **Size** is stored as pixels in Composer files, changing your screen resolution (DPI) changes rendered text sizes.
Placement	**Position**	Specifies where the BOM table is located in the viewport: • **Free** - Lets you place and resize the panel manually. The **Left**, **Top**, **Width**, and **Height** properties (in millimeters) are available only when **Free** is selected. • **Bottom**, **Top**, **Left**, **Right** - Places the panel at the specified location. The **Dedicated paper space (%)** property determines the panel size. **Note:** The panel size defines the maximum size of the BOM table. The actual BOM table might be smaller depending on the table content and the specified font size.
	Dedicated paper space (%)	(Not available when **Position** is **Free**.) Specifies the maximum percentage of the paper space the BOM table can occupy. The actual BOM table might be smaller depending on the table content and the specified font size. **Note:** This option overrides the **Font** size when needed.
	Left	Specifies the distance, in millimeters, from the left edge of the paper space.
	Top	Specifies the distance, in millimeters, from the top edge of the paper space.
	Width	Specifies the panel width, in millimeters.
	Height	Specifies the panel height, in millimeters.

Category	Property / Description
Shadow	**Show** Displays a shadow under the 2D panel, giving the actor a 3D effect. Disabled Enabled
	Preset Lets you choose predefined combinations of shadow properties: **Bottom right** **Halo** **Bottom** **Bump** **User (Selected automatically when you modify a preset)**
	Distance Specifies shadow offset, in millimeters, relative to the panel center. 3 mm 15 mm
	Orientation Specifies shadow position, in degrees (º), relative to the right side of the panel. 0º 45º 135º
	Opacity Specifies shadow opacity, from 0 (transparent) to 255 (opaque).

Category	Property / Description

50 255

Blur Specifies shadow sharpness, from 0 (no blur) to 20 (high blur).

0 20

BOM colors

Header text color Specifies the text color of the header row.

Id	Description	Qty
1	Bearing_SS_	2
2	Fifth_Gear_Pinion_SS	1
8	First_Gear_Pinion_SS	1
5	Second_Gear_Pinion_SS	1
4	Second_Shaft	1
7	Sleeve_1_and_2	1
6	Synch_Body_1_and_2	1
3	Third_Fourth_Gear_Pinion_SS	1

Default Colors

Id	Description	Qty
1	Bearing_SS_	2
2	Fifth_Gear_Pinion_SS	1
8	First_Gear_Pinion_SS	1
5	Second_Gear_Pinion_SS	1
4	Second_Shaft	1
7	Sleeve_1_and_2	1
6	Synch_Body_1_and_2	1
3	Third_Fourth_Gear_Pinion_SS	1

Custom Colors

Header fill color Specifies the fill color of the header row.

Row text color Specifies the text color of all rows except the header.

Odd row fill color Specifies the fill color of odd rows.

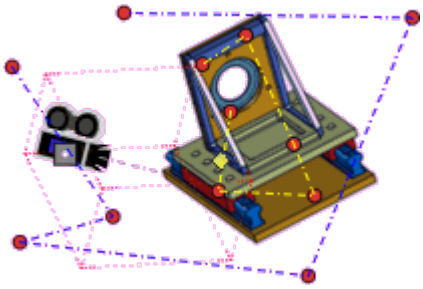
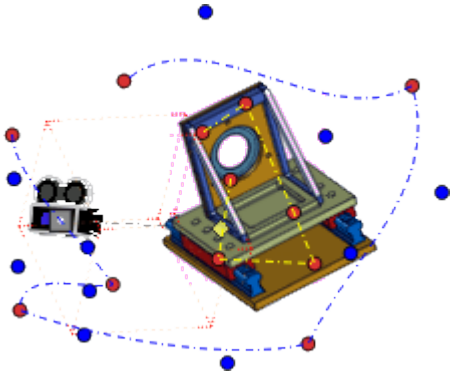
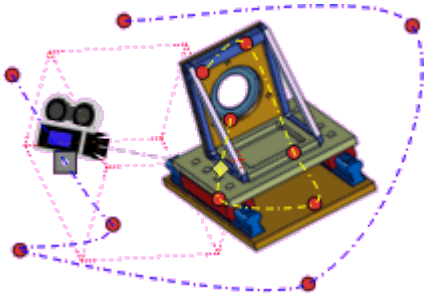
Even row fill color **Specifies the fill color of even rows.**

Camera Properties

You can set camera properties in the Properties pane.

To select a camera, expand **Cameras** in the Collaboration pane and click a camera. You can also select cameras in the viewport. See the **Home** > **Navigate** > **Attach Camera** ribbon commands for commands to create, attach, and detach cameras.

Category	Description	
N/A	**Name**	Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
	Color	Specifies the color of the camera icon in the viewport and camera keys in the timeline.
	Roll	(Not available when **Arcball** is selected.) Allows the camera to rotate about the z-axis (twisting movement) to track its target.
	Pitch	(Not available when **Arcball** is selected.) Allows the camera to rotate about the x-axis (up-down movement) to track its target.
	Yaw	(Not available when **Arcball** is selected.) Allows the camera to rotate about the y-axis (side-to-side movement) to track its target.
	Lock distance to target	(Not available when **Arcball** is selected.) Freezes the distance between the camera and its target. Translating the target also translates the camera to maintain the **Distance to target** value.
	Distance to target	(Available when **Lock distance to target** is selected.) Specifies the distance between the camera and its target, in document length units.
Animation	**Arcball**	(Available when **Path** is **Linear**.) Creates curved camera paths by creating arcs centered on target points. Target paths are linear. Use this mode to rotate around a center of interest. **Notes:** • Arcball interpolation requires the same number of camera (center) and target keys, else simple linear interpolation is used.

Category	Description
	• The displayed animation path does not show arcball curves (the paths appear linear), but the camera does follow curved paths during animation.
Path	Specifies the type of animation path between camera keys. To see the animation path, select the camera. The blue dashed line is the camera path and the yellow dashed line is the camera target path. Red dots ( ) correspond to camera keys. • **Linear** - Creates straight-line camera and target paths.  • **Linear** with **Arcball** - Creates curved camera paths. See **Arcball** for details. • **Custom** - Creates configurable curved camera paths (Bézier curves). To change the path shape, drag the blue anchors. Target paths are linear.  • **Smooth** - Creates curved camera and target paths (cubic Hermite splines). Path, rotation, and speed are optimized to produce smooth animations. Use this mode to create realistic walk-through animations. For best results, define at least four keys because the path at any point is calculated using the two preceding and the two following keys.  **Tip:** You can also set the camera path type from the ribbon (**Animate** > **Paths** > **Camera Path**).

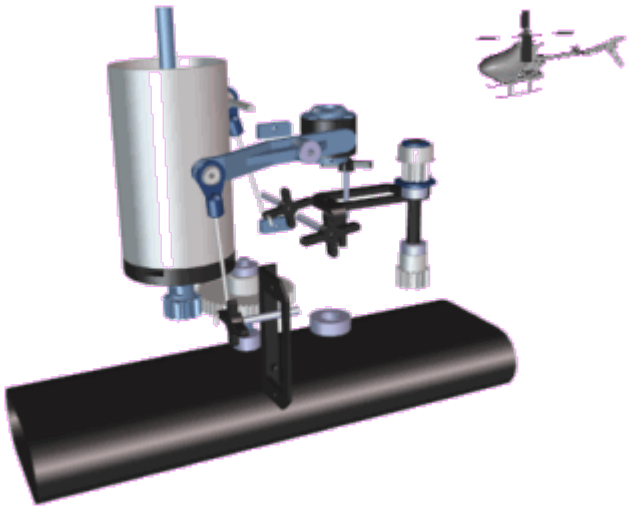
Compass Properties

You can set compass properties in the Properties pane.

To select the compass, click **Environment** > **Compass** in the Collaboration pane.

You can also select the compass in the viewport by dragging a selection box, but only if the compass is the only actor selected. To move the compass, select it and drag the icon.

Category	Property / Description
N/A	**Geometry path** Specifies a Composer model to use as the compass. Click the ellipsis ... and select a geometry file (`.smgGeom`). For example, you might set the compass to a helicopter model to better visualize the engine orientation.



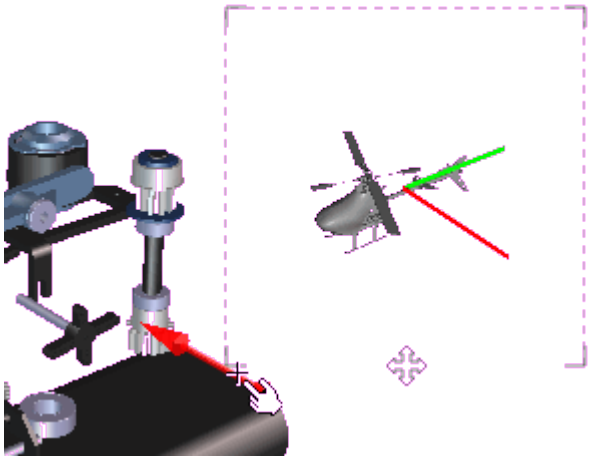
Notes:

- You cannot change camera views by clicking the compass. Only the default compass is clickable.
- The compass is always gray because geometry files do not contain properties.
- For best performance, use the **Merge Geometry** command or Simplification workshop to create a geometry file with as few actors as possible.
- Because geometry files do not support instances, use the **Merge Geometry** command before creating `.smgGeom` files for models containing instances.
- You cannot specify a geometry file named 'product' (`product.smgGeom`).

After selecting the compass model, you can align the compass to any axis in the viewport:

1. Select the compass.
2. Click the compass axis to align: x-axis (red) or y-axis (green).
3. Click the model axis to align to.

Category	Property / Description



Reset size and position Sets compass size and position to the defaults. Click **Proceed** to reset.

Sensitive Enables compass interactivity; clicking the compass changes camera position. When cleared, the compass displays camera orientation but is not clickable. Clear this option to avoid changing camera orientation accidentally when the compass is near other actors.

Note: Only the default compass has interactivity. A compass with **Geometry path** specified is not clickable.

Size

Fixed in viewport Makes the compass size absolute (in pixels) regardless of viewport size. To make compass size change as viewport width changes, clear this option.

Size (Available when **Fixed in viewport** is cleared.) Specifies the compass size relative to the viewport size, from 0 (not visible) to 1 (full viewport width). The compass changes size when you change the viewport width.

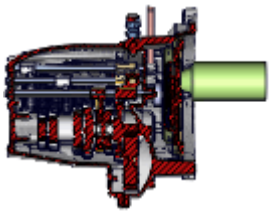
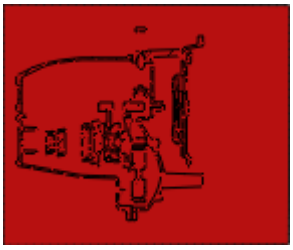
Size (pixels) (Available when **Fixed in viewport** is selected.) Specifies the compass size in pixels.

Cutting Plane Properties

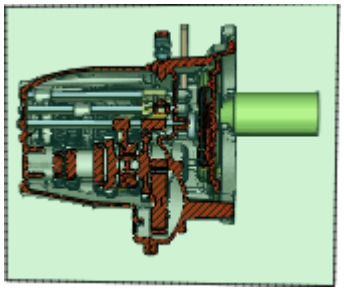
You can set cutting plane and cutting line properties in the Properties pane.

Cutting Plane Properties

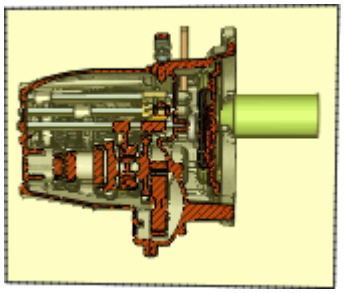
You can set cutting plane properties in the Properties pane.

Category	Property / Description
N/A	**Name** Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
	Tooltip Specifies the tooltip text that appears when you hover over the actor. The default is the actor name, but you can select a different property or meta-property, or type a text string. To type text, which itself can contain properties, select **String** and use the **Tooltip string** property. **Note:** By default, labels attached to an actor display the actor's tooltip text. To change this behavior, modify the label's **Text** property.
	Tooltip string (Available when **Tooltip** is **String**.) Specifies the tooltip text. Type your text, optionally with property keywords. For geometry actors, click ... to display the **Text** pane, where you can type multiple lines of text and more easily embed properties. See *Text pane* for details on property keywords and the **Text** pane.
	Cut Enables the cutting plane. Toggling this option is useful when using cutting planes in animations.
	Opacity Specifies the cutting plane opacity, between 0 (transparent) and 255 (opaque). When the opacity is less than 8, only a ruler can move the actor. To select the cutting plane, use the Collaboration pane.  Opacity = 0  Opacity = 255
	Color Specifies the cutting plane color.

Category	Property / Description

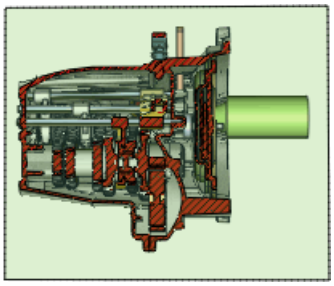


Green

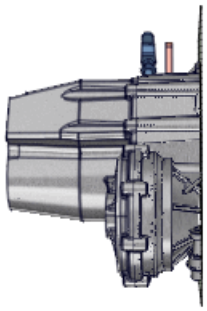


Yellow

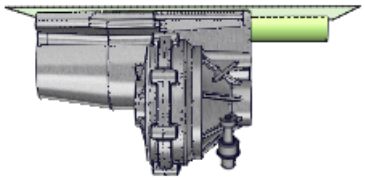
Axis Specifies the cutting plane axis: **X**, **Y**, **Z**, **X-**, **Y-**, **Z-**, or **User**.



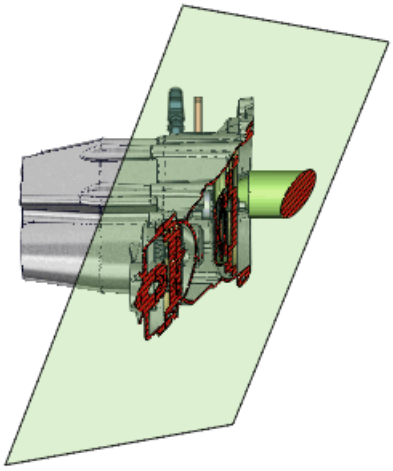
X-axis



Y-axis



Z-axis

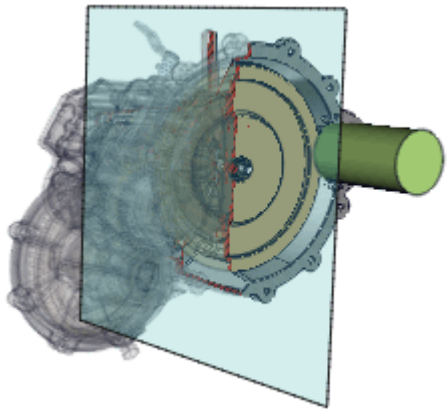


User-defined

Depth Specifies the depth of the cutting plane. You can also change depth by dragging cutting planes in the viewport.

Offset Specifies the depth value.

Category	Property / Description
	Auto flip Flips (inverses the cutting plane normal) automatically as you rotate the model.
	Front/Back space opacity Specifies the opacity (transparent = 0, opaque = 255) of the portion of the model in front of the cutting plane and the portion behind the cutting plane.

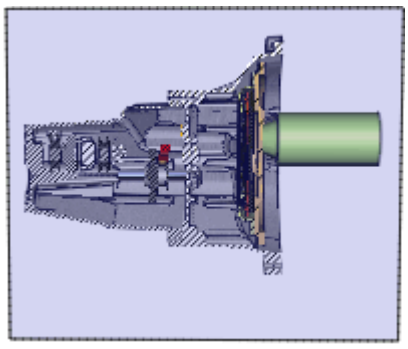


Front space opacity = 30 Back space opacity = 255

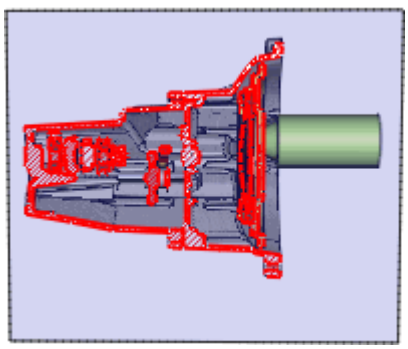
Note: These properties are available for a cutting plane when at most one cutting plane is visible. When 2 or more cutting planes are visible, select the **Cutting planes** parent node in the Collaboration pane and set **Front space opacity** and **Back space opacity** as needed.

Cutting line

Show Displays the cutting line.



Disabled



Enabled Color=Red

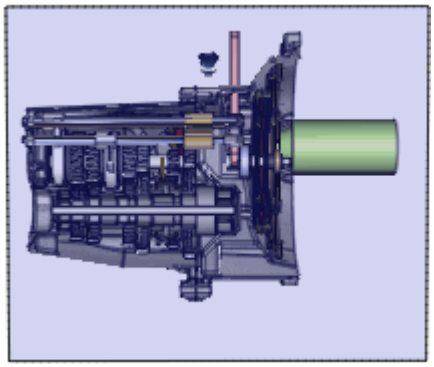
Thickness Specifies the width, in millimeters, of the cutting line and hatch lines.

Note: In vector output, the width of cutting lines due to capping is computed by: **Outline** > **Width** (actor property) x **Silhouette width** (Technical Illustration - Lines) x **Global line width**(Technical Illustration - Lines). Cutting-line **Thickness** is ignored.

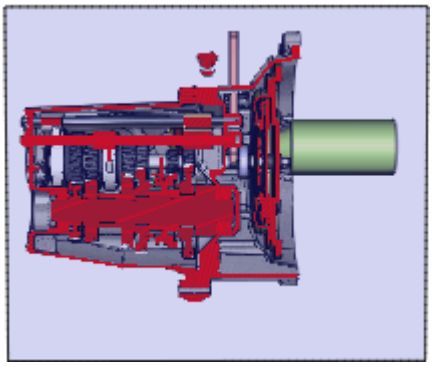
Category	Property / Description
	Color Specifies the color of the cutting line and hatch lines.

Note: You cannot override hatch-line color from the Technical Illustration workshop. To create vector output with black hatch lines, set **Color** to black.

	Cut invisible actors (Available when **Show** is enabled.) Displays the cutting line where the cutting plane intersects actors with **Opacity** = 0. To disable the cutting line for invisible actors, clear this property.
Capping	**Show** Creates surfaces where the cutting plane intersects solid model geometry.



Disabled

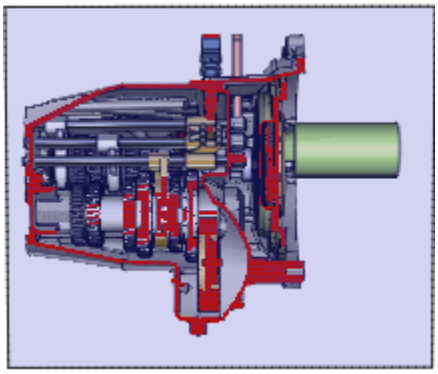


Enabled

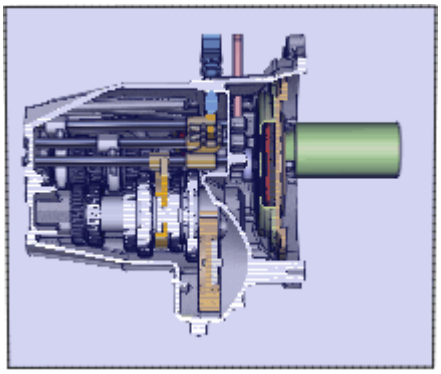
Keep actor color Caps surfaces using actor colors instead of the same color for all actors (as specified by **Color**).

Notes:

- This property requires an OpenGL extension. Ensure the **HardwareSupport.Advanced** setting (Application Preferences - Advanced Settings) is enabled. If this property is unavailable, your video card does not support this extension.
- **Hatch** and **Keep actor color** are not compatible. It is recommended that you select **Lighted capping** with **Keep actor color** , especially for merged cutting planes.

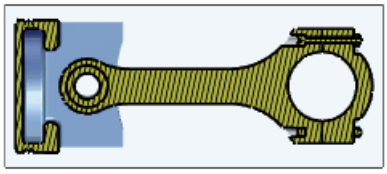


Disabled Color=Red

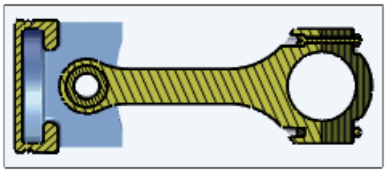


Enabled

Category	Property / Description	
	Lighted capping	(Available when **Keep actor color** is selected.) Specifies that capping is affected by scene lighting.
	Color	(Available when **Keep actor color** is cleared.) Specifies the capping color. **Note:** You cannot override capping color from the Technical Illustration workshop. To create vector output without capping color, set **Color** to white.
Hatching (Available when **Capping** is enabled)	**Angle**	Specifies the rotation angle of hatch lines.
	Hatch	(Available when **Hatch by actor** is cleared.) Specifies the spacing between hatch lines. To turn off hatching, specify 0. **Notes:** • When **Hatch by actor** is selected, set hatch spacing for each actor using the actor's **Hatch** property. • When **Hatch by actor** is cleared, set hatch line width and color using the **Cutting line** properties **Thickness** and **Color**. • Hatch lines in vector output do not necessarily match what is displayed in the viewport. Vectorization creates hatch lines in 2D space whereas the viewport shows 3D space.
	Hatch by actor	Enables different hatch spacing and angles for each geometry actor. After selecting this property, use **Initialize spacing** and **Initialize angles** to generate per-actor hatching and then optionally modify actor-specific **Hatching** properties. To have uniform hatching across the entire cutting plane, clear this property. **Notes:** • This property requires an OpenGL extension. Ensure the **HardwareSupport.Advanced** setting (Application Preferences - Advanced Settings) is enabled. If this property is unavailable, your video card does not support this extension. • Hatching for each actor is computed separately, which can affect performance. • Each actor has one set of hatching properties that apply to all cutting planes (with **Hatch by actor** selected) that intersect it.
	Initialize spacing	(Available when **Hatch by actor** is selected.) Sets random per-actor hatch spacing. Click **Proceed** to initialize hatch spacing and then change spacing as needed using the **Hatch** property for each actor.



Disabled



Enabled

Category	Property / Description	
	Initialize angles	(Available when **Hatch by actor** is selected.) Sets random per-actor hatch angles. Drag the slider to initialize hatch angles and then change angles as needed using the **Angle** property for each actor. **Notes:** • Actors of the same size are assigned the same angle. • Each slider position assigns different random hatch angles, but the assignments are always the same for a given position. • Both the cutting plane and actor **Angle** properties affect hatch angles.

Cutting Line Properties

These properties apply to cutting line actors created using **Author** > **Cutting Planes** > **Cutting Line** > **Create Cutting Line Actor**.

Category	Property / Description	
N/A	**Name**	Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
	Tooltip	Specifies the tooltip text that appears when you hover over the actor. The default is the actor name, but you can select a different property or meta-property, or type a text string. To type text, which itself can contain properties, select **String** and use the **Tooltip string** property. **Note:** By default, labels attached to an actor display the actor's tooltip text. To change this behavior, modify the label's **Text** property.
	Tooltip string	(Available when **Tooltip** is **String**.) Specifies the tooltip text. Type your text, optionally with property keywords. For geometry actors, click ... to display the **Text** pane, where you can type multiple lines of text and more easily embed properties. See *Text pane* for details on property keywords and the **Text** pane.
	Color	Specifies the actor color.
	Opacity	Specifies the opacity, from 0 (transparent) to 255 (solid).
	Stay on top	Makes the collaborative actor visible even when a geometry actor covers it.

Category	Property / Description		
		Disabled	Enabled
Geometry	**Width**	Specifies the width, in millimeters, for the cutting line actor.	
	Type	Specifies that **Curve** is the geometry type for cutting lines. Composer uses geometry types to determine certain actor behaviors.	
	ScaleX	Resizes the cutting line along the x-axis.	
	ScaleY	Resizes the cutting line along the y-axis.	
	ScaleZ	Resizes the cutting line along the z-axis.	

Debug Properties

Debug properties give information about the selected actor, or the model if the background is selected, that can aid debugging.

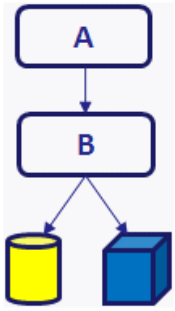
To display debug properties in the Properties pane, select **Debug information** > **ShowDebugPropertiesInPropertiesPane** (*Application Preferences - Advanced Settings* page).

Property / Description	
CAD source file	(Available when the background is selected.) Specifies the source file path of the model. This file is used by default by **File** > **Update** > **Composer Document**.
Class name	Specifies the internal actor description.
Node Type	Specifies the node type, such as part, product, or assembly. **Note:** Node type classification applies to SOLIDWORKS and Pro/ENGINEER files only and requires Composer 2010x or later. Composer documents created from other CAD formats or using older Composer versions only have **Default** node types.
RTTI Type	Specifies additional dynamic information about the actor type.
Guid	Specifies the globally unique identifier (GUID) of the selected actor as specified in the `.smgXml` file.
Net Guid	Specifies the concatenation of the GUIDs from the root to the selected actor. This is a unique identifier.
Geometry ID	Specifies the geometry ID of the selected actor. When actors in the `.smgXml` file have geometry, the link between `.smgXml` and `.smgGeom` is base on this ID (`IdentGeom=" id"` in the `.smgXml` file).
Path Rel. InstanceOf	Specifies the relative path of the referenced `.smgXml`. This is only visible when a fully-shattered (red) assembly group is selected.
Path Abs. InstanceOf	Specifies the absolute path of the referenced `.smgXml`. This is only visible when a fully-shattered (red) assembly group is selected.
Path Issued from	Specifies the name of the original CAD file the selected actor is from.
Path Ref ext geom	Categorizes the list of parameters.
Loaded	Shows whether the selected actor is loaded in the 3D scene.

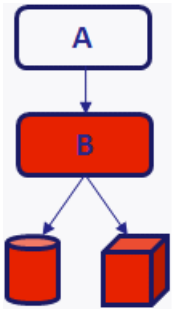
Geometry Actor Properties

You can set properties for geometry actors in the Properties pane.

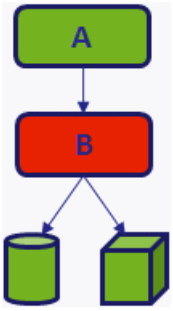
Category	Property	
N/A	**Name**	Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
	Tooltip	Specifies the tooltip text that appears when you hover over the actor. The default is the actor name, but you can select a different property or meta-property, or type a text string. To type text, which itself can contain properties, select **String** and use the **Tooltip string** property. **Note:** By default, labels attached to an actor display the actor's tooltip text. To change this behavior, modify the label's **Text** property.
	Tooltip string	(Available when **Tooltip** is **String**.) Specifies the tooltip text. Type your text, optionally with property keywords. For geometry actors, click ... to display the **Text** pane, where you can type multiple lines of text and more easily embed properties. See *Text pane* for details on property keywords and the **Text** pane.
	Color	Specifies actor color. You can set color on both parts and assemblies. Setting color at the assembly level can simplify color management and improves performance because Composer manages one color property instead of many. Parts inherit from the highest defined assembly color.



Assembly A = Undefined Assembly B = Undefined Part colors are displayed.



Assembly A = Undefined Assembly B = Red Part colors overridden by Assembly B.



Assembly A = Green Assembly B = Red Part colors overridden by Assembly A.

After specifying the actor color, if a color is inherited from the assembly, a message appears. Click **Clear** to clear the inherited color (and therefore, use the specified color), or click **Cancel** to keep using the inherited color.

Note: You can choose to make the **Clear** behavior the default one by selecting the **Don't ask this question again** check box.

To specify no assembly color, click **Undefined** on the color palette.

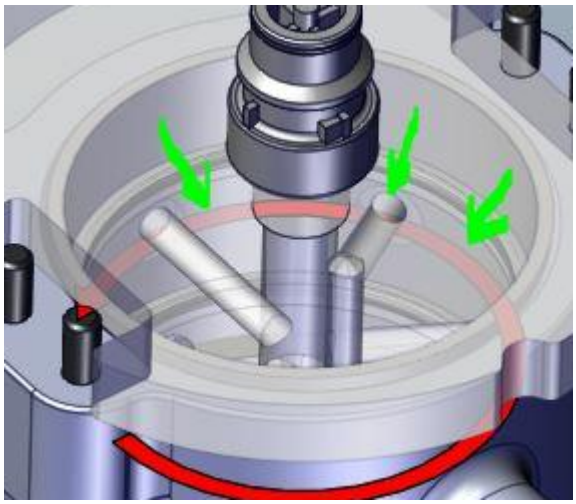
Notes:

Category	Property

- Color interpolation is not performed when animating assembly actors with undefined color. When creating color property keys for assemblies, ensure that you specify colors. Composer imports assembly-level color for the following formats: SOLIDWORKS and 3DXML.
- Composer does not support SOLIDWORKS occurrence (non-direct child) color and visibility.

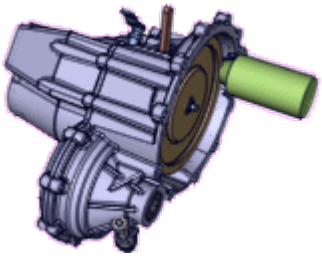
Opacity Specifies actor opacity, from 0 (transparent) to 255 (solid). Part and assembly opacities are cumulative. Composer imports assembly-level opacity for the following formats: SOLIDWORKS and 3DXML.

Note: When a part is on top of another one, depending on the camera's orientation, the color of both parts does not blend and any part may appear as being on top of the other one, in an unsystematic manner. Therefore, the rendering is not always as expected.

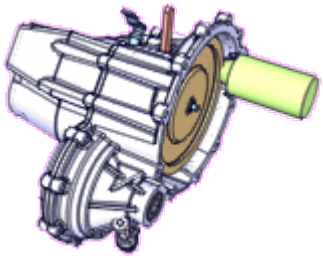


Shininess Specifies how reflective the actor is.

Emission Specifies the intensity of reflected light.



Low emission

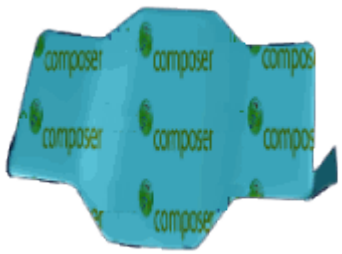


High emission

BOM ID Specifies the bill of materials (BOM) identifier as appears in callouts. You can assign BOM IDs automatically from the BOM workshop.

Category	Property	
Texture	**Show**	(Not available for all **Environment effect** - **Type** values.) Applies a texture to the actor.
	Map path	Specifies the file path of the texture image.
	Transparency	Makes the texture image transparent so actors below it are visible.
	Projection mode	Specifies how the texture image is projected onto the actor: • **Planar** - Projects the texture along a plane axis. • **Cylindrical** - Projects the texture from a virtual cylinder around the actor inward toward the cylinder center axis. • **Spherical** - Projects the texture from a virtual sphere around the actor inward toward the sphere center. • **Imported texture** - The texture is from the original CAD file. For details, see Import textures in *(Default) Document Properties - Input*. **Note:** Changing the projection mode loses the imported texture.
	Blending (modulate)	Mixes the color and transparency of the texture with those of the textured actors. They are affected by the lighting of the scene. When disabled, the texture is not affected by the actor material or scene lighting.

Disabled

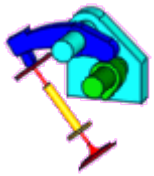


Enabled

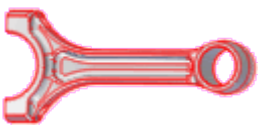
	Mosaic (repeat)	Repeats the texture image to fill the available space.

Disabled

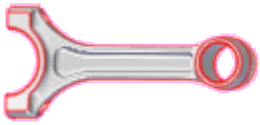
Enabled

Category	Property	
	Ratio height/width	Stretches the image, changing its aspect ratio.
	Scale	Specifies the displayed image size.
Environment effect	**Type**	Applies a material texture: • **None** (no environment effect) • **Chromic** • **Metal** • **Metal brushed** • **Plastic** • **Glass** • **Glass plastic** • **Chromic II (with color)** • **Gold** • **Aluminum** • **Satin**
		Note: Selecting **Gold**, **Satin**, **Aluminum**, **Glass** or **Chromic** disables the **Color**, **Shininess** and **Emission** properties from the Properties pane.
	Map path	Specifies the file path of the texture image.
Outline	**Width**	Specifies the width, in points, of actor outlines (sharp edges, construction edges, and smart outlines).  **Width** = 1 **Color** = black **Width** = 3 **Color** = red
	Color	(Available when **Same outline color for all actors** (Document Properties - Viewport) is selected.) Specifies the color of actor outlines (sharp edges, construction edges, and smart outlines). When **Same outline color for all actors** is cleared, outlines are based on actor colors.
	Minimum angle	Specifies the minimum angle between two face planes that defines a sharp-edge outline. Smaller values produce more lines.

Category	Property



5



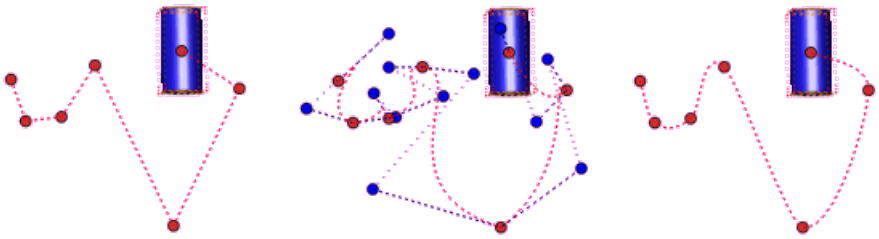
100

Tip: The **Minimum angle** property on the [Default] Document Properties - Viewport page defines the default value for all actors.

Animation

Path Specifies the type of animation path between location keys:

- **Linear** - Creates straight paths.
- **Custom** - Creates configurable curved paths (Bézier curves). To change the path shape, drag the blue anchors.
- **Smooth** - Creates curved paths (cubic Hermite splines). Path, rotation, and speed are optimized to produce smooth animations. For best results, define at least four keys because the path at any point is calculated using the two preceding and the two following keys.



Linear **Custom** **Smooth**

Time function Specifies how transformations are applied during a time period:

- **Linear** - Applies transformations uniformly.
- **Sine** - Applies transformations nonlinearly. For example, an actor moves more slowly at the beginning and end of a path than in the middle.

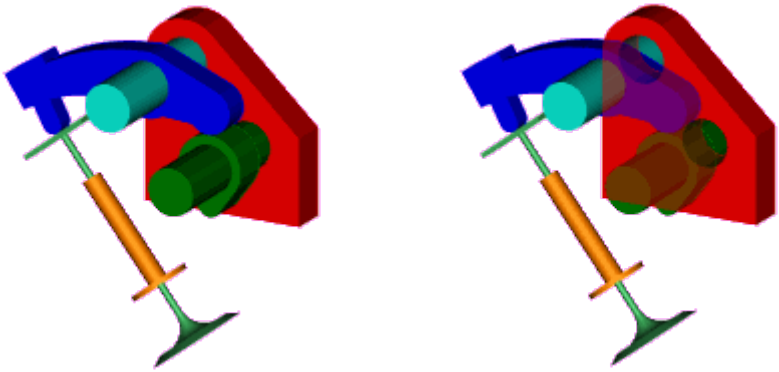
Kinematic link

Link type Specifies the kinematic link type:

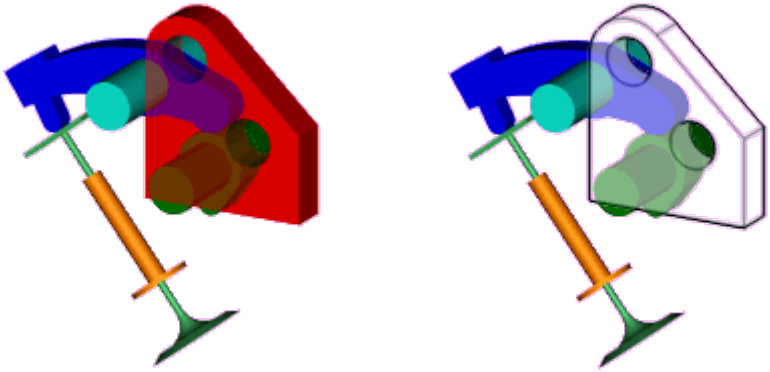
- **Free** - Specifies no kinematic link. The actor can move freely.
- **Pivot** - Allows rotation in one direction as specified by **Link axis**.
- **Spherical** - Allows rotation in all directions.
- **Linear** - Allows translation along the **Link axis**.
- **Rigid** - Disables all actor transformations.

Link axis (in parent) (Available when **Link type** is **Pivot** or **Linear**.) Specifies the free axis.

Limited joints (Available when **Link type** is **Pivot**, **Spherical**, or **Linear**.) Limits the range of motion.

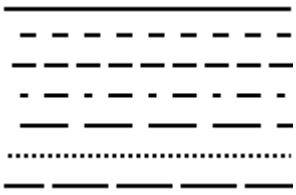
Category	Property	
	Rxmin / Rxmax / Rymin / Rymax / Rzmin / Rzmax / Xmin / Xmax	(Available when **Limited joints** is selected.) Specifies range-of-motion limits. **Note:** For **Pivot** and **Spherical**, Rxmin / Rxmax / Rymin / Rymax / Rzmin / Rzmax values must be included within the following range: -180 degrees to 180 degrees.
Geometry	**Area / Volume**	Specifies geometry information read from CAD. These values have no effect on Composer geometry with the following exception: changing area or volume of pipe geometry affects measurement collaborative actors.
	Bounding box volume	(Read-only.) Specifies the bounding box volume for the actor.
	Type	Specifies the geometry type. Composer uses geometry types to determine certain actor behaviors. For example, only **Solid** actors can have cutting-plane capping. Possible values are: • **Undefined** • **Solid** • **Face** • **Pipe** • **Point** • **Curve** • **Construction geometry (fta)**
	Scale X / Scale Y / Scale Z	Changes the actor size by the specified scaling value. Specify 1.0 for the default size (no scaling).
Custom rendering (Available when **Render** > **Mode** > **Mode** > **Custom** is selected)	**Priority**	Sets the priority of the rendering layer. Actors with higher priority are displayed above lower priority actors. The priority affects actors in the 3D scene and in vector output. In the following example, a priority of 1 is applied to the red baseplate.  Priority=0 Priority=1 **Note:** Ghosted actors with high priority can create unexpected effects, such as holes through parts.

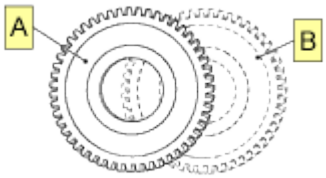
Category	Property	
	Opacity	Sets the opacity of the rendering layer to show more or less of layers below with higher priorities. For example, if Layer1 is above Layer2 but Layer1 has lower priority, the visibility of Layer2 is controlled by the opacity of Layer1.
	Rendering	Sets the rendering mode of the rendering layer: • **Smooth** • **Smooth outline** • **Technical** • **Flat technical** • **Silhouette** In the following example, Silhouette is applied to the red baseplate:



Smooth Silhouette

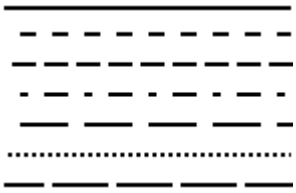
	Visible lines style for Technical Illustration	Specifies the line style for visible lines in vector output.

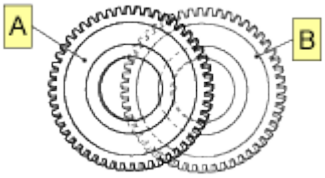




Gear A: Solid visible lines Gear B: Dashed visible lines

Category	Property	
	Hidden lines style for Technical Illustration	Specifies the line style for hidden lines in vector output.





Gears A & B: Solid visible lines Gear B: Dashed hidden lines

Note: Gear B hidden lines are visible because its rendering layer has higher **Priority** than Gear A.

Event

Pulse

Specifies the rate at which the actor flashes, indicating an event is defined:

- **None** - No flashing.
- **200 ms** - Flashes every 200 milliseconds.
- **400 ms** - Flashes every 400 milliseconds.
- **800 ms** - Flashes every 800 milliseconds.

Notes:

- Composer pulses all actors in the scene at the same rate using the most recently set value.
- In animations, defining a pulse key pauses the animation until the user clicks the actor. Use the **Event** > **Link** property to define the action when clicking the actor. If **Link** is not defined, the actor flashes only when **Design Mode** (status bar) is cleared.

Pulse Color

(Available when **Pulse** is not **None**.) Specifies the flashing color.

Link

Defines the action performed when a user clicks an actor or hotspot in the viewport or in vector image output (see the **Technical Illustration - Hotspots** tab).

To create an event link:

1. Click in the **Link** field and then click ...
2. In the **Select a Link** dialog box, select a link type in the **URL** field, specify an appropriate target for that type, and then click **OK**.

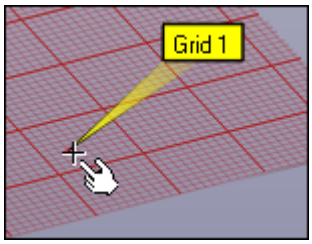
   See *Select a Link*.

Category	Property	
		3. To test the event in the viewport, disable **Design Mode** (status bar) and then click the actor or hotspot.
	Pack linked resource	(Available when the **Link** property specifies a **file://** URL.) Includes the linked file as part of the Composer document. To omit the file, clear this property and ensure that recipients of the document have the linked file in the same absolute path.
Hatching (Available when a **Hatch by actor** cutting plane property is selected)	**Angle**	Specifies the rotation angle of hatch lines.
	Color	Specifies the color of hatch lines.
	Hatch	Specifies the spacing between hatch lines. To turn off hatching, specify 0.
	Thickness	Specifies the thickness of hatch lines.

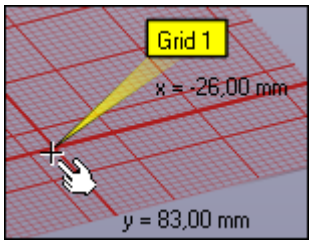
Grid Properties

You can set grid properties in the Properties pane.

Property / Description	
Name	Displays the grid name.
Display axes labels	Displays axes labels (X+ and Y+) on the grid.
Stay on top	Makes the grid visible from any point of view.
Auto fit scene	Fits the grid to visible actors in the scene.
Axis	Defines the axis for the grid.
Color	Specifies the grid color.
Display scale	(Available in orthogonal mode only.) Displays a scale in the lower-right corner of the scene. **Note:** The scale appears in orthogonal mode only (disable **Camera Perspective Mode**).
Opacity	Specifies grid opacity.
Project coordinates	Displays grid coordinates and location lines as you move collaborative actors over the grid in snap-to-grid mode. To enable snap-to-grid mode, select **Grid Mode** in the lower-right corner of the Composer window.



Disabled



Enabled

Steps	Sets the ratio between the X and Y axes. Select **Keep squared** to specify only one axis.
Size	Specifies the grid size, in document length units.
Rotation	Specifies the grid rotation.

Property / Description	
Origin	Specifies the grid origin.

Ground Properties

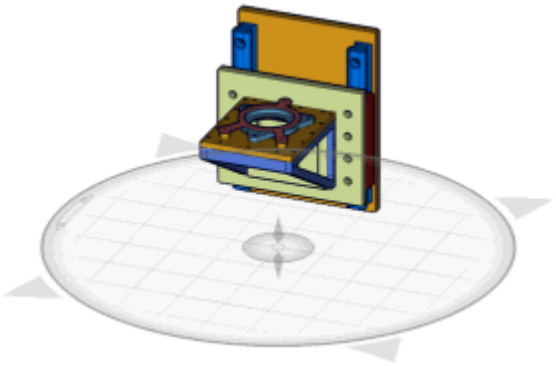
You can set ground properties in the Properties pane.

To select the ground actor, do one of the following:

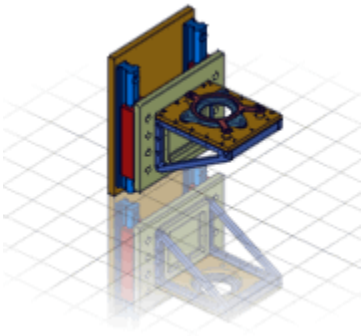
- In the Collaboration pane, click **Environment** > **Ground** .
- In the viewport, drag a selection box without selecting any other actors.

To show or hide the ground actor, do one of the following:

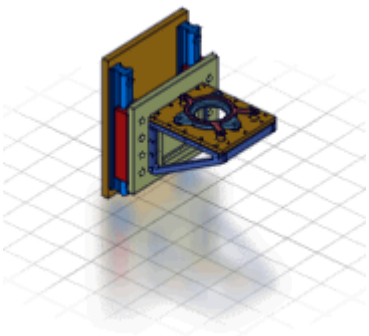
- In the Collaboration pane, click the **Environment** > **Ground** check box.
- On the ribbon, click **Render** > **Ground** > **Ground** .
- In the viewport, press **Ctrl+G**.

Category	Property / Description	
N/A	**Name**	Specifies the name of the ground actor, **Ground** by default.
	Auto fit	Displays additional options to size and position the ground automatically. **Tip:** When the ground actor is selected, you can resize, rotate, and reposition the ground by dragging the handles in the viewport. 
	Auto size	(Available when **Auto fit** is selected.) Sizes the ground automatically to fit the visible actors.
	Auto center	(Available when **Auto fit** is selected.) Centers the ground automatically to fit the visible actors.
	Auto height	(Available when **Auto fit** is selected.) Positions the ground automatically so visible actors are resting on it.
	Set height on geometry	Positions the ground so visible actors are resting on it.
	Diameter	(Available when **Auto size** is cleared.) Specifies the ground diameter.

Category	Property / Description	
Ground texture	**Color**	Specifies the ground color.
	Opacity	Specifies the ground opacity.
	Ground texture	Specifies an image files to apply to the ground.
	Scale	Specifies the magnification of the ground texture
Ground mirror	**Mirror**	Displays reflections of geometry actors on the ground. You can also show or hide the mirror from the ribbon (**Render** > **Ground** > **Mirror**). **Notes:** • The mirror does not reflect actors such as annotations, outlines, cutting planes, and Digger. • Requires Advanced OpenGL hardware acceleration. See *Advanced*.
	Reflection intensity	Specifies mirror image opacity.
	Blur	Blurs mirror reflections by applying a Gaussian filter. Blurring the mirror can improve the viewing experience by better differentiating the model from its reflection.
Ground shadow	**Ground shadow**	Displays shadows of geometry actors on the ground. You can also show or hide the shadow from the ribbon (**Render** > **Ground** >**Shadow**).
	Soft shadowing	Specifies shadow sharpness.
Ground grid	**Ground grid**	Displays a grid on the ground. You can also show or hide the grid from the ribbon (**Render** > **Ground** > **Grid**).
	Color	Specifies the grid color.



No Blur



Blur

Category	Property / Description	
	Opacity	Specifies the grid opacity.
	Ratio grid/ground	Specifies the relative size of the grid. To make the grid exactly cover the ground, specify 100. Smaller values limit the grid to a portion of the ground. Larger values extend the grid beyond the ground.
	Step X/Y	Specifies the size of each grid cell.
Ground border	**Show border**	Displays a border at the ground edge of the color you specify.
	Fall off	Specifies how quickly the ground color fades as it approaches the edge. If **Show border** is selected, the border color grows in intensity as the ground color fades.
	Color	Specifies the border color.

Hotspot Properties

You can set hotspot properties in the Properties pane.

Category	Description	
N/A	**Show**	Specifies whether the hotspot is active in the viewport. Select **Enable** to activate the hotspot. When enabled, the hotspot highlight color, tooltip, and link definition take precedence over individual actor highlighting, tooltips, and links. **Note:** Disabling a hotspot affects viewport behavior only. To disable hotspots in vector output, clear **Export custom hotspots** on the Technical Illustration - Hotspots tab. See *Technical Illustration - Hotspots*.
	Tooltip	Specifies the tooltip text that appears when you hover over the hotspot in the viewport or generated vector image. **Note:** You cannot create multi-line tooltips.
	Color	Specifies the highlight color when you hover over the hotspot in the viewport or generated vector image. **Note:** CGM files do not store highlight colors. The highlight color depends on the CGM viewer.
Event	**Link**	Defines the action performed when a user clicks an actor or hotspot in the viewport or in vector image output (see the **Technical Illustration - Hotspots** tab). To create an event link: 1. Click in the **Link** field and then click …. 2. In the **Select a Link** dialog box, select a link type in the **URL** field, specify an appropriate target for that type, and then click **OK**. See *Select a Link*. 3. To test the event in the viewport, disable **Design Mode** (status bar) and then click the actor or hotspot.
	Pack linked resource	(Available when the **Link** property specifies a **file://** URL.) Includes the linked file as part of the Composer document. To omit the file, clear this property and ensure that recipients of the document have the linked file in the same absolute path.
CGM Attributes	**Application Structure Ident**	(Applies to technical illustrations generated in the CGM format, and compliant with the S1000D 4.x standard. See *Options Tab*.) Specifies the value used in the XML companion file for the applicationStructureIdent attribute of the hotspot element. **Note:** If you do not specify a value, some default values will be used in the XML companion file.

Category	Description
Application Structure Name	(Applies to technical illustrations generated in the CGM format, and compliant with the S1000D 4.x standard. See *Options Tab*.) Specifies the value used in the XML companion file for the applicationStructureName attribute of the hotspot element. **Note:** If you do not specify a value, some default values will be used in the XML companion file.

Light Properties

You can modify the properties of each light source in the Properties pane.

Category	Property / Description	
N/A	**Name**	Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
	Type of light	Specifies the light type: **Spot**, **Positional**, or **Directional**.
	On/off	Enables/disables each light source separately.
	Intensity	Specifies the intensity of each light source.
	Display in animation	Uses a light source in an animation.
Color	**Ambient color**	Specifies the color of the ambiance of the scene. Ambient light is applied to the whole scene in all directions.
	Diffuse color	Specifies the color of the diffuse light source. Diffuse light has rays that are randomly reflected in many directions.
	Specular color	Specifies the color of the specular light source. Specular light is the direct (mirror-like) reflection of a light source on a 3D actor.
Spot configuration	**Cut off**	Specifies the angle of the light cone (between 0 and N/4).

Category	Property / Description
	Exponent Specifies the graduated shading of the border (between 0 and 128).

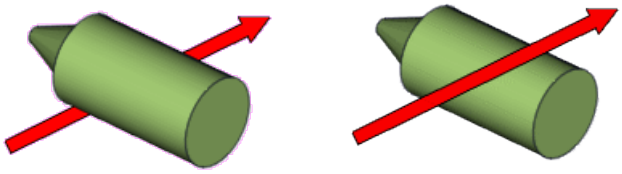
Magnetic Line Properties

You can set magnetic line properties in the Properties pane.

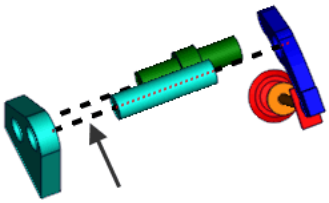
Property / Description	
Name	Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
Length	Specifies the magnetic line length, in document length units. You can change the length by typing a value or by dragging a magnetic line anchor:
Magnet	Turns on or off magnetic line magnetism.
Spacing	Specifies how actors are positioned on the magnetic line: • **Custom** - Positions actors where you drag them. • **Uniform** - Spaces actors evenly.

Markup Properties

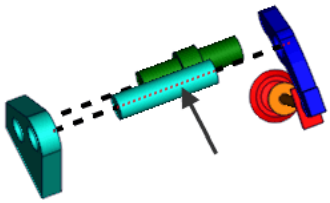
You can set markup properties in the Properties pane.

Category	Description	Available for
N/A	**Name** Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.	
	Tooltip Specifies the tooltip text that appears when you hover over the actor. The default is the actor name, but you can select a different property or meta-property, or type a text string. To type text, which itself can contain properties, select **String** and use the **Tooltip string** property. **Note:** By default, labels attached to an actor display the actor's tooltip text. To change this behavior, modify the label's **Text** property.	
	Tooltip string (Available when **Tooltip** is **String**.) Specifies the tooltip text. Type your text, optionally with property keywords. For geometry actors, click ... to display the **Text** pane, where you can type multiple lines of text and more easily embed properties. See *Text pane* for details on property keywords and the **Text** pane.	
	Color Specifies the actor color.	
	Opacity Specifies the opacity, from 0 (transparent) to 255 (solid).	
	Stay on top Makes the collaborative actor visible even when a geometry actor covers it.  Disabled Enabled	
	Hidden style (Available when **Stay on top** is cleared.) Enables **Back line** properties. A back line passes under actors that are on top. You can define different styles for front and back lines.	

Category	Description	Available for



Front Line



Back Line

Smooth

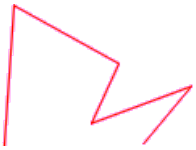
Creates curved polyline segments (cubic Hermite splines).

Disabled

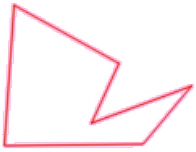
Enabled

Close

Connects the first and last nodes to create a closed polyline space.



Disabled



Enabled

Line width

Specifies redline thickness, in millimeters.

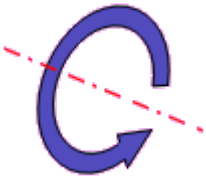
Radius

Specifies the radius, in millimeters.

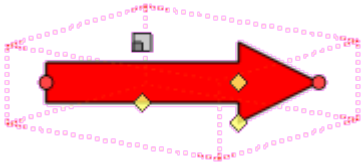
Show axis vertices

Displays the axis of the circular arrow, which helps indicate its orientation.

Disabled

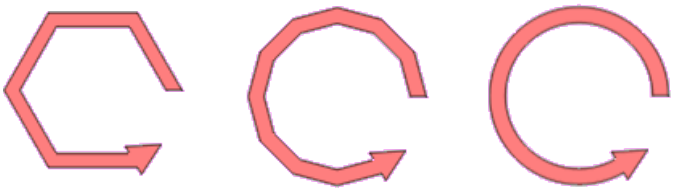


Enabled

Category	Description	Available for
Arrow shape	**Fixed Size Arrow** Specifies that the arrow size must remain fixed, no matter what the zoom factor is. This ensure that the arrow remains visible at all times.	→
	Fixed Length Specifies the required length of the arrow, when **Fixed Size Arrow** is selected. The length is defined according to paper dimensions.	→
	Extremity Specifies where to place arrowheads. **Start** **End** **Both** **None** The **Head shape**, **Head width**, and **Head length** properties define arrowhead shape and size. **Tip:** To easily change arrow shape and size properties, drag anchors in the viewport. 	→ ↶ ↱
	Head Shape Specifies where the arrowhead meets the shaft specified as a ratio of head length (-1 to 1, with 0 being perpendicular). 0.0 0.2 -0.2 **Note:** To avoid deformed arrows, the value range (-1 to 1) might be reduced when dragging the head-shape anchor ◆ in the viewport.	→ ↶ ↱
	Head width Specifies the arrowhead width, in document length units, as measured from the shaft centerline. 20 60	→ ↶ ↱

Category	Description	Available for
	Tip: To change head and shaft widths simultaneously, drag the head-width anchor in the viewport. To change just head width, press **Shift** while dragging the anchor.	
	Head length Specifies the arrowhead length, in document length units. Changing arrowhead length does not change the overall arrow length (**Length**). 20 60 100	
	Width Specifies the arrow shaft width, in document length units.	
	Length Specifies the arrow length, in document length units. **Note:** This property is disabled for linear arrows, when **Fixed Size Arrow** is enabled. **Tip:** When changing the length of a linear arrow by dragging an anchor in the viewport, an axis line appears to help you retain the arrow orientation. You can also press **Alt** while dragging to lock the orientation.	
	Flat Specifies the flat representation of a circular arrow. Disabled Enabled	
	Radius Specifies the radius, in millimeters.	
	Step Specifies the number of curve segments.	

Category	Description	Available for



5 10 30

Angle Specifies the number of degrees (0 to 360) of a circular arrow.

90 270

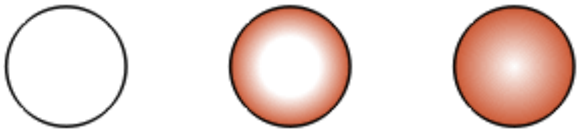
Tip: You can also change **Angle** and **Radius** by dragging the arrow in the viewport. A dashed line shows the original radius. The arrow snaps to this line when nearby so you can easily change the rotation angle without changing the radius.

Background

Color Specifies the background color.

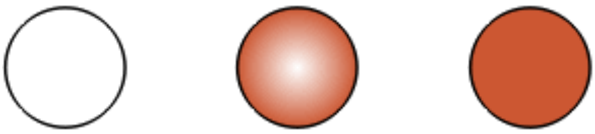
Opacity Specifies the opacity, from 0 (transparent) to 255 (solid).

Thickness Specifies the thickness of the circle background as a percentage.



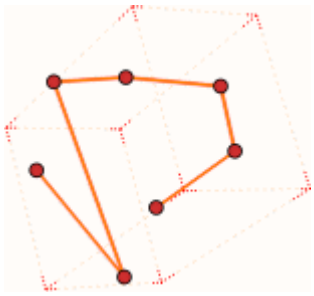
0% 50% 100%

Type Specifies the background style.

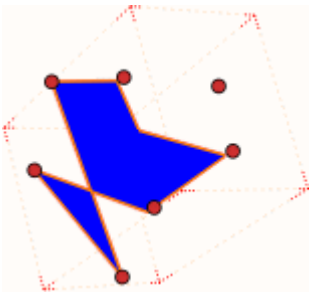


None Gradient Fill

Category	Description	Available for
	Gradient Specifies the gradient effect.	
Fill	**Fill** Applies a fill color to the polyline interior. Composer flattens the polyline to a 2D plane defined by the first three polyline nodes. Nodes not on the plane are projected onto the plane to define the polyline shape.	
	Color Specifies the fill color.	
	Opacity Specifies the fill opacity.	
Border	**Show** Displays the border.	
	Width Specifies the border line width, in millimeters.	
	Opacity Specifies the border opacity (between 0 and 255).	
	Color Specifies the border color.	
	Type Specifies the border type.	

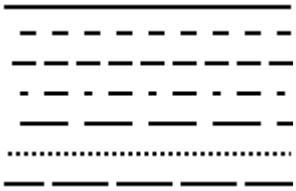


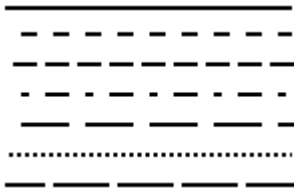
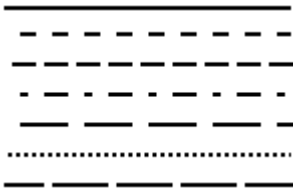
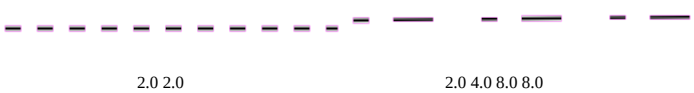
Disabled



Enabled **Color** = blue **Opacity** = 255

Note: Z-fighting can occur for filled polylines on 3D geometry when **Stay on top** is cleared. To prevent Z-fighting, translate the polyline so it is offset from the 3D surface, or enable **Stay on top**.

Category	Description		Available for
			
Inlaid Text	**Show inlaid text**	Displays text inside a linear arrow.	
	Color	Specifies the color of the inlaid text.	
	Type	Specifies the type of text to display inside the arrow: • **Length** displays the length of the arrow (in model coordinates). Not available for fixed-size arrows. • **Custom** displays text you specify. **Note:** For technical illustrations saved in SVG format, available only when **Stay on Top** is selected.	
	Text	(Available when **Custom** is selected.) Specifies the text to display inside the arrow.	
Back Border	**Show**	(Available when **Stay on top** is cleared and when **Hidden Style** is selected.) Displays the back border.	
	Width	Specifies the width of the back border line, in millimeters.	
	Opacity	Specifies the back border opacity (between 0 and 255).	
	Color	Specifies the back border color.	
	Type	Specifies the back border type.	
Line	**Width**	Specifies the line width, in millimeters.	
	Opacity	Specifies the actor opacity (between 0 and 255).	
	Color	Specifies the line color.	

Category	Description		Available for
	Type	Specifies the line style. 	
Front line/Back line (**Back line** available when **Hidden style** is selected)	**Width**	Specifies the line width, in millimeters.	
	Opacity	Specifies the actor opacity (between 0 and 255).	
	Color	Specifies the line color.	
	Type	Specifies the line style. 	
		Selects a predefined style.	
		User defined — Defines a custom dashed-line style (see the **Dash pattern** property).	
		Advanced — Defines a custom line style using symbols and custom spacing (see the **Symbol # *n***, **Symbol size**, and **Space between symbols** properties).	
	Dash pattern	(Available when **Type** is **User defined**.) Defines the line as a repeating series of dashes and spaces of the specified lengths, in millimeters. For example, `2.0 4.0 8.0 8.0` defines a 2 mm dash followed by a 4 mm space followed by an 8 mm dash followed by an 8 mm space, and then repeat.  2.0 2.0 2.0 4.0 8.0 8.0	
	Symbol #1, Symbol #2, Symbol #3, Symbol #4		
	Style	(Available when **Type** is **Advanced**.) Defines a custom line style consisting of up to 4 different symbols.	

Category	Description	Available for

None

Bold arrow

Medium arrow

Thin arrow

Rhombus

Round

Cross

Star

Plus

Square

Minus

Half Sinus up

Half Sinus down

Small round

Symbol size

(Available when **Type** is **Advanced**.) Specifies the size of each symbol.

Space between symbols

(Available when **Type** is **Advanced**.) Specifies the space between symbols as a multiplier of **Symbol size**.

-0.5 (overlapping) 0 (touching) 1 (one symbol width)

Extremity

Start

Specifies the extremity symbol for the line start point.

None

Bold arrow

Medium arrow

Thin arrow

Rhombus

Round

Cross

Arrow

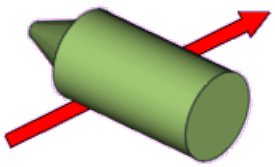
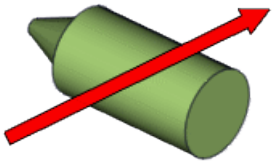
End

Specifies the extremity symbol for the line end point.

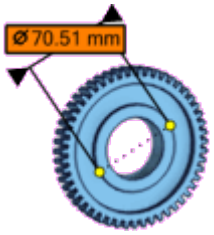
Category	Description	Available for
	None **Bold arrow** **Medium arrow** **Thin arrow** **Rhombus** **Round** **Cross** **Arrow**	
Size	Specifies the size of the extremity symbol (between 0.5 and 100).	

Measurement Properties

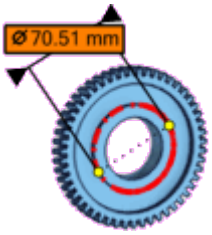
You can set measurement properties in the Properties pane.

Category	Description
General	**Name** — Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
	Tooltip — Specifies the tooltip text that appears when you hover over the actor. The default is the actor name, but you can select a different property or meta-property, or type a text string. To type text, which itself can contain properties, select **String** and use the **Tooltip string** property. **Note:** By default, labels attached to an actor display the actor's tooltip text. To change this behavior, modify the label's **Text** property.
	Tooltip string — (Available when **Tooltip** is **String**.) Specifies the tooltip text. Type your text, optionally with property keywords. For geometry actors, click ... to display the **Text** pane, where you can type multiple lines of text and more easily embed properties. See *Text pane* for details on property keywords and the **Text** pane.
	Opacity — Specifies the opacity, from 0 (transparent) to 255 (solid).
	Stay on top — Makes the collaborative actor visible even when a geometry actor covers it.  Disabled  Enabled
	Auto show — Displays hidden annotation and measurement actors temporarily when you move the mouse pointer over the associated geometry actor. The annotation or measurement disappears when you hover over a different actor. **Note:** The Collaboration tree does not reflect this temporary change of visibility.
	Show red lines — (Available for radius and diameter measurements, for distance between centers, and for distance between two axes.) Shows the measurement construction line.

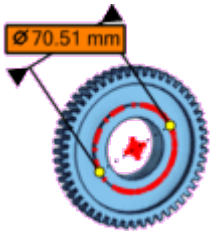
Category	Description



Disabled



Enabled (with **Show construction line** disabled)



Enabled (with **Show construction line** enabled)

Show construction line (Not available when **Show red lines** is cleared.) Shows construction lines.

Show planes Shows planes (in the case of distance or angle measurements between plane and plane or point). To disable the display of planes, clear this property.

Auto alignment Specifies positions for collaborative actors with respect to their associated geometry actors: **Perimetric**, **Circle**, **Rectangle**, **Bottom**, **Bottom and left**, **Bottom and right**, **Bottom and top**, **Top**, **Top and left**, **Top and right**, **Left**, **Left and right**, **Right**, **Free 2D**, **Free 3D**.

Notes:

- To align collaborative actors using magnetic lines, **Auto alignment** must be **Free 2D** or **Free 3D**. When dragged onto a magnetic line, an actor's **Auto alignment** is set to **Free 2D** automatically.
- To ensure that cutting planes are applied to annotations, you must set **Auto alignment** to either **Free 2D** or to **Free 3D**.

Show axis vertices (Available for distance between centers, and for distance between two axes.) Shows the axis vertices.

Auto hide Specifies whether the annotation should be hidden if the anchor of the label or callout is hidden.

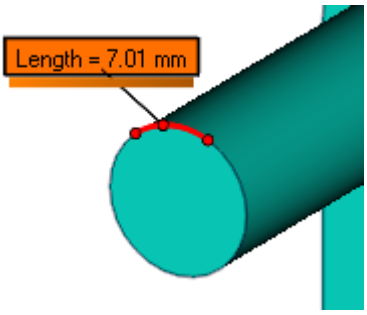
- **Disable**: Disables **Auto hide**.
- **Standard**: Enables **Auto hide** if the anchor of the annotation is hidden by any geometry (even the geometry linked by the annotation).
- **Advanced**: Enables **Auto hide** if the anchor of the annotation is hidden by any geometry other than the linked object.

Note: Depending on the number of annotations, the **Advanced** option may be slow. It is recommended to use it only when needed.

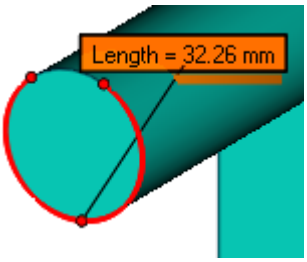
Value (Diameter, Length, etc.) Specifies the measurement value. Changing the value changes the measurement construction lines.

Tip: To change the value displayed by the measurement actor without changing the actual measurement, clear the **Measurement/GD&T** > **Display value** property and specify a pre, middle, or post string.

Category	Description
	Complementary Flips the arc direction.

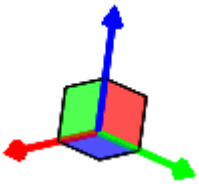


Arc

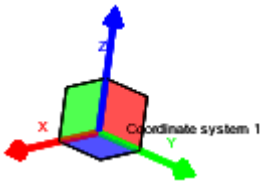


Complementary Arc

Display name	Displays the coordinate system name on the icon.



Without name and axes labels



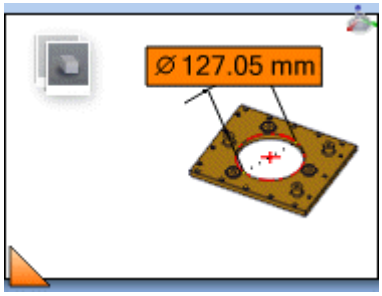
With name and axes labels

Display axes labels	Displays axes labels on the icon.
Size	Specifies the size of the coordinate system icon.
Measurement / GD&T	
Display value	Displays the measurement value. To omit the value and use just the specified Measurement/GD&T strings and symbols, clear this property.
Pre symbol, Middle symbol, Post symbol	Specifies the pre-, middle-, or post-position GD&T symbol.

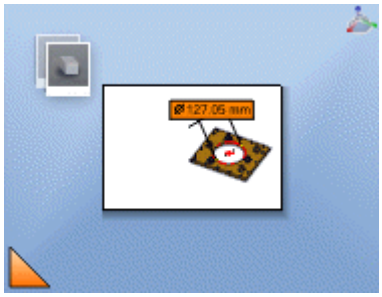
	None
	Straightness
	Flatness
	Circularity
	Cylindricity
	Line Profile
	Surface Profile
	Angularity
	Perpendicularity

Category	Description
	Parallelism
	Position
	Concentricity
	Symmetry
	Circular Runout
	Total Runout
	Projected Tolerance Zone
	Max. Material Condition
	Min. Material Condition
	Free State Variations
	Diameter
	Plus Minus
	Plus
	Minus
	Equal
	To be Defined
	Pre string, Middle string, Post string — Specifies the pre-, middle-, or post-position string.
Text	**Color** — Specifies the text color.
	Font — Specifies the font family, style, and size of actor text. The default font family is your machine's default font or Arial depending on **Use default GUI font for text** (Application Preferences - Viewport). The default size is specified by **Font size** ([Default] Document Properties - Paper Space). **Notes:** • **Font** (size) and **Size** properties are linked. • When a font is not available in a vector image format, it is replaced by a default font. If the vector output is not acceptable, use a different font in Composer.
	Size — Specifies the text size, in points. The default size is specified by **Font size** (in **[Default] Document Properties - Paper Space**). **Notes:** • **Font** (size) and **Size** properties are linked.

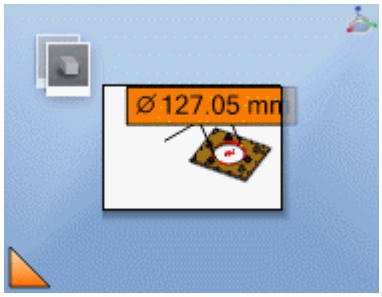
Category	Description
	• Because **Size** is stored as pixels in Composer files, changing your screen resolution (DPI) changes rendered text sizes.
	Size in paper space Defines the font size in the paper space. When you resize the viewport or zoom the paper space, the text scales accordingly. To define text size as fixed in the viewport, clear this property.



Before Zooming the Paper Space



After: **Size in paper space** Enabled



After: **Size in paper space** Disabled

Note: You can specify the default value using **AnnotationRelativeComposer** (for Composer) or **AnnotationRelativePlayer** (for Composer Player) on the Application Preferences - Advanced Settings page.

Label	**Label orientation**	Specifies the orientation of the measurement label. • **Horizontal:** Displays the label horizontally. • **Auto:** Aligns the label parallel with the leader line. This property does not work with angle measurements.

Category	Description

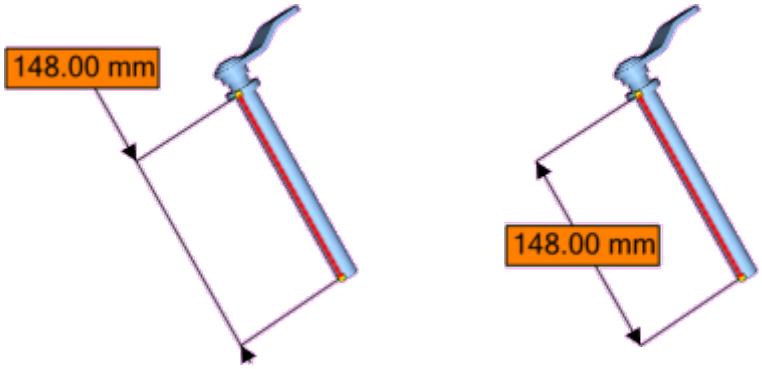
Label position

(Available when the orientation of the measurement label is set to **Auto**.) Specifies the position of the measurement label relatively to the leader.

- **Inline:** Displays the label in the leader.
- **Inside:** Aligns the label below the leader.
- **Outside:** Aligns the label above the leader.

Center value

Centers the measurement text between the attach lines.



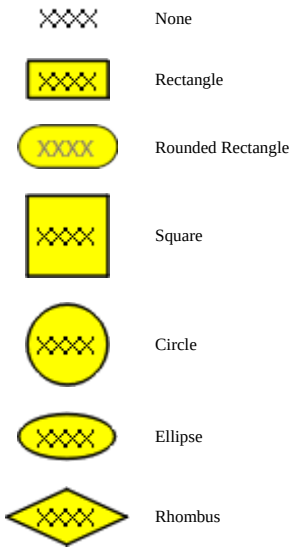
Before After

Notes:

- This capability is available for all measurements between two axes except diameters and radii.
- Centering text does not lock its position.

Shape

Specifies the annotation or label shape.



Category	Description

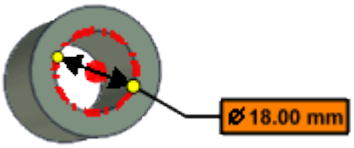
Note: When the label orientation is set to **Auto**, if a measurement value overlaps the leader line and you set its label's shape to **None**, some padding will be applied around the measurement value to ensure that it remains easy to read.

Color Specifies the shape background color.

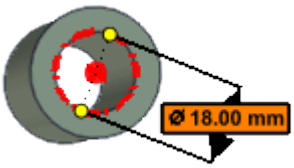
Opacity Specifies the shape background opacity.

Attach

Type Specifies the attachment line style for radius and diameter measurements.

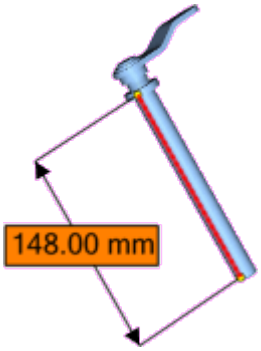


Simple



Double

Advanced Enables attach-line style properties (**Width**, **Color**, **Opacity**, **Type**). When cleared, line style properties are used by default.



Disabled (default style properties)

Enabled (advanced style properties)

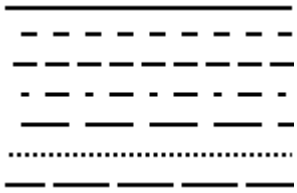
Width Specifies the attach line width.

Color Specifies the attach line color.

Opacity Specifies the attach line opacity.

Category	Description

Type Specifies the attach line type.



Show end points Shows end points for measurement lines, red lines, construction lines. To disable the display of end points, clear this property.

End point size Specifies the size of end points, when visible.

End point color Specifies the size of end points, when visible.

Arrow style Specifies the arrow style:

None

Bold arrow

Medium arrow

Thin arrow

Rhombus

Round

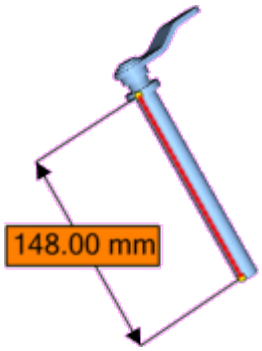
Cross

Arrow

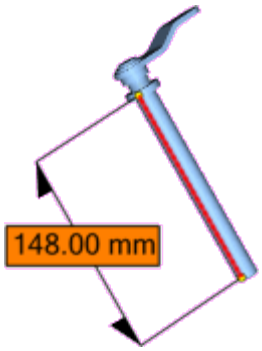
Up arrow

Down arrow

Category	Description
	Size Specifies the arrow size.



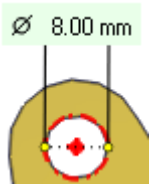
Default (4.0 Bold arrow)



8.0 Up arrow

Line

Show Displays a background border.



Disabled

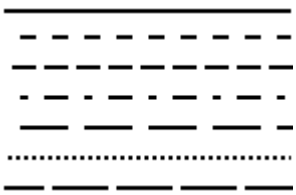
Enabled

Width Specifies the line width, in millimeters.

Opacity Specifies the actor opacity (between 0 and 255).

Color Specifies the line color.

Type Specifies the line style.



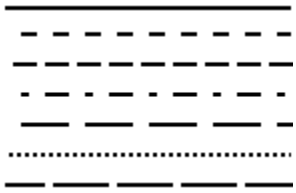
Category	Description	
Border	**Show**	Displays the border.
	Width	Specifies the border line width, in millimeters.
	Opacity	Specifies the border opacity (between 0 and 255).
	Color	Specifies the border color.
Event	**Link**	Defines the action performed when a user clicks an actor or hotspot in the viewport or in vector image output (see the **Technical Illustration - Hotspots** tab). To create an event link: **1.** Click in the **Link** field and then click ⋯. **2.** In the **Select a Link** dialog box, select a link type in the **URL** field, specify an appropriate target for that type, and then click **OK**. See *Select a Link*. **3.** To test the event in the viewport, disable **Design Mode** (status bar) and then click the actor or hotspot.
	Pack linked resource	(Available when the **Link** property specifies a **file://** URL.) Includes the linked file as part of the Composer document. To omit the file, clear this property and ensure that recipients of the document have the linked file in the same absolute path.

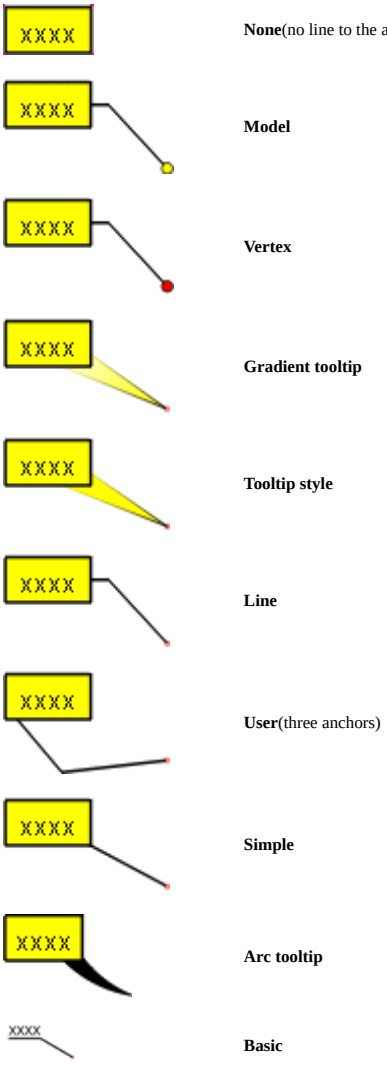
Panel Properties

You can set panel properties in the Properties pane.

Category	Description	Available for
N/A	**Name** Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.	
	Tooltip Specifies the tooltip text that appears when you hover over the actor. The default is the actor name, but you can select a different property or meta-property, or type a text string. To type text, which itself can contain properties, select **String** and use the **Tooltip string** property. **Note:** By default, labels attached to an actor display the actor's tooltip text. To change this behavior, modify the label's **Text** property.	
	Tooltip string (Available when **Tooltip** is **String**.) Specifies the tooltip text. Type your text, optionally with property keywords. For geometry actors, click ... to display the **Text** pane, where you can type multiple lines of text and more easily embed properties. See *Text pane* for details on property keywords and the **Text** pane.	
	Color Specifies the actor color.	
	Opacity Specifies the opacity, from 0 (transparent) to 255 (solid).	
	Background Places the panel behind all 2D and 3D actors in the scene. To keep the panel on top, clear this property. Use the **Depth** property to control the order of multiple 2D panels.	
	Depth Specifies the depth of the panel (if several panels are superposed).	
	Freeze Prevents selection of the actor in the viewport. You can select the actor in the Collaboration pane. You can change property values, but you cannot move the actor by dragging it. Frozen actors are not attracted to magnetic lines. Choose one of the following: **No Freeze** — The actor is not frozen. **Freeze** — The actor is frozen in Composer Player and Composer. **Freeze only in player** — The actor is frozen in Composer Player only (and Composer when **Design Mode** is off).	

Category	Description		Available for
	Clipping for Technical Illustration	Eliminates the panel from vector output when all four panel borders are outside the paper space. To include the panel, such as a large background image or title block, clear this option.	
	Billboard	Specifies the actor orientation: • **None** - Keeps the creation position. • **XYZ** - Remains parallel to the world frame. • **XYZ Screen** - Remains parallel to the world frame with the size relative to the screen. • **Up** - Keeps the vertical axis.	
	Scale	Resizes the vector image.	
	Shape	Specifies the background shape, which does not affect the vector image itself. **Rectangle** — Uses a rectangular corresponding to the bounding box. **Circumscribed circle** — Uses a circle that fully encloses the bounding box. **Inscribed circle** — Uses a circle that is fully enclosed by the bounding box. Use the **Scale** property to resize the image as necessary.	
Background	**Show**	Displays a background.	
	Color	Specifies the background color.	
	Opacity	Specifies the opacity, from 0 (transparent) to 255 (solid).	
	Gradient	Specifies the gradient effect.	
Border	**Show**	Displays the border.	
	Width	Specifies the border line width, in millimeters.	
	Opacity	Specifies the border opacity (between 0 and 255).	

Category	Description	Available for
	Color Specifies the border color.	
	Type Specifies the border type. 	
Attach	**Type** Specifies the attachment line style. You can position the attach line by dragging the anchor at either endpoint.	



None(no line to the attach point)

Model

Vertex

Gradient tooltip

Tooltip style

Line

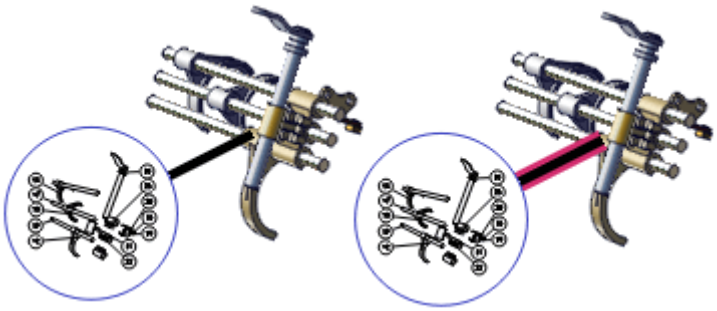
User(three anchors)

Simple

Arc tooltip

Basic

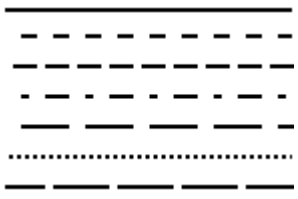
Category	Description		Available for
	Width	(Available when **AttachType** is **Line**, **Vertex**, **Model**, **Simple**, **User**, or **Arc tooltip**.) Specifies the width of the attach line, in millimeters.	
	Color	(Available when **AttachType** is **Line**, **Vertex**, **Model**, **Simple**, or **User**.) Specifies the attach color.	
	Curvature	(Available for **Arc tooltip** only.) Specifies the arc shape. For 2D panels only, you can change the curvature by dragging the curvature anchor in the viewport.	
Attach border	**Show**	Displays an attach border. Not available for all attach types.	



Without attach border | With attach border (pink)

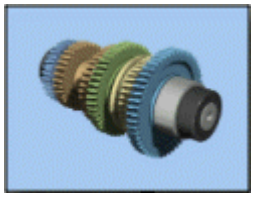
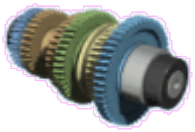
Note: For annotations, **Border** settings override **Attach border** settings.

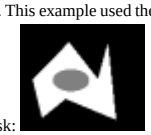
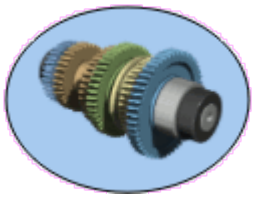
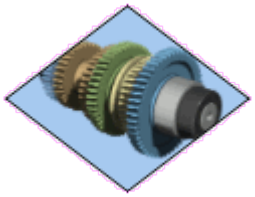
	Color	Specifies the attach border color.	
	Opacity	Specifies the border opacity, between 0 (transparent) and 255 (solid).	
	Type	Specifies the border line type.	



Category	Description	Available for
	Width Specifies the attach border width, in millimeters.	
Placement	**Auto fit** Resizes the panel automatically to fit its text. Disable this property to resize manually. In this case, the text is wrapped automatically. The wrap width matches the size of the 2D panel. Disabled: One anchor at each corner Enabled: No anchors	
	Left Specifies the distance, in millimeters, from the left edge of the paper space.	
	Top Specifies the distance, in millimeters, from the top edge of the paper space.	
	Width Specifies the panel width, in millimeters.	
	Height Specifies the panel height, in millimeters.	
	Keep aspect ratio Retains the height-to-width ratio when resizing the panel.	
Event	**Pulse** Specifies the rate at which the actor flashes, indicating an event is defined: • **None** - No flashing. • **200 ms** - Flashes every 200 milliseconds. • **400 ms** - Flashes every 400 milliseconds. • **800 ms** - Flashes every 800 milliseconds. **Notes:** • Composer pulses all actors in the scene at the same rate using the most recently set value. • In animations, defining a pulse key pauses the animation until the user clicks the actor. Use the **Event** > **Link** property to define the action when clicking the actor. If **Link** is not defined, the actor flashes only when **Design Mode** (status bar) is cleared.	
	Pulse Color (Available when **Pulse** is not **None**.) Specifies the flashing color.	

Category	Description	Available for
	Link Defines the action performed when a user clicks an actor or hotspot in the viewport or in vector image output (see the **Technical Illustration - Hotspots** tab). To create an event link: 1. Click in the **Link** field and then click …. 2. In the **Select a Link** dialog box, select a link type in the **URL** field, specify an appropriate target for that type, and then click **OK**. See *Select a Link*. 3. To test the event in the viewport, disable **Design Mode** (status bar) and then click the actor or hotspot.	
	Pack linked resource (Available when the **Link** property specifies a **file://** URL.) Includes the linked file as part of the Composer document. To omit the file, clear this property and ensure that recipients of the document have the linked file in the same absolute path.	
Texture	**Map path** Specifies the file path of the texture image.	
	Image fill mode Specifies how the texture is applied to the panel: • **No Deformation** - Retains the image aspect (width-to-height) ratio, adapting the panel size as needed. • **Strech** - Adapts the image aspect ratio to fit the panel. • **Repeat** - Retains the image size and repeats it multiple times on the panel.	
	Transparency Makes the texture image transparent so actors below it are visible.	
	Ratio height/width Stretches the image, changing its aspect ratio.	
	Scale Specifies the displayed image size.	
Text	**Alignment** Specifies the text alignment: **Left**, **Center**, or **Right**.	
	Color Specifies the text color.	
	Font Specifies the font family, style, and size of actor text. The default font family is your machine's default font or Arial depending on **Use default GUI font for text**	

Category	Description	Available for
	(Application Preferences - Viewport). The default size is specified by **Font size** ([Default] Document Properties - Paper Space). **Notes:** • **Font** (size) and **Size** properties are linked. • When a font is not available in a vector image format, it is replaced by a default font. If the vector output is not acceptable, use a different font in Composer.	
	Size Specifies the text size, in points. The default size is specified by **Font size** (in **[Default] Document Properties - Paper Space**). **Notes:** • **Font** (size) and **Size** properties are linked. • Because **Size** is stored as pixels in Composer files, changing your screen resolution (DPI) changes rendered text sizes.	
	Text string Specifies the text. To type multiple lines of text or to embed properties, click … to display the **Text** pane. See *Text pane*.	
Size	**Width** Specifies the panel width, in millimeters.	
	Height Specifies the panel height, in millimeters.	
Shape	**Shape** Specifies the image shape, occluding the image when it does not fit.	
	 **None** Uses the rectangular bounding box.	
	 **Auto** Detects the shape automatically by making the dominant image color (typically the background color) transparent.	
	User Uses the **Mask path** image to define the shape. The darker the color in the mask image, the more the texture image is erased. White in the mask has no effect on the texture image, whereas black completely hides the	

Category	Description		Available for
		texture image. This example used the following mask: 	
	 **Ellipse**	Uses an ellipse.	
	 **Rhombus**	Uses a rhombus.	
	Mask path	(Available when **Shape** is **User**.) Specifies an image file that is overlayed on the panel.	
Border	**Color**	Specifies the shape border color.	
	Opacity	Specifies the shape border opacity.	
	Show	Displays the shape border. Borders are not shown when **Shape** is **User** or **Auto**.	
	Type	Specifies the line type for the shape border.	
	Width	Specifies the line width, in millimeters, for the shape border.	
Shadow	**Show**	Displays a shadow under the 2D panel, giving the actor a 3D effect.	

Disabled

Enabled

Category	Description	Available for

Preset Lets you choose predefined combinations of shadow properties:

Bottom right

Halo

Bottom

Bump

User (Selected automatically when you modify a preset)

Distance Specifies shadow offset, in millimeters, relative to the panel center.

3 mm

15 mm

Orientation Specifies shadow position, in degrees (º), relative to the right side of the panel.

0º

45º

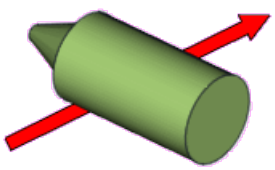
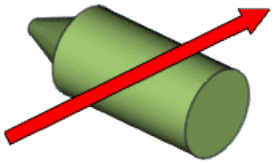
135º

Opacity Specifies shadow opacity, from 0 (transparent) to 255 (opaque).

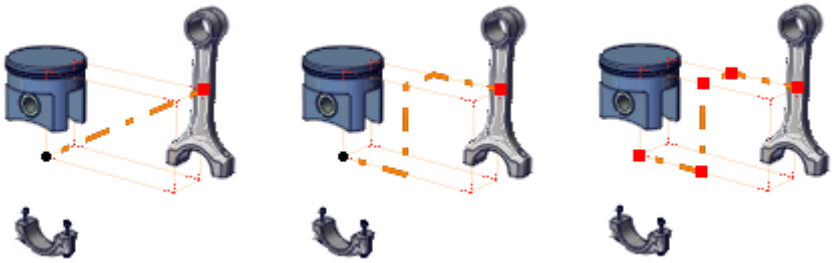
Category	Description	Available for
	50 255	
	Blur Specifies shadow sharpness, from 0 (no blur) to 20 (high blur). 0 20	

Path Properties

You can set properties for associative and non-associative paths in the Properties pane.

Category	Property / Description
N/A	**Name** Specifies the actor name. This name appears in the Collaboration or Assembly tree and is the default tooltip text.
	Tooltip Specifies the tooltip text that appears when you hover over the actor. The default is the actor name, but you can select a different property or meta-property, or type a text string. To type text, which itself can contain properties, select **String** and use the **Tooltip string** property. **Note:** By default, labels attached to an actor display the actor's tooltip text. To change this behavior, modify the label's **Text** property.
	Tooltip string (Available when **Tooltip** is **String**.) Specifies the tooltip text. Type your text, optionally with property keywords. For geometry actors, click ... to display the **Text** pane, where you can type multiple lines of text and more easily embed properties. See *Text pane* for details on property keywords and the **Text** pane.
	Stay on top Makes the collaborative actor visible even when a geometry actor covers it.  Disabled  Enabled
	Construct Mode Specifies how the path is drawn: • **Real path** (associative paths only) - Uses a direct path. • **Free path** (non-associative paths only) - The path is a polyline you can customize. • **Based on World Axis** - Uses the world coordinate system. T he **Axes order** property defines the axis order. • **Based on Local Axis** - Uses the local coordinate system. T he **Axes order** property defines the axis order.

Category	Property / Description



Real path | World Axis/ Local Axis | Free path

Axes order

(Available when **Construct mode** is **Based on World Axis** or **Based on Local Axis**.) Specifies the path axis order: **XYZ**, **XZY**, **YZX**, **YXZ**, **ZXY**, **ZYX**.

Draw Full Path

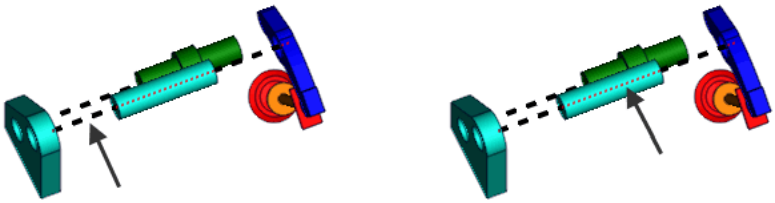
(Available for associative paths when **Construct mode** is **Real path**.) Shows the complete path from the beginning of the animation to the end of the animation. To show the path up to the current animation time only, clear this property. The following example shows a six-second animation after three seconds:

Disabled | Enabled

Note: This property has no effect on associative paths from neutral.

Hidden style

(Available when **Stay on top** is cleared.) Enables **Back line** properties. A back line passes under actors that are on top. You can define different styles for front and back lines.



Front Line | Back Line

Opacity

Specifies the opacity, from 0 (transparent) to 255 (solid).

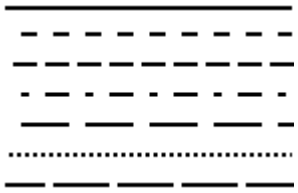
Front line/Back line (Back line available when

Width

Specifies the line width, in millimeters.

Category	Property / Description
Hidden style is selected)	**Opacity** Specifies the actor opacity (between 0 and 255).
	Color Specifies the line color.
	Type Specifies the line style.

Selects a predefined style.



User defined Defines a custom dashed-line style (see the **Dash pattern** property).

Advanced Defines a custom line style using symbols and custom spacing (see the **Symbol # *n***, **Symbol size**, and **Space between symbols** properties).

Dash pattern (Available when **Type** is **User defined**.) Defines the line as a repeating series of dashes and spaces of the specified lengths, in millimeters. For example, `2.0 4.0 8.0 8.0` defines a 2 mm dash followed by a 4 mm space followed by an 8 mm dash followed by an 8 mm space, and then repeat.

2.0 2.0 2.0 4.0 8.0 8.0

Symbol #1 Symbol #2 Symbol #3 Symbol #4

Style (Available when **Type** is **Advanced**.) Defines a custom line style consisting of up to 4 different symbols.

None

Bold arrow

Medium arrow

Thin arrow

Rhombus

Round

Cross

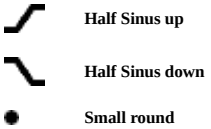
Star

Plus

Square

Minus

Category	Property / Description



Symbol size (Available when **Type** is **Advanced**.) Specifies the size of each symbol.

Space between symbols (Available when **Type** is **Advanced**.) Specifies the space between symbols as a multiplier of **Symbol size**.

-0.5 (overlapping) 0 (touching) 1 (one symbol width)

Border

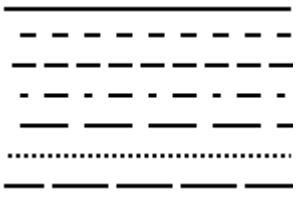
Show Displays the border.

Width Specifies the border line width, in millimeters.

Opacity Specifies the border opacity (between 0 and 255).

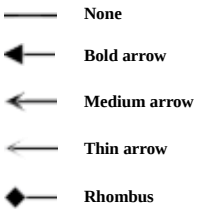
Color Specifies the border color.

Type Specifies the border type.



Extremity

Start Specifies the extremity symbol for the line start point.



Category	Property / Description
	Round **Cross** **Arrow**
End	Specifies the extremity symbol for the line end point. **None** **Bold arrow** **Medium arrow** **Thin arrow** **Rhombus** **Round** **Cross** **Arrow**
Size	Specifies the size of the extremity symbol (between 0.5 and 100).

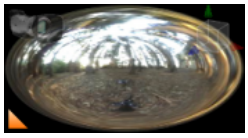
Viewport Properties

You can set viewport properties in the Properties pane.

Tip: You can also set some viewport properties from the Viewport Background page. See *Document Properties - Viewport Background*.

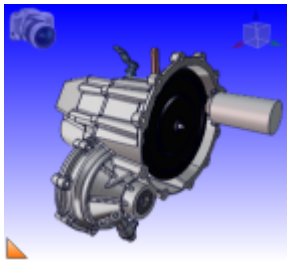
Category	Property / Description	
N/A	**Background image path**	Defines a background image.
	Image fill mode	(Available when **Background image path** is specified.) Specifies how the background image appears in the viewport: • **No deformation** - The image maintains its aspect ratio, typically leaving part of the viewport background uncovered. • **Stretch** - The image aspect ratio changes as necessary to fill the entire viewport. • **Environment** - The image is projected on a sphere around the scene.
	Background color	Defines the primary background color. **Tip:** You can create raster images with transparent backgrounds by selecting **Alpha channel** in the High Resolution Image workshop.
	Foot color	Defines the secondary background color. When different from **Background color**, the background has a color gradient. **Note:** Ensure that **Gradient** is selected on the Document Properties - Viewport Background page.

No deformation



Stretch

Environment



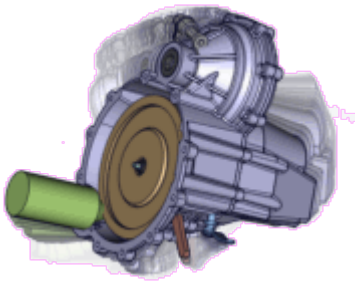
Background color=blue **Foot color**=white

Category	Property / Description

Back culling Disables rendering of back faces (faces not visible from the current camera angle). Back culling increases rendering speed, but some front faces might disappear when model faces are not well oriented.

Opacity (Available when **Background image path** or **Motion blur** is specified.) Specifies the background image opacity, from 0 (transparent) to 255 (solid).

Motion blur Causes moving objects to leave an image trail along the direction of relative motion. Use **Opacity** to adjust the blur transparency.



Motion blur during rotation

Use coordinate system Specifies the coordinate system. The default is the world coordinate system, or select a user-defined coordinate system.

Vertical axis Determines the vertical axis. This vertical axis is used to facilitate navigation, the position of the ground, and the shading. You can choose a vertical axis according to a user-defined coordinate system. The camera is placed according to this coordinate system.

Camera Specifies the viewport camera, which determines the viewport orientation and zoom when you first activate a view. Changing camera orientation using the compass or navigation commands affects the active camera, not the viewport camera. The **Camera** viewport property is animatable; your animations can switch between cameras. If you have multiple viewport panes, **Camera** is animatable for the main viewport pane only.

Camera Height (Available in orthogonal view mode.) Specifies the height of the camera according to the model, which amounts to determining the zoom factor of the viewport.Increasing the value makes the model smaller.

Camera FOV (Available in perspective view mode.) Specifies the angular extent of the view of the model, which amounts to determining the zoom factor of the viewport. Increasing the value makes the model smaller. You can enter a value or use the slider.

Note: The size of the model can depend on the position of the object in the camera frame.

Category	Property / Description	
Publication aspect	**Format**	Specifies the viewport aspect-ratio format: • **Free** - Adjusts to the viewport size. • **User defined** - Specified by **Aspect (width/height)**. • **16/9** - Specifies the standard 16:9 format (**Aspect (width/height)** is 1.778). • **4/3** - Specifies the standard 4:3 format (**Aspect (width/height)** is 1.333). For all but **Free**, black banners appear at the top and bottom of the viewport. **Non client color** defines the banner color. **Note:** Define *paper space* instead of publication aspect unless recipients of your content might have older versions of Composer applications that do not support paper space.
	Aspect (width/height)	Specifies the aspect ratio. For **User defined**, type a ratio, otherwise **Format** determines the value.
	Non client color	Specifies the viewport color outside the specified aspect ratio.
Event	**Lock rotation** **Lock pan** **Lock zoom** **Lock selection** **Lock highlighting**	Prohibits viewport operations in Composer Player (or Composer with **Design Mode** disabled). For example, when **Lock zoom** is selected, users cannot zoom the model.
Lighting	**Lighting mode**	Defines the number and type of lights: **Custom** **Soft (1 light)** **Medium (2 lights)** **Metal (3 lights)** **Heavy metal (3 lights)** **High contrast** **Shaded illustration (cool & warm)** **Default (2 lights)** **Note:** You can also select the lighting mode from the ribbon (**Render** > **Lighting** > **Mode**).
	Static lighting	(Not available when **Lighting mode** is **Custom**, and always disabled for **Soft (1 light)** .) Applies the light in 2D (screen) space. The light keeps its position and direction irrespective of camera position. To apply the light in 3D space (it can appear in front or behind actors), clear this option.

Category	Property / Description

Lights diffuse (Not available when **Lighting mode** is **Custom**.) Specifies the intensity of scattered light (as though shined on a rough surface).

Low

High

Lights specular (Not available when **Lighting mode** is **Custom**.) Specifies the intensity of reflected light (as though shined on a mirror).

Low

High

Soft shadowing (Available when **Ground Shadow** is enabled.) Sharpens or blurs the ground shadow.

Per-pixel lighting Displays shaded surfaces based on the color and illumination at each pixel. Per-pixel lighting is also known as Phong shading. PPL can improve lighting of models with poor tessellation.

Disabled

Enabled

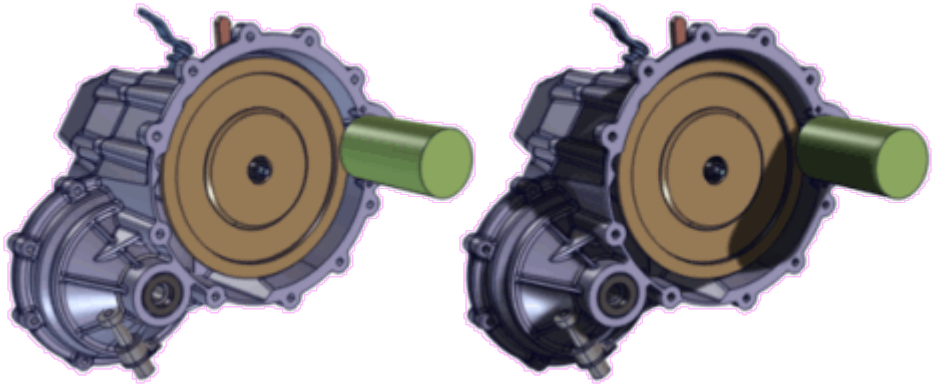
Notes:

- **HardwareSupport.Advanced** must be enabled. See *Advanced Settings*
- Requires a graphics card with OpenGL 3.2 or higher.
- This effect is not displayed when using cutting planes or custom render mode.
- You can also enable per-pixel lighting from the ribbon (**Render** > **Lighting** > **Per-Pixel Lighting**).

Category	Property / Description

- You can enable or disable per-pixel lighting for all documents and specify when to render the effect from the Application Preferences - Viewport. See *Viewport*.

Shadows (Available when **Per-pixel lighting** is selected.) Makes all geometry actors cast and receive shadows, making rendering for lighted scenes more realistic.

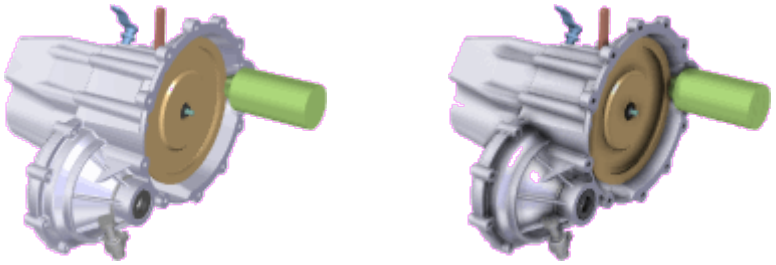


Disabled Enabled

Notes:

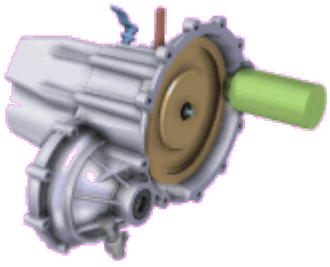
- For lighting modes with multiple lights, shadows are cast by one light only. When using three or more lights, artifacts might result.
- **HardwareSupport.Advanced** must be enabled. See *Advanced Settings*
- Requires a graphics card with OpenGL 3.2 or higher.
- Shadow results vary greatly depending on lighting and rendering modes.
- Not displayed when one or more cutting planes are enabled.
- Not displayed in all render modes.
- You can also enable shadows from the ribbon (**Render** > **Lighting** > **Shadows**).
- You can enable or disable shadows for all documents and specify when to render the effect from Application Preferences - Viewport. See *Application Preferences - Viewport*.
- Shadows are not visible in **Soft (1 light)** lighting mode with **Camera Perspective Mode** disabled. Because lighting is always dynamic in **Soft (1 light)** mode and the light direction matches the camera direction, shadows are projected directly behind actors. When **Camera Perspective Mode** is enabled, shadows might be partially visible.

Ambient occlusion (Available when **Per-pixel lighting** is selected.) Displays shaded surfaces by considering light attenuation from nearby actors.

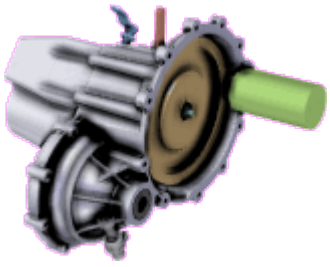


Category	Property / Description

Disabled



Enabled



Notes:

- **HardwareSupport.Advanced** must be enabled. See *Advanced Settings*
- Requires a graphics card with OpenGL 3.2 or higher.
- This effect is not displayed when using cutting planes or custom render mode.
- You can also enable ambient occlusion from the ribbon (**Render** > **Lighting** > **Ambient Occlusion**).
- You can enable or disable ambient occlusion for all documents and specify when to render the effect from Application Preferences - Viewport. See *Application Preferences - Viewport*.

Ambient occlusion intensity

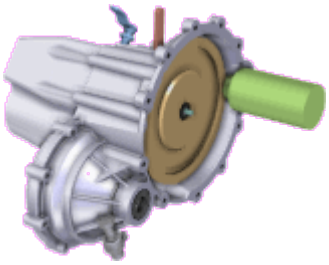
(Available when **Ambient occlusion** is selected.) Specifies shading darkness.

1.5

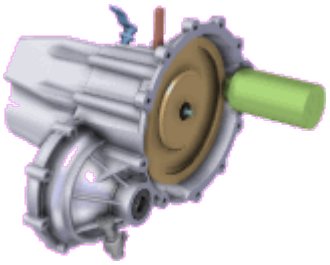
5.0

Ambient occlusion radius

(Available when **Ambient occlusion** is selected.) Specifies shading coverage.



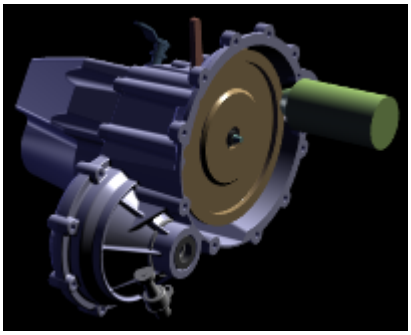
1



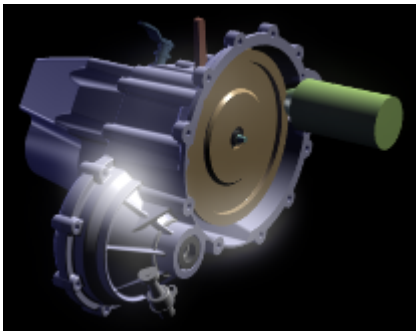
10

Glow (Available when **Per-pixel lighting** is selected.) Displays a halo of radiant light on portions of the model with light color and high specularity.

Category	Property / Description



Disabled



Enabled

Notes:

- This effect depends on scene lighting characteristics. Properties such as **Render mode**, **Lighting mode**, **Static lighting**, and **Per-pixel lighting** greatly affect the results.
- This effect considers the viewport background. A white or light background color might produce unintended results.
- **HardwareSupport.Advanced** must be enabled. See *Advanced Settings*.
- Requires a graphics card with OpenGL 3.2 or higher.
- This effect is not displayed when using cutting planes or custom render mode.
- You can also enable glow from the ribbon (**Render** > **Lighting** > **Glow**).

Glow intensity (Available when **Glow** is enabled.) Specifies the amount of glow effect.

Depth of field

Depth of field Enables the depth of field (DOF) effect. Portions of the scene away from the camera focal point appear blurred.

Disabled

Enabled

Notes:

- Set the focal point from the ribbon (**Render** > **Depth of Field**).
- **Camera Perspective Mode** (status bar) must be enabled.
- **HardwareSupport.Advanced** must be enabled. See *Advanced Settings*.

Category	Property / Description

- You can enable or disable DOF for all documents and specify when to render the effect from Application Preferences - Viewport. See *Application Preferences - Viewport*.
- Video (`.avi`) output does not support DOF. If DOF is required, create images from the High Resolution Image workshop and then post-process the images to create videos.

Level Specifies the amount of DOF effect (field depth). High values increase the portion and intensity of the scene that is out of focus.

0.02 0.1

Number of passes Specifies the number of internal renderings made to create the DOF effect. More passes produce better results but take longer to perform.

Managing (Default) Document Properties

You can view or change document properties for the active Composer file. You can set default document properties for new files created by importing CAD files.You can save document properties to a file that can be reused as a template for sharing with collaborators in your team or organization.

This is done in the **Document Properties** dialog box, or in the **Default Document Properties** dialog box.

Accessing and Customizing (Default) Document Properties

With Composer, you can customize properties for the current document (**Document Properties**), or properties that will be used by default for all documents (**Default Document Properties**).

Notes:

- Some Document Properties pages are available from publication dialog boxes, such as **Save As Composer** and **Save As Package**.
- Application preferences and default document properties are shared by all versions of Composer applications (Composer, Sync, Composer Player) installed on a given computer. The registry settings created when you change application preferences or default document properties are not removed when you uninstall Composer.
- Administrators can restrict which document properties and application preferences team members can modify. See *Disabling Document Property and Application Preference Modifications*.

1. Select **File** > **Properties** > **Document Properties**or **Default Document Properties**.

   The **(Default) Document Properties** dialog box appears.

2. Select the appropriate category in the left-hand box.

Options in this category...	Allow you to...
Security	Manage Composer document passwords and reduce model accuracy for theft protection.
Signature	Specify a logo and text, such as a usage agreement, that is displayed when a recipient opens a Composer file in Composer Player.
Viewport	Manage viewport settings.
Viewport Background	Manage background settings.
Selection	Specify selection and highlight properties in both default and assembly selection modes, as well as selection and highlight properties for product manufacturing information (PMI) cross-highlight.
Image Quality	Presents options related to lighting, ground shadow, and annotations.
Input	Configure the importing of CAD files.
Update	Configure updates of your model geometry from CAD sources.
Output	Configure the Composer compression level and export options.
Animation	Configure animation speed and the maximum frames between two images.
History	Lists all modifications made to a Composer file and lets you edit version numbers and comments. The history is stored in the Composer file itself.
Right Manager	Enable Composer capabilities for Composer (SMG) files opened in Composer Player and Composer Player ActiveX Plug-in (Microsoft Office documents, 3D PDF, and so on).
Project	Configure the default preferences when loading a project.
Paper Space	Configure the margins and orientation of the paper space.
Units	Specify 3D measurement units.
Advanced Properties	Customize all the document settings available in the registry.

   The corresponding properties appear.

3. Set these properties according to your needs.
4. Click **OK** to save the preferences and exit the **Application Preferences** dialog box.

Sharing (Default) Document Properties Across Teams

Once you have configured (default) document properties the way you want them, you can save them to a file that can be reused as a template. Collaborators in your team or organization are then able to load this file in Composer, in order to use the same (default) document properties. This makes it easy to harmonize globally document properties for all stakeholders working on a given project.

Important: The **Password** property (**Security** page) is not saved to this file.

Saving Document Properties for Reuse

You can save document properties to a file that can be reused as a template across your team or organization.

Before you begin: Customize document properties the way you want them for sharing.

1. In the **(Default) Document Properties** dialog box, click the **Save...** button.
2. In the **Save** dialog box that appears, choose a location and specify a name for the file.
   The file will be saved with the extension `*.docPropSet`.
3. Click the **Save** button.

Reusing (Default) Document Properties

You can reuse document properties that have been saved to a `*.docPropSet` file.

Note: You can reuse properties either in the current document (**Document Properties**), or in all documents (**Default Document Properties**).

1. In the **(Default) Document Properties** dialog box, click the **Load...** button.
2. In the **Load** dialog box that appears, select the `*.docPropSet` file to reuse.
3. Click the **Open** button.

The document properties are now loaded and taken into account.

Security

The Security page lets you manage Composer document passwords and reduce model accuracy for theft protection.

You can set these properties both for the active document and as document defaults.

Command Name	Description
Password	Specifies the password required to open the file.
Confirm password	Confirms the password (for improved safety).
Reduce accuracy	Reduces model accuracy by the specified amount. **Note:** In the case of default document properties, the unit is millimeters. **Important:** After each save, the model is degraded. Reduced accuracy prevents the unauthorized use of intellectual property contained within 3D models. Altering the exact dimensions prevents the reverse engineering and manufacturing of a part or product. The 3D image is still viewable for the purposes for which the viewer is authorized. **Tip:** You can degrade portions of your model using **Secure 3D Brush** (**Geometry** ribbon tab).

Signature

The Signature page lets you specify a logo and text, such as a usage agreement, that is displayed when a recipient opens a Composer file in Composer Player.

You can set these properties both for the active document and as document defaults.

Command Name	Description
Signature	Displays a signature page consisting of a logo, text, or both, when a recipient opens a Composer file.
Logo path	Specifies the logo image file.
Agreement	Specifies the text, typically a usage agreement.
Display	Specifies the signature display mode: • **Ask for agreement** - The recipient must click **I agree** to accept or **I disagree** to decline the agreement. If declined, Composer Player does not load the file. • **Show only** - The recipient clicks **OK** to dismiss the signature page. • **Do not display** - Composer Player does not display the signature page.

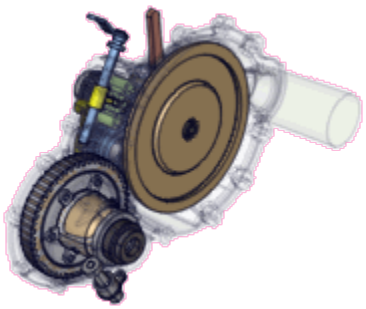
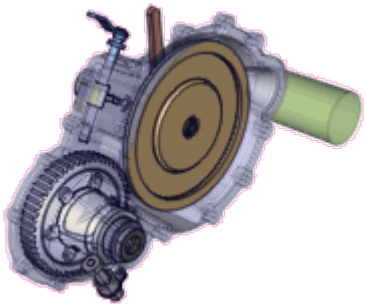
Viewport

The Viewport page lets you manage viewport settings.

You can set these properties both for the active document and as document defaults.

General

This section lets you manage general viewport settings.

Command Name	Description
Back culling	Enables back faces rendering. Back culling increases speed when activated. Back culling is disabled by default; some front faces might disappear when model faces are not well oriented. **Note:** This setting cannot be configured from Sync.
BOM table	Displays the bill of materials (BOM) table in the viewport. **Note:** This setting cannot be configured from Sync.
Ground	Displays the ground actor, which adds realism to the scene. **Note:** This setting cannot be configured from Sync.
Texture path	(Available when **Ground** is selected.) Specifies the ground image file path. **Note:** This setting cannot be configured from Sync.
Ghost opacity	Specifies the transparency for ghost rendering, from 0 (transparent) to 128 (translucent). **Note:** You cannot select ghosted actors in the viewport.  20  128
Render mode	(Visible when a specific environment variable has been created.) Defines the render mode used to display actors in the viewport.

Command Name	Description
	Important: • This setting is hidden by default. To make it visible, you must create an environment variable, `DS_3DVC_OVERRIDE_RENDER_MODE`, and set its value to `1`. • Composer documents generated from Sync do not contain this setting. Once a document is opened in Composer, the render mode defined in the (default) document properties will be applied when saving the file. **Note:** This setting cannot be configured from Sync.

Outline

This section lets you manage outline settings.

Command Name	Description
Minimum angle	Specifies the minimum angle between two face planes that defines a sharp-edge outline. Smaller values produce more lines. 5 100 **Tip:** The **Outline** > **Minimum angle** property (Properties pane) sets the outline angle per geometry actor.
Same outline color for all actors	Sets the default outline color for all actors to the selected color. Set **Outline** > **Color** (Properties pane) to changes per-actor outline colors. To use outline colors based on actor colors, clear this option.

Vertical axis

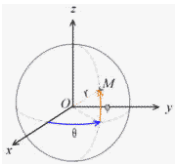
This section lets you manage vertical axis settings.

Command Name	Description
Vertical axis	Determines the default vertical axis after loading. The vertical axis is used to facilitate navigation and to position the ground. The vertical axis is saved in the Composer file. **Note:** This setting cannot be configured from Sync.

Custom camera views

You can define up to four custom camera view orientations using a spherical coordinate system (polar angles) to define camera position.

Note that Composer uses the best camera rotation to keep verticality of the viewport.



Command Name	Description
Name	Specifies the name of the custom view, as listed under **Home** > **Navigate** > **Align Camera** .
Theta	Specifies the longitude angle (the angle in the X-Y plane about the Z axis).
Phi	Specifies the latitude angle (the elevation above or below the X-Y plane).
Ortho	Creates an orthogonal view. Orthogonal views eliminate the effect of distance from the viewpoint (actor sizes remain constant). To create a perspective view, clear this option.

Viewport Background

The Viewport Background page lets you manage background settings.

You can set these properties both for the active document and as document defaults.

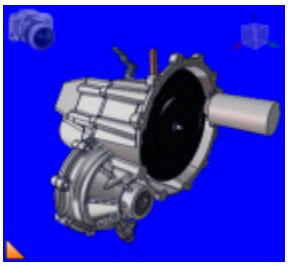
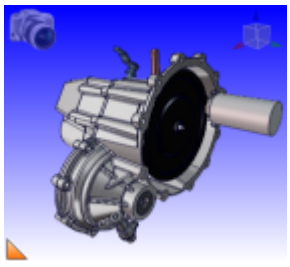
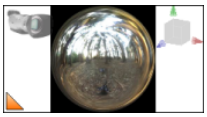
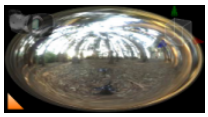
Command Name	Description
Color	Specifies the background color. **Note:** This setting cannot be configured from Sync. **Tip:** You can create raster images with transparent backgrounds by selecting **Alpha channel** in the High Resolution Image workshop.
Gradient	Creates a color gradient between **Color** and **Foot color**. • **Foot color** - Specifies the color at the bottom of the viewport. • **Dynamic gradient** - Adjusts the color when rotating. To have static background gradient, clear this option.  Color=blue No Gradient  Color=blue Foot color=white **Note:** This setting cannot be configured from Sync. **Note:** Gradient backgrounds can cause odd behaviors in video editing packages.

Image	Specifies a background image.
	
	• **Path** - Specifies the path to the image.
	• **Fill mode** - Specifies how the background image appears in the viewport:
	  - **No deformation** - The image maintains its aspect ratio, typically leaving part of the viewport background uncovered.
	  - **Stretch** - The image aspect ratio changes as necessary to fill the entire viewport.
	  - **Environment** - The image is projected on a sphere around the scene.
	
	 
	No deformation
	
	 
	Stretch
	
	Environment

Command Name	Description
	Note: This setting cannot be configured from Sync.
Display logo	Displays a logo in the bottom-right corner of the viewport. Specify the path to the image file.

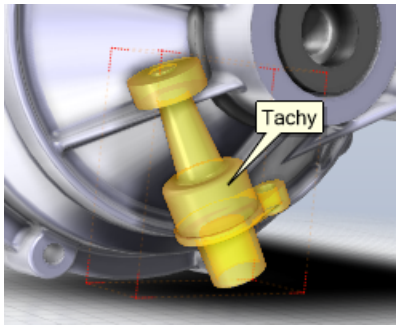
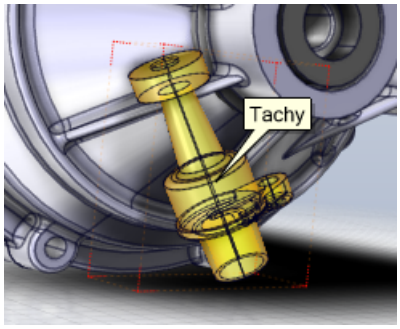
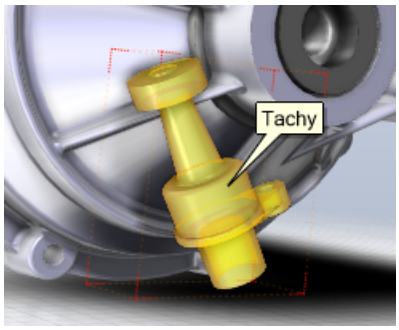
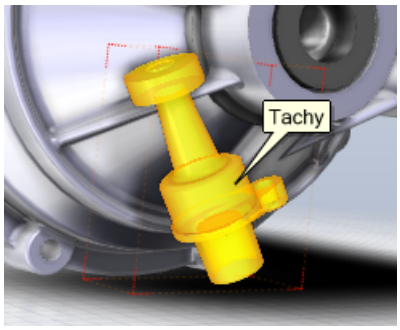
Selection

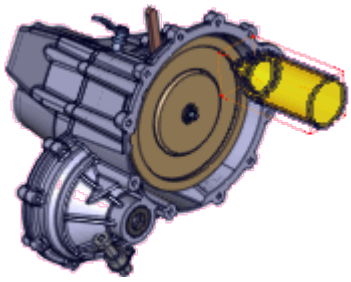
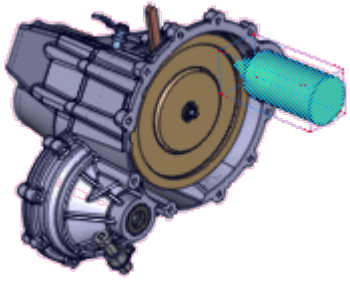
The Selection page lets you specify selection and highlight properties in both default and assembly selection modes, as well as selection and highlight properties for product manufacturing information (PMI) cross-highlight.

You can set these properties both for the active document and as document defaults.

Selection

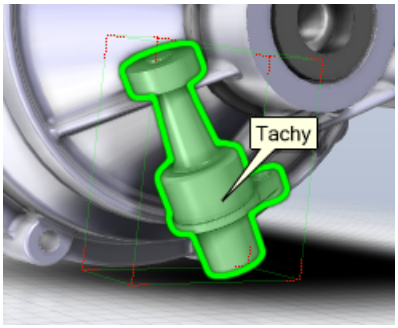
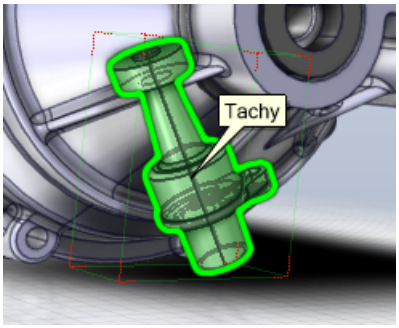
You can specify the properties that apply when selecting actors in both default and assembly selection modes.

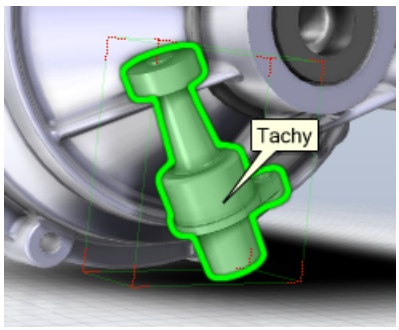
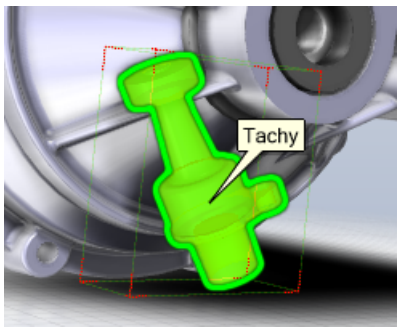
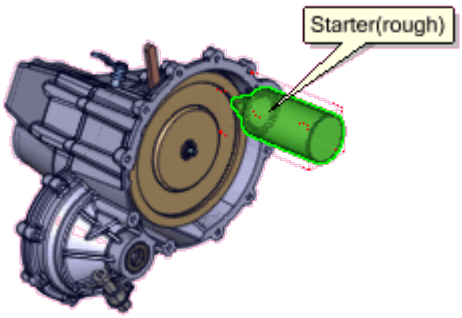
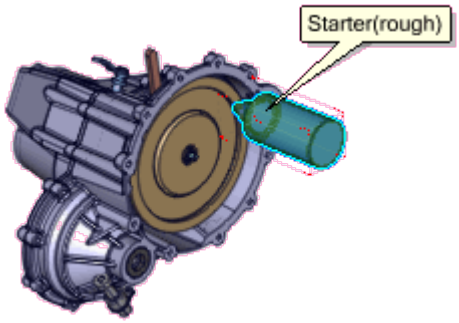
Command Name	Description
Show hidden edges	Displays hidden edges when an actor is selected.  Disabled  Enabled (default) **Note:** Hidden-edge highlighting requires that Composer has calculated outlines for you model. If hidden edges do not appear, select a render mode with outlines, such as **Smooth with Outlines**, and then restore your previous render mode.
Color intensity	Specifies the amount of selection shading.  Medium (default)  High
Default	Specifies the selection color in default mode.

Command Name	Description
	
Assembly	Specifies the selection color in assembly selection mode. 

Highlight

You can specify the properties that apply when highlighting actors in both default and assembly selection modes.

Command Name	Description
Show hidden edges	Displays hidden edges when an actor is highlighted.  Disabled  Enabled (default) **Note:** Hidden-edge highlighting requires that Composer has calculated outlines for you model. If hidden edges do not appear, select a render mode with outlines, such as **Smooth with Outlines**, and then restore your previous render mode.

Command Name	Description
Color intensity	Specifies the amount of highlight shading.  Medium (default)  High
Default	Specifies the highlight color in default mode. 
Assembly	Specifies the highlight color in assembly selection mode. 

PMI Cross-highlight

Specify selection and highlight properties for product manufacturing information (PMI) cross-highlight.

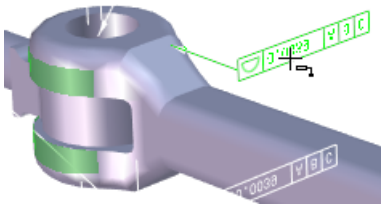
You can select or highlight PMI both from the assembly tree and from the viewport.

Notes:

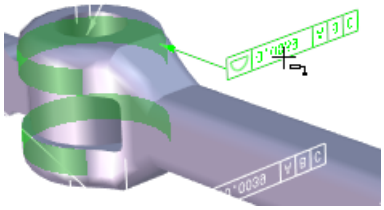
- Selecting or highlighting PMI now selects or highlights construction geometry as well as its connected geometry (given that the entire geometry is in the same part or product). In this case, all linked geometry appears as selected, even geometry which is currently hidden (no-show).

- Ensure that you do not move PMI, as this may adversely affect the cross-highlight mechanism.

Command Name	Description
Stay on top	Makes hidden surfaces visible when selecting or highlighting related product manufacturing information (PMI).



PMI highlighted with **Stay on top** cleared

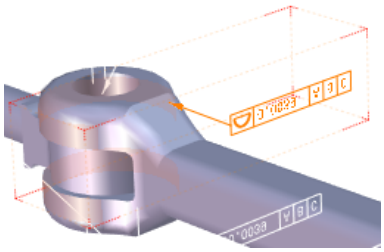


PMI highlighted with **Stay on top** selected

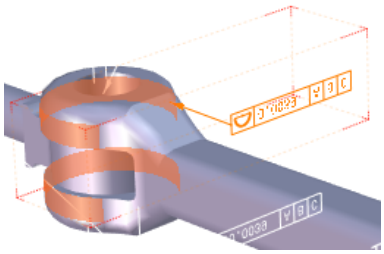
Note: When using the Digger tool with **Stay on top** cleared, hidden surfaces may still be visible when selecting or highlighting related PMI.

Selection intensity

Specifies the color intensity of the attached surface, from 0 (transparent) to 128 (translucent).



PMI selected with **Selection intensity** set to 30



PMI selected with **Selection intensity** set to 128

Selection color Specifies the color of the surface attached to selected PMI.

Highlight color Specifies the color of the surface attached to highlighted PMI.

Image Quality

The Image Quality page presents options related to lighting, ground shadow, and annotations.

You can set these properties both for the active document and as document defaults.

Lighting

Specifies the ambient lighting.

Command Name	Description
Model	Enables custom lighting. Lighting is determined by the spot, directional, and positional lights that have been added to the scene.
Auto. soft	Specifies 1 light with no specularity, and light direction always matches camera direction (dynamic lighting). Performance is optimized.
Auto. medium	Specifies 2 simple lights.
Auto. metal	Specifies 3 lights, with metal aspect reinforced.
Auto. heavy metal	Specifies 3 lights, with metal aspect strongly reinforced.
Auto. contrasted	Specifies 3 lights, with contrast optimized.
Default	Specifies 2 lights, with specularity and no ambiant light.

Ground shadow

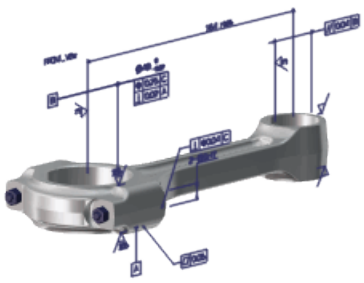
Specifies ground shadow properties.

Command Name	Description
Ground shadow	Enables **Soft shadows**.
Soft shadows	(Available when **Ground shadow** is selected.) Specifies the shadow focus, **low** for sharp and **high** for blurred.

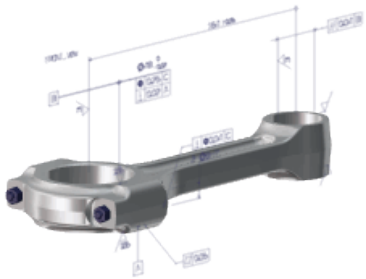
Text

Specifies annotation properties.

Command Name	Description
PMI auto fade	Makes product manufacturing information (PMI) visibility dependent on camera orientation. PMI parallel to the screen are fully visible. Perpendicular or reversed PMI are transparent. To make PMI always visible, clear this option.

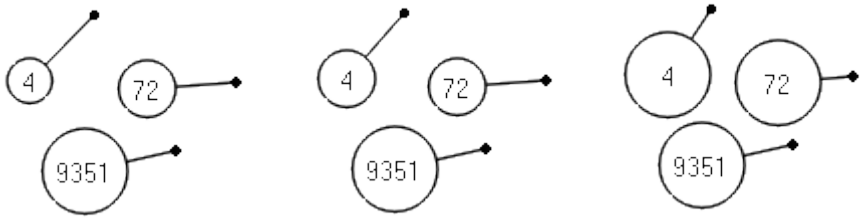


Disabled



Enabled

Command Name	Description
Callout width	Specifies how callout widths, as defined by the number of characters that can be displayed, are determined: • **Variable (based on callout text)** - Sets widths based on callout text; the longer the text, the wider the callout. You can optionally specify a **Minimum callout width**. For example, if you want all callouts to be at least two characters wide, specify `2`. • **Uniform (same as largest callout)** - Sets all callouts to the width of the widest visible callout. Hidden callouts are not considered when identifying the widest callout.



Variable **Variable, Minimum callout width = 2** **Uniform**

Note: These options affect the number of characters a callout can display. Actual callout size can vary based on callout shape, font family, and font size.

Input

The Input page lets you configure the importing of CAD files.

You can set these properties both for the active document and as document defaults.

Notes:

SOLIDWORKS

You can specify which configuration to convert and configure the import options.

Command Name	Description
Select the configuration to open	From the list, select configurations to save with the Composer file. **Select current configuration**. Saves the active configuration with the Composer file. **Select all configurations**. Saves all configurations with the Composer file. **Select following configurations**. Saves the selected configurations with the Composer file. Select one or more configurations.
Import SOLIDWORKS appearance	Imports all appearances in SOLIDWORKS files. You can also specify this option as follows: • In Composer, click **File** > **Properties** > **Default Document Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, enable **IOSWImportAppearance**. • In Composer Sync, at the bottom of the window, click **More Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, enable **Batch.IOSWImportAppearance** to enable batch import of appearances. • In the SOLIDWORKS software, click **Tools** > **Options** > **System Options** > **Export**. Under **File Format**, select **SMG**, and select **Export SOLIDWORKS appearance**.
Import SOLIDWORKS decals	Imports decals from SOLIDWORKS files to Composer files. You can also specify this option as follows: • In Composer, click **File** > **Properties** > **Default Document Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, select **IOSWImportDecals**. • In Composer Sync, at the bottom of the window, click **More Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, select **Batch.IOSWImportDecals** to enable batch import of decals. • In the SOLIDWORKS software, click **Tools** > **Options** > **System Options** > **Export**. Under **File Format**, select **SMG**, and select **Export SOLIDWORKS decals**. **Note:** The following apply: • The **Import SOLIDWORKS decals** check box is independent of the **Import SOLIDWORKS appearance** check box. If you clear **Import SOLIDWORKS appearance** and select **Import SOLIDWORKS decals**, then the color and texture of the SOLIDWORKS file is not imported. Only decals are imported to the Composer file. • The appearance of decals in Composer should be same as that in SOLIDWORKS. The properties of decals in SOLIDWORKS like size, position, mapping, and masking are supported in Composer. • If you import a SOLIDWORKS file with multiple configurations, then decals specific to each configuration are imported. • Composer supports a maximum of four decals per face. To render decals correctly in SOLIDWORKS Composer: • Use OpenGL version >= 1.3 • In **Application Preferences** > **Hardware Support**, under **Graphics**, select **Enable 3D OpenGL hardware acceleration**.
Import SOLIDWORKS BOM	Imports part and assembly BOMs in SOLIDWORKS files. After import, you can access and edit all the BOM properties in Composer. You can also specify this option as follows: • In Composer, click **File** > **Properties** > **Default Document Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, enable **IOSWImportBOM**.

Command Name	Description
	• In Composer Sync, at the bottom of the window, click **More Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, enable **Batch.IOSWImportBOM** to enable batch import of BOMs. • In the SOLIDWORKS software, click **Tools** > **Options** > **System Options** > **Export**. Under **File Format**, select **SMG**, and select **Export SOLIDWORKS BOM**.
Import SOLIDWORKS Explode Views and Saved Views	Imports all exploded, saved, and named views in SOLIDWORKS files. You can also specify this option as follows: • In Composer, click **File** > **Properties** > **Default Document Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, enable **IOSWImportExplodeViews**. • In Composer Sync, at the bottom of the window, click **More Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, enable **Batch.IOSWImportExplodeViews** to enable batch import of exploded, saved, and named views. • In the SOLIDWORKS software, click **Tools** > **Options** > **System Options** > **Export**. Under **File Format**, select **SMG**, and select **Export SOLIDWORKS Exploded views and Saved Views**.
Import SOLIDWORKS assembly envelope	Imports all the SOLIDWORKS assembly envelopes. You can also specify this option as follows: • In Composer, click **File** > **Properties** > **Default Document Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, enable **IOSWImportEnvelope**. • In Composer Sync, at the bottom of the window, click **More Properties** > **Advanced Properties**. Under **INPUT - IMPORT**, enable **Batch.IOSWImportEnvelope** to enable batch import of envelope geometry. • In the SOLIDWORKS software, click **Tools** > **Options** > **System Options** > **Export**. Under **File Format**, select **SMG**, and select **Export SOLIDWORKS assembly envelope**.

Import

You can configure Import options.

Command Name	Description
Import profile	Sets import options as recommended for the selected format. **Notes:** • Selecting a profile makes all import options read-only. To override profile settings, select **Custom**. • When you revisit the Input page, the profile reverts to **Custom** but the import option settings are retained. • You cannot redefine or create new import profiles. • Import profiles are not available on the Sync Import Options page. Set import options manually as needed.
Merge file into one actor per part	Imports parts, including multibody parts, as single actors. To load multibody parts as individual actors, clear this option. **Tip:** Select this option to facilitate updates when CAD geometry changes. The identifiers are based on the part name and not the body names. Body names can change when features change. **Notes:** • For SOLIDWORKS models, this option merges all part geometry and creates single nodes in the Composer assembly tree that are both part and geometry nodes. For other CAD formats, this option merges part geometry but creates part nodes with geometry nodes.
Import instance names	Adds the instance names after the part name: #PN# (#IN#). #PN# and #IN# are also added as meta-properties so you can add annotations linked to these meta-properties. **Note:** When importing 3DXML files containing 3D shapes that are aggregated directly under the root node of the product reference, make sure that you select this option if you want to import both the name of the 3D shape reference, and the name of the 3D shape instance.
Import meta-properties	Imports user-defined attributes such as part number (P/N), designation, and revision number. Meta-properties appear as user properties of the string type in the Properties pane.

Command Name	Description
Overload assembly tree names	Uses the text value associated to a given meta-property (instead of the default Actor.Name property) to display actor names in the assembly tree. In the text box, the V_Name value is entered by default. This displays the value associated to the Meta.V_Name meta-property. Enter the name of another meta-property if the default one does not suit your needs. **Notes:** • This option is available only if **Import meta-properties** is selected. • In order for this option to be taken into account, you need to close and then re-open the current Composer document, or perform an operation that will refresh the Assembly Tree.
Import as bodies	Imports parts as solid bodies. To import parts as individual faces, clear this option and clear **Merge file into one actor per part**. If you select **Merge file into one actor per part**, it does not matter what you select for **Import as bodies**; multibody parts import as single bodies.
Import area, volumes, inertia axes	Displays surface and volume information from CAD models as meta-properties on the assembly level. This option is useful only for translation of CAD files into Composer format.
Import points	Imports point geometry.
Import curves	Imports curve geometry (curves, wires, wireframes).
Import free faces	Imports surface bodies (construction faces).
Import hidden components (no show)	Imports and displays hidden parts in assemblies and bodies in multibody parts. The hidden components are stored in a selection set. **Note:** Suppressed components are never imported.
Import coordinate systems	Imports coordinate systems. **Notes:** • Coordinate systems are not imported when **Merge file into one actor per part** is selected. • Use this option with caution. Models can have large numbers of coordinate systems.
Import textures	Imports textures, including UV textures, on actor faces. **Notes:** • Composer can import one texture per face (single-channel). If geometry has a multi-channel texture, Composer imports the first channel only. • Changing the **Texture** > **Map path** property of an actor with imported textures loses texturing-by-face. The specified texture is applied to all actor faces. • You can apply texture properties such as **Environment effect**, **Blending**, and **Transparency** to imported textures. • The **Texture** > **Projection mode** property is set to **Imported texture** for actors with imported textures. Changing the projection mode loses the imported texture. • The **Update Composer Document** command updates UV coordinates of imported textures. Texture property changes made in Composer, such as **Map path** and **Scale**, are retained.

Refinement

Refinement settings determine how Composer tessellates (meshes) the model, which affects model accuracy.

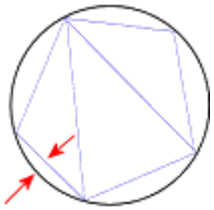
Set these options to achieve the best compromise between accuracy and file size.

Command Name	Description
Relative	Specifies the triangulation method:

Command Name	Description

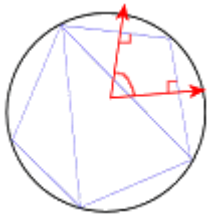
- **Chordal error** - All geometry has the same chordal error. Chordal error is the distance between the triangles that define the geometry in Composer and the edges of the original geometry. When you move the slider to **high quality**, you decrease the chordal error and increase the quality of the assembly.

  In this image, the black circle is the original geometry. The blue triangles define the geometry in Composer. The chordal error is the distance represented by the red arrows.



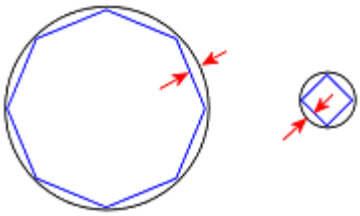
- **Normal deviation** - All geometry has the same normal deviation. Normal deviation is the angle between the normals of the edges that define the triangular geometry of Composer. When you move the slider to **high quality**, you decrease the normal deviation and increase the quality of the assembly.

  In the image, the black circle is the original geometry. The blue triangles define the geometry in Composer. The normal deviation is the angle between the red arrows.

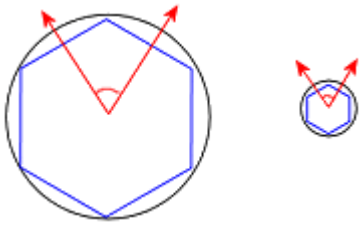


The difference between these two triangulation methods is visible for scenes containing geometry of various sizes. Consider an assembly of one very large cylinder and one very small cylinder.

With **Chordal error**, because the chordal error is constant, the polygon inscribing the large cylinder has many more sides. This results in the geometry of the large cylinder looking better than the small cylinder.



With **Normal deviation**, because the normal deviation is constant, the polygons inscribing both cylinders have the same number of sides. This results in the geometry of the small cylinder looking better than the large cylinder.



Command Name	Description
	You can optimize the geometry degradation by moving the slider between **high quality** (for optimum triangulation quality), **medium**, and **low quality**.
Absolute (Advanced users only, use carefully)	Defines the triangulation approximations. **Important:** This option is recommended for expert users only. Configuring absolute refinement is time consuming and should be used only when relative refinement produces unacceptable results. You can set these three parameters independently. When you set more than one, their effects are combined. • **Chordal error** - Variation in millimeters between native geometry CAD and the tessellated model. • **Normal deviation** - Angle formed between the normals of the triangle faces. • **Edge length** - Length of the triangle edges in millimeters. **Note:** Not considered for files. For each parameter, specify values that define the maximum limits.
Enable auto repair (healing is time intensive)	Checks for missing triangles, incorrect holes in the mesh, extra faces, and other discontinuity issues, and attempts to repair problems by adding triangles. This option degrades import speed, so use only when tessellation is poor. To import files without checking for incorrect geometry, clear this option.

Update

The Update page lets you configure updates of your model geometry from CAD sources.

You can set these properties both for the active document and as document defaults.

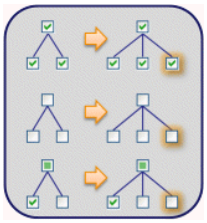
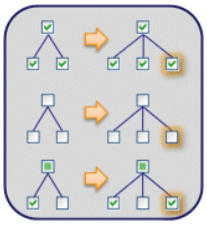
Views

This section lets you specify how actor visibility is stored in view definitions. This setting affects file size and load time, and also determines the visibility of new actors resulting from document updates.

The `Define actor visibility in views by` option applies to **File** > **Update** > **Composer Document** only, not **Geometry** > **Update** .

Notes:

- This option also affects animation visibility (actor visibility at time=0).
- This option does not affect custom views. Custom views that capture actor visibility always list visible actors.
- In all modes, ghosted actors are always listed in view definitions.

Option	Description	Illustration
Define actor visibility in views by: Visible actors	All visible geometry and collaborative actors are listed in view definitions. New actors resulting from document updates are hidden.	
Define actor visibility in views by: Hidden actors	All hidden geometry and collaborative actors are listed in view definitions. New actors resulting from document updates are visible.	
Define actor visibility in views by: Visible assemblies	All visible collaborative actors are listed in view definitions, and geometry actors are listed as follows: • Visible assemblies are listed, but their subassemblies and parts are not. New actors resulting from document updates are visible (inherit assembly visibility). • Hidden assemblies are not listed, nor are their subassemblies and parts. New actors resulting from document updates are hidden. • Mixed-visibility assemblies are not listed, but their visible parts are. New actors resulting from document updates are hidden. For more compact view definitions, choose **Visible assemblies** or **Hidden assemblies**.	
Define actor visibility in views by: Hidden assemblies	All hidden collaborative actors are listed in view definitions, and geometry actors are listed as follows: • Hidden assemblies are listed in view definitions, but their subassemblies and parts are not. New actors resulting from document updates are hidden (inherit assembly visibility). • Visible assemblies are not listed in view definitions, nor are their subassemblies and parts. New actors resulting from document updates are visible. • Mixed-visibility assemblies are not listed in view definitions, but their hidden parts are. New actors resulting from document updates are visible.	

Legend

The illustrations in the table above use these symbols:

Note: The root assembly node never displays . To determine if the root node has mixed visibility, examine its children.

Type of visibility	Symbol used for existing actor	Symbol used for new actor from update
Visible		
Hidden		
Mixed		N/A

Geometry

This section lets you configure geometry update.

These options apply to **Geometry** > **Update** only, not **File** > **Update** > **Composer Document** .

Command Name	Description
Add new geometry	Checks if new geometry actors have been created in the CAD file and converts them. The checks are based on CAD file names.
Delete old geometry	Checks if geometry actors have been deleted in the CAD file and deletes them in the Composer file. The checks are based on CAD file names.
Modify geometry	Updates all 3D geometry (not collaboration, points, and so on) no matter if changes have been made to the CAD file.
Check issued from	Updates only actors from a CAD file with the same name as the update file. For example, `part1.sat` and `part2.sat` are merged in Composer. To update only actors coming from `part1.sat`, check this option. To consider actors from `part2.sat`, clear this option. **Notes:** • This option is deprecated. • This option is applicable to the following formats only: ACIS, IGS, STP, VDA, and Pro/ENGINEER.
All occurrences	Looks for occurrences of the same actor in the Composer file and updates all of them. To update selected actors only, clear this option.

Output

The Output page lets you configure the Composer compression level and export options.

You can set these properties both for the active document and as document defaults.

SMG, SMGXML, SMGPROJ output

These options let you configure the SMG output.

Command Name	Description
Geometry compression	Sets the amount of compression in Composer files, which affects model tessellation quality. • **Low (high quality)** - 32 bytes/point, high measurement quality, large file • **Medium** - 16 bytes/point • **High (low quality)** - 8 bytes/point, low measurement quality, small file The compression algorithm uses a bounding box defined by its coordinates: xmin, xmax, ymin, ymax, zmin, zmax. This bounding box is subdivided into a number of cubes according to the quality of compression selected: • Low (high quality): 2^32 * 2^32 * 2^32 • Medium: 2^16 * 2^16 * 2^16 • High (low quality): 2^8 * 2^8 * 2^8 All tops (xi, yi, zi) of the triangulation are laid out on the tops of the cubes contained in the bounding box. **Notes:** When saving a file with medium or high compression, you should consider the following: • You cannot return to original quality. You must re-import your CAD files if you want to do so. • Medium or high compression affects geometry precision. In the case of large parts where most of the precision is taken by the position of the object, little precision is left for elements such as small faces, lines or vertices. • Medium or high compression might cause display issues (such as small holes visible in the mesh of a part, overlapping faces, z-fight, appearance of undesired lines in technical illustration, etc.) in vector output generated by the Technical Illustration workshop. To make it short, if geometry precision matters to you, it is recommended to use the **Low (high quality)** option.
Write normals	Saves normal directions for all faces in Composer files. Composer needs this information to display the outward or outside faces of parts and assemblies. When selected, file size is larger but file load time is shorter because Composer does not have to calculate this information. A normal to a flat surface is a three-dimensional vector that is perpendicular to the surface. A normal to a non-flat surface at a point "p" on the surface is a vector that is perpendicular to the tangent plane to that surface at "p".
Write outlines	Saves outlines along with the 3D model. Thus, whenever the model is opened, or whenever you change to a render mode that uses outlines, outlines are loaded immediately (as it is no longer required to compute them each time they must be loaded). Note that selecting this option increases the file size of the SMG output. **Note:** Render modes that use outlines are, for example, Smooth with Outline, Shaded Illustration, Technical, Silhouette, etc. Outline styles can be Sharp Edges, Construction Edges, or Smart Outlines.

Package output

These options let you configure the package output.

Command Name	Description
Language	Specifies the language for the Composer Player user interface and online help that is bundled in the package and for the e-mail text. Select **Same as application** or select from the installed languages.

Product export

These options let you configure the product export.

Command Name	Description
Save only visible actors	Exports only visible actors when you export a product (right-click on the assembly tree).
Save collaboration actors (only when exporting from root)	Exports collaboration actors when you export a product.

Animation

The Animation page lets you configure animation speed and the maximum frames between two images.

You can set these properties both for the active document and as document defaults.

Command Name	Description
Animation speed	Specifies the rate at which animation images are displayed in frames per second (FPS). The animation frame rate is a property of the document. For example, if an animation defines 2 keys at 0 and 90. and the animation is played at 30 FPS, the duration of the animation is 3 sec. **Note:** The animation speed for the National Television System Committee standard (NTSC) is 30 FPS. The animation speed for Phase Alternating Line (PAL) is 25 FPS.
Inter frames min.	Specifies the minimum number of frames between two images. Depending on the graphics card and computer performance, animations might jump due to animation speed. Defining a minimum frame number between two images can eliminate jumping. Note that animation speed might not be respected.
Animated transition	Specifies the transition speed between two views when you drag views into the viewport.
Max. objects	Specifies the maximum number of nodes allowed for animated transitions between views. A node is any atomic unit of a document (property, actor, assembly group, etc.) Larger values can result in choppy transitions. For large models or for computers with limited RAM, reduce this value to improve performance.

History

The History page lists all modifications made to a Composer file and lets you edit version numbers and comments. The history is stored in the Composer file itself.

You can set these properties for the active document only, not as document defaults.

Command Name	Description
Version number	Specifies the version number of your file. Composer automatically increments the last index of the version number, but you can specify a different number.
Save number	Shows how many times the file has been saved.
Comment	Lets you specify a comment associated with this version of the file.
History	Lists all previous file saves.
Clean	Removes all history entries except the first, last, and all error entries. **Note:** The clean operation itself is stored in the comment history.

Right Manager

Right Manager lets you enable Composer capabilities for Composer (SMG) files opened in Composer Player and Composer Player ActiveX Plug-in (Microsoft Office documents, 3D PDF, and so on).

You can set these properties both for the active document and as document defaults.

Notes:

- If a Right Manager license is not available, files have no rights.
- For fully shattered files, all files must be granted a right for that right to be available.
- When opened in Composer, all rights are always available.

Right Manager

This section lets you configure Right Manager properties.

Command Name	Description
Annotations	Lets users add annotation and markup actors.
Cutting plane	Lets users apply cutting planes.
Trees	Makes Assembly and Collaboration panes available.
Loading on demand	(Available when **Trees** is selected.) Loads trees only as actors are accessed. Applicable to fully-shattered files.
Save	Lets users save Composer files. **Note:** Save capability is available in Composer Player Pro only.
Forbid delete part	(Available when **Save** is selected.) Prevents users from deleting geometry actors. To prevent users from deleting geometry and collaborative actors, select **Forbid delete actor**.
Forbid delete actor	Prevents users from deleting any geometry or collaborative actor. To prevent users from deleting geometry actors only, select **Forbid delete part**.
Freeze publication	(Available from the **Publish** and **Save As** commands only.) Protects published content from future editing. Users can view frozen content from Composer Player or Player Pro. **Note:** The **Save** command is disabled from Player Pro. **Caution:** Always save to another file name (do not overwrite the current file) when **Freeze publication** is enabled. You cannot open a frozen document in Composer.
Simulation	Enables kinematic dragging mode to consider kinematic conditions defined in the model.
BOM	Makes the BOM pane available, where users can change the bill of materials (BOM) table content.

Expiration

This section lets you configure expiration properties.

Command Name	Description
Expiration	Places a time limit for accessing Composer files. When expired, users cannot open the Composer file.
Start date	(Available when **Expiration** is selected and **Day date** is cleared.) Specifies a date before which the Composer file cannot be opened.

Command Name	Description
Day date	(Available when **Expiration** is selected.) Specifies that the start date of the expiration period is when the CAD file is imported into Composer format. Use this option with **Relative** to save your Composer files with relative expiration dates.
End date	(Available when **Expiration** is selected and **Relative** is cleared.) Specifies a date after which the Composer file could not be opened.
Relative (days)	(Available when **Expiration** is selected.) Specifies the number of days after the start date after which the file cannot be opened. start date + relative (days) = end date of use

Project

The Project page lets you configure the default preferences when loading a project.

You can set these properties both for the active document and as document defaults.

Geometry

This section lets you configure geometry-related preferences when loading a project.

Note: Sync does not support Geometry settings because they are stored in project (`.smgProj`) files.

Command Name	Description
Load	Loads the assembly-tree structure and geometry for products (`.smgProj` and `.smgXml` files). When this option is cleared, only the tree structure is loaded. To reduce memory usage, clear this option for large models or when working with only a portion of a model.
Visible actors only	Loads geometry for visible actors only.
Show only first level assembly tree	(Available when **Load** is cleared.) Loads the root and first-level tree structure only (not sub-products or geometry). **Note:** When you double-click an assembly or a part node in fully shattered structures (i.e. when you click the red icon that identifies it), only one level is loaded. To load all levels, right-click and click **Product** > **Load Products** or in the ribbon click **Home** > **Visibility** > **Visibility** > **Load on Visibility**. When this option is cleared, the entire assembly structure is loaded.
Use level of detail	Specifies the default actor mesh detail to load. For example, a screw can have a lower level of detail (LOD) in a car context than in an engine context. Select one of the following: • **Based on bounding box** - The LOD is based on the size of the geometry as compared to the entire model. • **Low** • **Medium** • **High** Low Medium High You can define multiple LODs from Sync during the conversion process to Composer format. When opening an SMG file with LOD in the different Composer products, each actor's geometry is chosen as a function of the size of the actor compared to the full model size. Note that when resaving the file, only the current LOD is saved. Moreover, the refinement specified in Input settings is used for the higher LOD. Sub-levels are automatically defined.

Command Name	Description
	Warning: If an SMG file was converted with several LODs, only the selected LOD is saved. To keep an SMG file with all LODs, change the file name (to keep the original SMG file). This does not apply to project (`.smgProj`) files.
Load on visibility	In loading-on-demand mode (**Home** > **Visibility** > **Visibility** > **Load on Visibility**), loads actor geometry when a product is not loaded and visibility is activated.

Launch

This section lets you configure launch preferences when loading a project.

Command Name	Description
View mode	Starts Composer applications in view mode. When you open a model, the first view (as listed in the Views pane) is displayed. To open models in animation mode at the beginning of the animation (time=0), clear this option.
Outlines on demand	Calculates outlines when needed instead of when opening a file. Outline calculation takes time. Outlines are needed for some rendering modes and measurements.

Views

This section lets you configure view preferences when loading a project.

Command Name	Description
View Name Template	Lets you define a template to use for view names when creating views. You can use alphanumeric characters, as well as the following optional variables, in any order: • `%filename%`: inserts the name of the file containing the model, without its extension. • `%viewnumber%`: inserts the number of the view based on the creation order in the current session. For example, **1** is used for the first-created view, **2** for the second-created view, etc. • `%viewindex%`: inserts the index of the view based on the actual number of visible views in the document. For example, **4** is used when creating the first view if there are already three views visible in the document, **5** is used for the next one, etc. • `%viewindex+`*n*`%` (where *n* is an integer): inserts the index of the view based on the actual number of visible views in the document plus the number you define. For example, if you specify`%viewindex+10%`, **14** is used when creating the first view if there are already three views visible in the document, **15** is used for the next one, etc. • `%viewindex-`*n*`%` (where *n* is an integer): inserts the index of the view based on the actual number of visible views in the document minus the number you define. For example, if you specify`%viewindex-2%`, **2** is used when creating the first view if there are already three views visible in the document, **3** is used for the next one, etc. **Note:** For `%viewindex+`*n*`%` and `%viewindex-`*n*`%`, make sure you don't add spaces between characters. **Note:** In the examples provided in the table below, we consider that the file containing the model is called `Hammer.smg`. **Use this template...** → **To create views as...** `%filename%_View_%viewnumber%` → **Hammer_View_1**, **Hammer_View_2**, **Hammer_View_3**, etc. `%filename% %viewindex%` → **Hammer 1**, **Hammer 2**, **Hammer 3**, etc. `View %viewindex+10%` → **View Hammer 11**, **View Hammer 12**, **View Hammer 13**, etc.

Command Name	Description

Use this template...	To create views as...
`%viewnumber%-%filename%`	**1-Hammer**, **2-Hammer**, **3-Hammer**, etc.
`Demo of %filename%, View %viewnumber%`	**Demo of Hammer, View 1**, **Demo of Hammer, View 2**, **Demo of Hammer, View 3**, etc.
`View %viewnumber%` **Note:** This is the default template.	**View 1**, **View 2**, **View 3**, etc.
`View %viewGuid%`	**View 812b33921beb7aa**, **View 88fdbf810d791318, etc.**

Note: If you leave the field empty, views will be automatically named according to the default template.

Tip: Click **?** at the right of the **File-name template** box to display a tooltip listing available keywords.

View Collections

This section lets you specify a template to name the collections.

Command Name	Description
Collection template	Defines a template to use for collection names when creating collections. You can use alphanumeric characters and these optional variables in any order: • `%filename%`: Inserts the name of the file containing the model, without its extension. • `%collectionnumber%`: Inserts the number of the collection based on the creation order in the current session. For example, **1** is used for the first-created collection, **2** for the second-created collection etc. • `%collectionindex%`: Inserts the index of the collection based on the actual number of visible collections in the document. For example, **4** is used when creating the first collection if there are already three collections visible in the document, **5** is used for the next one, etc. • `%collectionindex+`*n*`%` (where *n* is an integer): Inserts the index of the collection based on the actual number of visible collections in the document plus the number that you define. For example, if you specify`%collectionindex+10%`, **14** is used when creating the first collection if there are already three collections visible in the document, **15** is used for the next one etc. • `%collectionindex-`*n*`%` (where *n* is an integer): Inserts the index of the collection based on the actual number of visible collections in the document minus the number that you define. For example, if you specify`%collectionindex-2%`, **2** is used when creating the first collection if there are already three collections visible in the document, **3** is used for the next one etc. **Notes:** • For `%collectionindex+`*n*`%` and `%collectionindex-`*n*`%`, make sure that you do not add spaces between characters. • Collection names are unique. If the name of the collection calculated using the templates above is the same as an existing collection, then add a suffix to make it unique.

Paper Space

The Paper Space page lets you configure the margins and orientation of the paper space.

You can set these properties both for the active document and as document defaults.

Command Name	Description
Format	Specifies a standard or custom paper format: • **Viewport ratio** - Defined by **Height** and the viewport width-to-height ratio. • **Custom** - Defined by **Width** and **Height**. • **Standard formats** - Defined by standard formats such as **Letter** and **A4**. The paper size determines the relative limits of the scene. Actors managed in relative mode are adjusted according to these limits.
Width	(Available when **Format** is **Custom**.) Specifies the paper width.
Height	(Available when **Format** is **Custom** or **Viewport ratio**.) Specifies the paper height.
Orientation	(Not available when **Format** is **Viewport ratio**.) Specifies the paper orientation: • **Portrait** • **Landscape**
Size	Specifies default sizes: • **Point size** (measurement vertices, text point size) • **Line width** (markup redlining, attach lines, panel borders) • **Arrow size** (measurement arrow heads) • **Font size** • **Coordinate system size** • **Measurement redline width**

Units

The Units page lets you specify 3D measurement units.

You can define units for all display parameters: length, angle, area, volume, and distance type (dimensions). You can also modify the interpretation of units of CAD models.

You can set these properties both for the active document and as document defaults.

Tab

The tabs on the Units page let you choose which 3D measurement units you want to define.

Notes:

- All 2D measurements (such as border widths and 2D panel positions) are in millimeters.
- Input and output units do not affect conversions from CAD to Composer format. Composer internal units are millimeters.

Tab	Description
Length	Lets you define length measurement units.
Angle	Lets you define angle measurement units.
Area	Lets you define area measurement units.
Volume	Lets you define volume measurement units.

Output

The Output section lets you define the output parameters for the chosen measurement unit.

Command Name	Description
Length / Angle / Area / Volume	Specifies the display units.
Number of decimals	Specifies the number of places displayed after the decimal point for floating-point values in the viewport. To specify the number of decimals for floating-point values in the Properties pane, set **PropertiesValueNbOfDecimal** on the **Application Preferences - Advanced Settings** page. See *Advanced Settings*.
Decimal symbol	Specifies the decimal point character: • **.** (period) • **,** (comma) • **;** (semicolon)
Show units	Specifies how units are displayed in measurements: • **Short** - Displays unit abbreviations (example: `15.1 cm`). • **Long** - Displays full unit names (example: `15.1 Centimeters`). • **None** - Displays no units (example: `15.1`)

Input

The Input section lets you define the input parameters for the chosen measurement unit.

Command Name	Description
Model unit (internal)	Specifies internal model units. For example, change internal units if the CAD units are centimeters instead of the Composer default units of millimeters. **Important:** For SOLIDWORKS files, **Model unit** must be **millimeters**.

Advanced Properties

The Advanced Properties page lets you customize all the document settings available in the registry.

You can define some of these settings in the Application Preferences or (Default) Document Properties pages.

You can set these properties both for the active document and as document defaults.

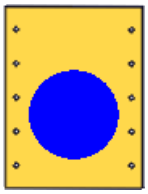
Display Commands

The icons available at the top of the page let you configure how the properties list is displayed.

Icon	Command Name	Description
	Categorized	Lists settings by category.
	Alphabetic	Lists settings alphabetically.
	Show Advanced Preferences Only	Displays advanced settings only. To list settings available from other (Default) Document Properties pages, clear this option.

Properties

Advanced properties let you customize all the document settings available in the registry.

Category	Property	Description
General	**CGMMetafileName**	Specifies the name of the Computer Graphics Metafile (CGM) metafile. For details, see **CGM options** in the Technical Illustration - Options page.
	CalloutAutoSize	Specifies a size for callouts automatically.
	Primitive Offset (%)	Specifies the distance that disc and square primitives are shifted forward relative to other geometry actors to avoid color conflicts (Z-fighting). Specify the offset as a percentage of the disc radius and square half-diagonal length. 0%  3%
	ShowCalloutExponentX1	Displays quantities of 1 as callout quantity exponents. For details, see the **Quantity exponent** callout property.
	UpdateViewsWithSelectedAssemblies	Lets you use the **Update Views with Selected Actors** command on the toolbar of the **Views** pane to update selected views according to the changes performed on selected assemblies. For details, see *Update a View*.
Selection	**HighlightColorIntensityFactor**	Specifies the amount of highlight shading. Accepted values range between 0.00 and 2.00. For details, see *Selection*: **Color intensity** highlight property.
	HighlightHiddenEdges	Displays hidden edges when an actor is highlighted. For details, see *Selection*: **Show hidden edges** highlight property.

Category	Property	Description
	SelectionColorIntensityFactor	Specifies the amount of selection shading. Accepted values range between 0.00 and 2.00. For details, see *Selection*: **Color intensity** selection property.
	SelectionHiddenEdges	Displays hidden edges when an actor is selected. For details, see *Selection*: **Show hidden edges** selection property.
Input - Import	**IO3dxmlImportOnlyLeafGeometries**	Imports only leaf geometry from 3DXML files. To also import geometry on intermediate groups, clear this option. Typically, intermediate geometry are navigational representations (NavReps), but they can also be real geometry.
	IOIdentifierType	Specifies how Composer generates GUIDs for geometry actors: • **0** - Generates random, unique 32-byte IDs (for example: "805fb301f8f12ca6"). **Important:** Not recommended. GUIDs are regenerated during each import, so geometry updates are not possible. • **1** - Uses geometry names. IDs remain the same during subsequent imports as long as the names in the CAD system do not change. Unless required for backward compatibility, use **2** for better performance. • **2** - Uses geometry names, encrypting names longer than 16 characters. GUIDs are always 16 characters or fewer, resulting in smaller Composer files and improved performance.
	IOImportCurvesStayOnTop	Specifies that curves, wires,wireframe and construction geometries (construction lines, construction circles and construction threads) are imported as staying on top.
	IOImportGeometriesAsTriangleStripSet	Rearranges tessellation triangles during import to reduce tessellation size in memory and improve render performance. This optimization applies to SOLIDWORKS and 3DXML formats only. For 3DXML only, clear this option to disable the optimization, which can improve load times. Clearing this option has no effect on SOLIDWORKS files; the optimization is always performed.
	IOImportPointsStayOnTop	Specifies that points and construction points are imported as staying on top of the geometry.
	IOSWImportAppearance	Imports all appearances in SOLIDWORKS files. You can also set this option in the **File** > **Open** dialog box. On the **SOLIDWORKS** tab, in the Options section, select **Import SOLIDWORKS appearance**. This option is selected by default.
	IOSWImportBOM	Imports part and assembly BOMs in SOLIDWORKS files. After import, you can access and edit all the BOM properties in Composer. You can also set this option in the **File** > **Open** dialog box. On the **SOLIDWORKS** tab, in the Options section, select **Import SOLIDWORKS BOM**. This option is selected by default.
	IOSWImportCloneSamePartInstances	When importing SOLIDWORKS files, all instances of a given part will be viewed and converted as clones. Clear this option if you want independent geometries created for each instance of a given part. Note that this increases the file size.
	IOSWImportConfigurations	Saves configurations with the Composer file.
	IOSWImportDecals	Imports decals from the SOLIDWORKS file to the Composer file.
	IOSWImportEnvelope	Imports all the SOLIDWORKS assembly envelopes.
	IOSWImportExplodeViews	Imports all exploded, saved, and named views in SOLIDWORKS files. This option is available for all three Open options: **Open**, **Merge into**

Category	Property	Description
		the current document, and **Merge into a new document**. You can also set this option in the **File** > **Open** dialog box. On the **SOLIDWORKS** tab, in the Options section, select **Import SOLIDWORKS Exploded Views and Saved Views**. This option is selected by default. In the **Views** pane, the **Views** tab displays the saved and named views and the steps of the exploded views.
	IOSWImportGraphicData	Imports default model tessellations (graphic representations) from SOLIDWORKS files instead of performing complete translations, thereby improving load times. Because tessellations are not recomputed, **Refinement** settings are ignored. **Important:** This option might not work for all SOLIDWORKS files. Enable this option only when importing very large assemblies to improve load times, or when tessellation fails for SOLIDWORKS parts originating from non-SOLIDWORKS formats (such as IGES or STEP).
Output	**IODeleteEmptyGroups**	When empty groups exists in the assembly tree because they contain hidden elements, such as construction geometry or sensitive IP information, removes these empty groups from the assembly tree at import.
BOM table	**BOM.Filter**	Specifies the default state for **Show Visible Actors Only** on the BOM pane, 0=disabled and 1=enabled. For other property descriptions, see *BOM Table Properties*.
Viewport	**GenerateOutlineForHiddenActor**	Specifies whether or not hidden actors should be outlined by the render mode. By default, this option is selected and outlines are generated for hidden actors (as well as for visible actors). To ensure that outlines are not generated for hidden actors, clear this option. For more information on render modes and outline styles, see *Render Tab*.

Miscellaneous Examples

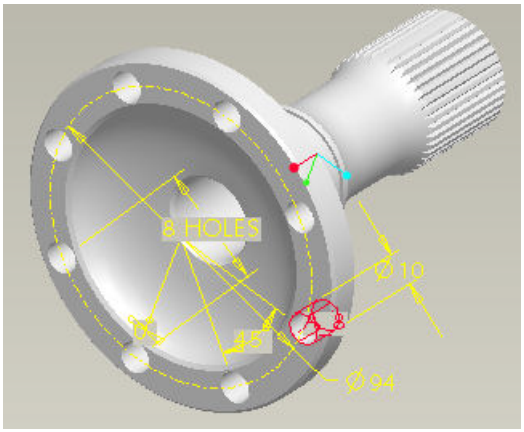
This theme provides a few useful examples.

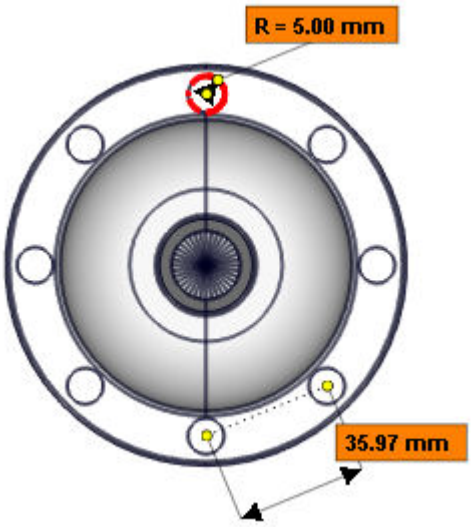
Example - Input Settings

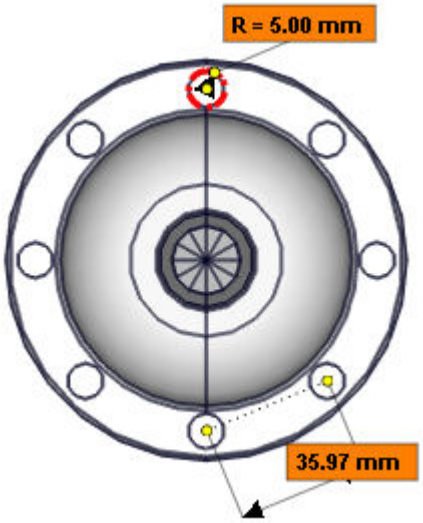
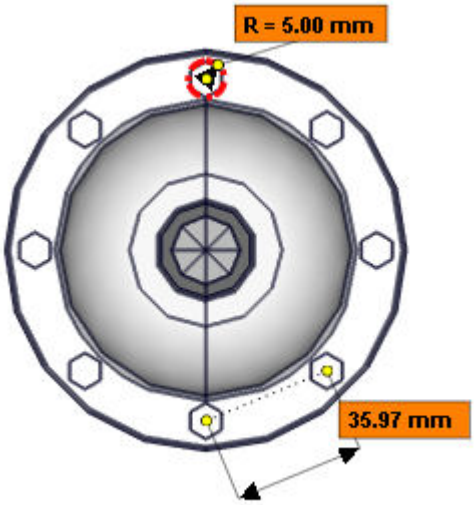
This example shows different tessellation levels from a native CAD file.

Let's take the following native CAD file as an example to study how the input settings influence the result.

- CAD file type: PTC Pro/ENGINEER®
- Extension: .prt
- Size: 2,276 KB



Input Settings	Result
Chordal error: 0.1 mm Normal deviation: 10° Output compression: 32 bits SMG size: 99 KB Compression ratio: 23	
Chordal error: 0.4 mm	

Input Settings	Result
Normal deviation: 40° Output compression: 32 bits SMG size: 44 KB Compression ratio: 52	
Chordal error: 0.8 mm Normal deviation: 80° Output compression: 32 bits SMG size: 38 KB Compression ratio: 60	

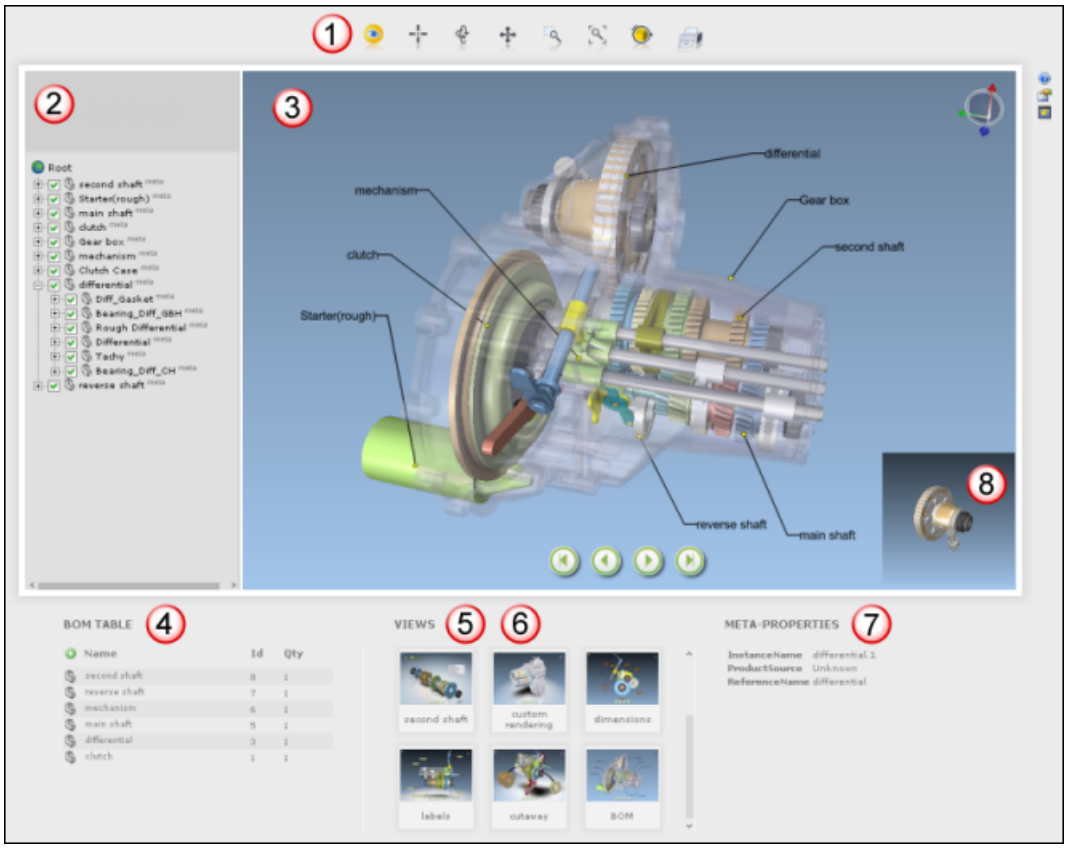
Publishing to HTML

This section explains how to publish a Composer document as an interactive HTML page.

About the HTML Output

When publishing to HTML, you can specify which features should be included in the HTML output.

The following sample HTML page shows the available features:



Number	Feature	Description	Profile
1	Toolbar	Provides quick access to navigation and other common tools.	Simple, Full, Meta-properties, PMI, View
2	Assembly	Displays the model assembly tree.	Full, Meta-properties, PMI
3	Main 3D Window (Viewport)	Displays the Composer document using the dedicated Composer Player plug-in.	All
4	BOM Table	Displays an interactive BOM table.	BOM, Full
5	Views	Displays thumbnail images of all document views. Click a view to activate it in the viewport.	Full, Meta-properties, PMI, View
6	PMI List (not shown)	Shows product manufacturing information (PMI) for actors with PMI.	PMI
7	Meta-Properties	Shows part and assembly meta-properties. To see meta-properties, hover over actors in the Assembly pane that have "meta" labels.	Full, Meta-properties

Number	Feature	Description	Profile
8	Detail View	Shows a zoomed version of the actor selected in the BOM Table or Assembly pane.	BOM, Full

Notes:

- A Composer Player Pro license is necessary to use advanced features in published Composer HTML files. Therefore, for custom models, the `Simple` profile is always used. However, if you are using a Composer built-in sample, advanced features are now available even without the Player Pro license.

  Note: When opening a Composer HTML file without a Player Pro license, an information message appears to inform you about this.

- HTML profiles (`.smgPublishHtmlSet`) are located in `<install_dir>\Profiles`. For information about customizing HTML profiles, see the *Composer Programming Guide*.

Publishing to HTML

You can publish the active Composer document as an interactive HTML page that will let users replay your Composer experience in Internet Explorer or in Mozilla Firefox.

Note: Dedicated plug-ins are necessary to read Composer content in either Internet Explorer or Mozilla Firefox. It is recommended to install Composer Player (free or with Player Pro), as the necessary plug-ins for both browsers are automatically installed and registered at the same time. In the case of Internet Explorer, you also have the option to accept the installation of this plug-in (based on ActiveX) the first time you access a published Composer HTML experience.

1. Click **File > Publish** > **HTML**.

   The **Publish to HTML** dialog box appears.

2. Choose your options, in particular the options related to `HTML Output`.
3. Choose a location and file name and click **Save**.

   Publishing to HTML creates the following files:

File	Description
`<name>.html`	The main HTML file, where `<name>` is the file name you specify on the **Save As** dialog box. To display the published Composer document, open this file.
`<name>_files`	A folder containing all files that comprise the Composer document, such as product (`.smgXml`), geometry (`.smgGeom`), and view thumbnail-image (`.jpg`) files.
`resources`	A folder containing all files that implement the HTML page, such as JavaScript and CSS files. The `resources` folder is the same for all published documents so can be shared.
`ComposerPlayerActiveX.cab`	The Composer Player plug-in for Internet Explorer. This file can be shared by multiple documents. When distributing HTML output, you must provide this file only if Composer Player is not previously installed on the target computer.
`npComposerWebPlayerPlugin.dll`	The Composer Player plug-in for Mozilla Firefox. This file can be shared by multiple documents. When distributing HTML output, Composer Player must be installed on the target computer.

Creating Animations

You can create simple animations quickly, using a library of pre-defined animations.

About the Timeline

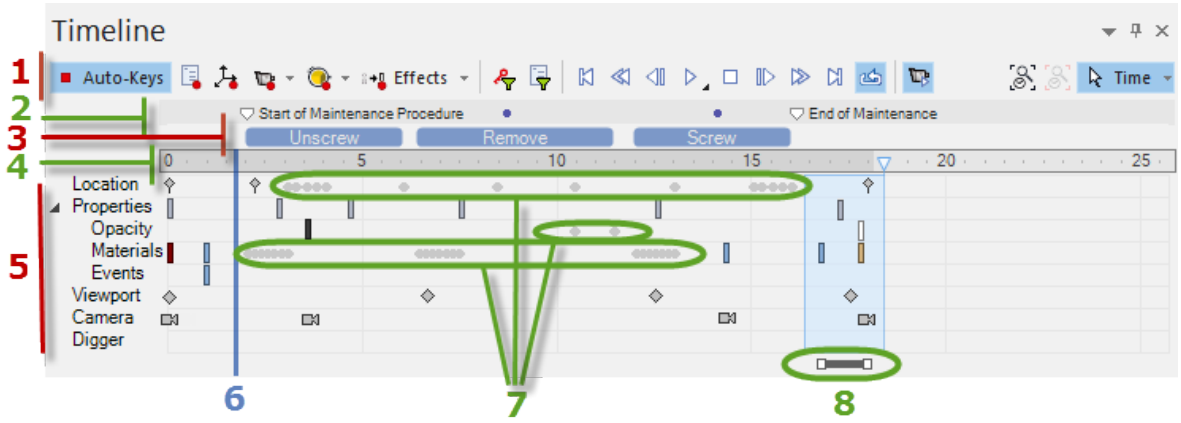
The timeline lets you create, edit, and play 3D animations. The timeline uses a keyframe-based interface. You create keys to capture actor properties and positions at given points in time, and then Composer smoothly animates the transitions between keys.

You can create animations using a library of pre-defined animations. See *About the Animation Library* and *Creating Pre-defined Animations*.

You can also animate actors individually. See *Creating Animations by Animating Actors Individually*.

Note: The timeline is active in Animation mode only. If you are in View mode, click **Switch to Animation Mode** in the upper-left corner of the viewport or click **Animation** on the **Home** ribbon tab. By default, the Timeline pane is docked at the bottom of the Composer window.

The timeline is available in the Timeline pane. This pane has several sections:



Number	Timeline Element	Description
1	Toolbar	Provides access to many animation commands. See *Toolbar Commands*. Additional animation commands are available: • on the **Animate** tab. See *Animate Tab*. • by right-clicking in the key tracks. See *Right-Click Commands*.
2	Marker bar	Displays animation markers, which flag significant points in your animations. Also displays milestones to identify key moments in the timeline. See *Creating and Using Animation Markers and Milestones*. You can also manage markers and milestones in the Markers pane. See *Markers Pane*.
3	Animation Blocks	Displays the pre-defined animations used in the timeline. See *Creating Pre-defined Animations*.
4	Timeline	Shows some or all of the animation timeline. You can pan and zoom the timeline using timeline commands in the toolbar. See *Handle the Timeline*.

Number	Timeline Element	Description
5	Key tracks	Displays animation keys. A track is the set of keys for a given actor property. For example, when an actor's position and material properties are both animated, that actor has a Location track and a Materials track. • Location key • Properties key • Viewport key • Camera key • Digger key • Animation block key (see dedicated row below) **Notes:** You can expand and collapse the Properties track. When expanded, it displays three additional tracks: Opacity, Materials and Events. When collapsed, it displays all keys for these three tracks combined. The Materials track records keys for the following properties: Color, Shininess, Emission, Environment Effect, and all Texture properties. The Events track records keys for the following properties: Pulse, Pulse Color, and Link.
6	Timebar	Indicates the current animation time.
7	Animation block keys	Correspond to the property changes of the various motions of pre-defined animations. Animation block keys are special kinds of keys that you cannot manage individually.
8	Multiple-key manipulator	Appears when the time selection contains multiple keys. Lets you reposition the selected keys and rescale the selection according to the timeline. See *Manage Keys*.

About the Animation Library

Composer uses key-frame based animation, which lets you build animations by arranging actors and taking snapshots at moments in time, called key frames. A set of pre-defined, generic animations is provided with Composer to let you create simple animations quickly, via the Animation Library workshop. Users proficient in XML can create their own custom animations.

The Animation Library

Your animation library is made up of pre-defined and custom animations.

By default, custom animations are available in . You can change the default location by specifying another folder in **Application Preferences** > **Data Paths**, under **Composer Files** > **Animation Library**.

Tip: In larger companies, documentation teams can keep their animation library on a server and redirect individual users to this library through the Data Paths mechanism.

Animation Groups, Animations and Motions

You need to understand how animations are organized on your computer, and how this relates to what you see in the Animation Library workshop in Composer.

Animations are organized in groups. Each group corresponds to a sub-folder in the `AnimationLibrary` folder. There are two groups for pre-defined animations, **Highlight** and **Motion**. Consequently, your `AnimationLibrary` folder contains two sub-folders, `Highlight` and `Motion`. You can add sub-folders as required to create custom animation groups.

Each group/sub-folder contains a set of XML files. Each XML file corresponds to an animation. For example, the `Highlight` animation folder contains a file called `Enhance.xml`. This file corresponds to the **Enhance** pre-defined animation, available in the **Highlight** group of the Animation Library workshop.

Animations themselves are made up of a number of motions. For example, the **Enhance** animation contains the following motions: **Flash** and **Scale**. In the Animation Library workshop, the motions available for the selected animation are listed, and you can customize the properties of each motion.

Pre-defined Animations

Composer is delivered with a set of generic animations that are pre-defined via XML files.

You can customize these pre-defined animations through their properties, in the Animation Library workshop. See *Properties*.

Pre-defined Animation Group	Pre-defined Animations Available
Highlight	• **Enhance** • **Focus** • **Validated** • **Warning**
Motion	• **Install** • **Remove** • **Roll** • **Screw**

Pre-defined Animation Group	Pre-defined Animations Available
	• **Unscrew** • **Untighten**

Custom Animations

You can consider creating your own custom animation groups and animations, provided that you are proficient in XML.

Tip: In larger companies, this task could be devoted to a documentation architect.

When creating custom animations, make sure you create them in the `AnimationLibrary` folder, and store them in sub-folder as required. This will ensure that they are listed alongside pre-defined animations in the Animations Library workshop.

For an example of XML code created for a custom animation, see *Custom Animation XML Example*.

Custom Animation XML Example

This topic provides an example of XML code created for a custom animation. To create your own custom animations, you must be proficient in XML.

Tip: In larger companies, this task could be devoted to a documentation architect.

Important: Before reading this, make sure that you understand the concepts described in *About the Animation Library*.

Basic Concepts

Each animation group corresponds to a dedicated folder in your Animation Library folder. Each folder stores a number of XML files that make up the animations of the group. Each XML file defines a single animation. An animation is created in the XML file using the single `<Step>` element.

For each animation/step, you can specify:

- whether or not to allow the user to modify the property values in the Animation Library workshop.
- whether or not to make the angle, axis, and distance properties of animated actors editable in the Animation Library workshop, when property values are not modifiable.
- whether to hide or to show the **Start time** and **End time** property values in the Animation Library workshop.

An animation/step can have one or several motions. Individual motions are pre-defined, and each motion has a set of pre-defined properties.

Tip: For ease of use, it is recommended to reuse the content of individual `<Motion>` elements (with the whole property set) from the pre-defined XML files provided by default in the Animation Library. You can customize the values of each property of the property set. Examples of reusable `<Motion>` elements are highlighted in the XML code example below.

XML Code Example

Here are examples of XML codes that you could write to create a custom animation called "Review", and to be able to mirror it.

```
<Step Name="Review" ReadOnly="1" MakeAngleAxisDistPtEditable="1" ShowStartEnd="1">
  <Modifiables/>
  <Motions>
    <Motion Name="SetColor" ApplyWhenMirrored="1">
      <PropSet>
        <Motion.Start Value="0"/>
        <Motion.End Value="1"/>
        <Motion.Color R="255" G="255" B="255" Defined="1"/>
      </PropSet>
    </Motion>
    <Motion Name="Flash" ApplyWhenMirrored="1">
      <PropSet>
        <Motion.Start Value="0"/>
        <Motion.End Value="2"/>
        <Motion.Color R="100" G="123" B="146"/>
        <Motion.Intensity Value="1.0"/>
        <Motion.Repetition Value="5"/>
      </PropSet>
    </Motion>
    <Motion Name="DisplayText">
      <PropSet>
        <Motion.Start Value="1"/>
        <Motion.End Value="3"/>
        <Motion.Top Value="10.0"/>
        <Motion.Left Value="120.0"/>
        <Motion.FontSize Value="20"/>
        <Motion.FontType Value="Arial"/>
        <Motion.BackgroundColor R="255" G="255" B="255"/>
        <Motion.FontColor R="255" G="0" B="0"/>
        <Motion.Text Value="Reviewer: control this!"/>
      </PropSet>
    </Motion>
  </Motions>
  <Links>
    <Mirror FolderName="Motion" FileName="Review"/>
  </Links>
</Step>
```

Code Description

The XML elements shown in the code example above are described here.

<Step> Creates an animation. Parameters are as follows:

`Name`: Text displayed to identify the animation in the Animation Library workshop.

`ReadOnly`: Specifies whether or not to allow the user to modify the property values in the Animation Library workshop.

- `"0"`: Allows the user to modify the property values.
- `"1"`: Prevents the user from modifying the property values.

(Optional) `MakeAngleAxisDistPtEditable`: Specifies whether or not to make the angle, axis, distance, and point properties of animated actors editable in the Animation Library workshop, when `ReadOnly` is set to `"1"`.

- `"0"`: Prevents the user from modifying the angle, axis, distance, and point properties of animated actors.
- `"1"`: Allows the user to modify the angle, axis, distance, and point properties of animated actors.

`ShowStartEnd`: For each motion of the animation, specifies whether to hide or to show the **Start time** and **End time** property values in the Animation Library workshop.

- `"0"`: Hides **Start time** and **End time**.
- `"1"`: Shows **Start time** and **End time**.

<Modifiables> Introduces the various motions that make up the animation. Standalone, compulsory element.

<Motions> Introduces the individual motions that make up the animation.

<Motion> Creates an individual motion within the animation. Each motion has the following parameter:

`Name`: Text displayed to identify the motion in the Animation Library workshop.

(Optional) `ApplyWhenMirrored`: For each motion of the animation, specifies whether or not to ignore the original animation definition and to use the motion definition described in the mirrored XML.

- `"0"`: Applies the original animation definition in the mirrored XML.
- `"1"`: Ignores the original animation definition and uses the motion definition described in the mirrored XML.

(Optional) `Defined`: For the `Motion.Color` property of the `Flash` and `SetColor` motions, specifies whether or not to change the color of the selected actor during this step of the animation.

- `"0"`: Sets the color to Undefined.
- `"1"`: Takes the RGB values into account.

Note: If you do not specify a `Defined` parameter, the RGB values are taken into account.

<PropSet> Introduces the property set of the motion.

<Motion.XXX> Defines each property of the motion, using one or several parameters.

<Links> (Optional) Defines a link type to other animations.

Note: If you do not use this XML element, there is no mirrored version of this animation.

<Mirror> (Optional) Creates a mirror link type. Parameters are as follows:

`FolderName`: Name of the folder where the XML file describing the animation to mirror is located.

`FileName`: Name of the XML file describing the animation to mirror.

Note: Both the `FolderName` and `FileName` parameters are case-sensitive.

About Scenarios

A scenario (`.smgSce`) file is an XML file that describes the partial or full animation of a set of actors.

A scenario contains a set of tracks with each track associated with a partial or full Net GUID. A Net GUID is an ID based on the name of an actor and its hierarchy in the Assembly tree. When a track is associated with a partial Net GUID, it can be applied to several actors. All actors instanced by the current open product that match the Net GUID of the track receive the animation.

For example:

Net GUID of track 1: b.c Net GUID of actor 1: a.b.c -> get track 1 Net GUID of actor 2: d.b.c -> get track 1 Net GUID of actor 3: e.f.c

```
<Server Type="CLitServerModifiable">
     <CLitActorMesh Name ="LeftWheel" NetGuid=
          "b7aebd17d5886219.8d029e89f289e09f">
          <Tracks>
          […]
          </Tracks>
     </CLitActorMesh>
</Server>
```

A scenario can reference a list of child scenarios:

```
<ScenarioChilds>
     <Child […] />
     […]
     <Child […] />
</ScenarioChilds>
```

These scenario instances have GUIDs and properties:

- The GUID of the scenario. `Ident = "81d0e51bd1e02c1e"`
- The file name of the scenario to instantiate. `IsInstanceOf = ".\wheel.smgSce"`
- The application point characterized by a partial or full Net GUID. Only actors matching this Net GUID are influenced by the referenced scenario. `NetGuid = "b7aebd17d5886219.8d029e89f289e09f.95d439236dcee9c5"`
- Apply mode: Tracks issued from the instance can replace tracks issued from the other children or can be merged. `Operator = "replace" Operator = "merge"`
- Start and end times: Expressed in the time space of the scenario, it is used to time-stretch child scenarios. `TimeStart = "60" TimeEnd = "119"`
- Priority: An integer that sorts the list of child scenarios. The lower child is applied first. `Priority = "0"`
- Inheritance: Each child scenario can reference other scenarios, so a Directed Acyclic Graph is built.
- Override: Tracks described in the parent scenario are applied after the instantiations of the child scenarios and overwrite the existing tracks.

Creating Pre-defined Animations

You can create simple animations quickly, using a library of pre-defined animations. Once you have added several animations to your timeline, you can easily manage animation blocks.

Note: You can also create animations in which you animate actors individually. See *Creating Animations by Animating Actors Individually*.

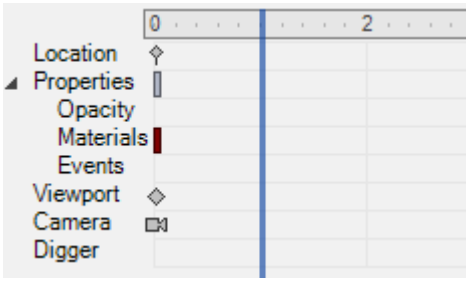
Create a Simple Animation

You can create simple animations quickly, using a library of pre-defined animations.

1. Click **Workshops** > **Publishing** > **Animation Library** .

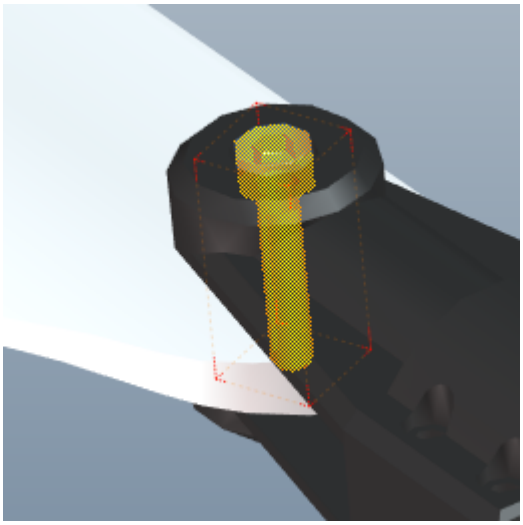
   The Animation Library workshop opens. The timeline, and the Animation mode are activated.

2. In the timeline, position the timebar at the starting point you want for the animation.



Note: On a given time-frame, you can only create one animation.

3. In the viewport or in the assembly tree, select one or several actors.



4. In the Animation Library workshop:
   a. In the **Animations** area, select an animation group, and then an animation.
   b. In the **Properties** area, customize the properties of the various motions of the selected animation.

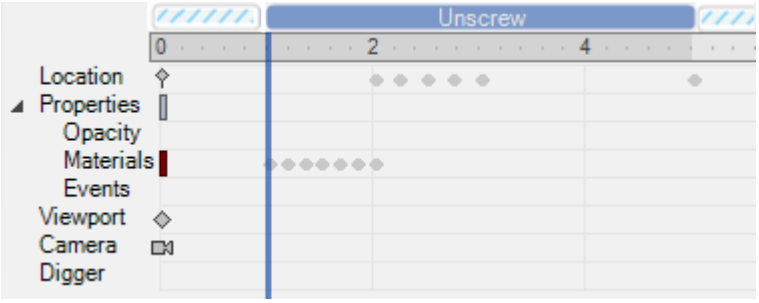
      Note: Available properties depend on the animation you selected.

      The **Overview** area in the Animation Library workshop provides a graphical overview of the chronology of motions in the animation, and of the global duration of the animation.

   c. Click **Create**.

   See *Animation Library Workshop*.

The animation is created. A dedicated animation block appears in the timeline, along with a set of animation block keys that correspond to the various steps of the animation. Empty steps are created for empty spaces.



To play the animation, click the Play button in the timeline.

You can add other pre-defined animations to your timeline, or enrich your animation with location, properties, viewport, camera, and Digger keys. See *Using the Timeline*.

Note: When working in the Animation Library, if you delete an actor from the model, the corresponding animation keys are deleted from the timeline. When this results in leaving an animation block empty (devoid of actors), a message informs you that the animation block is no longer associated with any actor, and asks if you want to want to delete this animation block from the timeline.

Handle Animation Blocks

Once you have added several animations to your timeline, you can easily handle animation blocks using the mouse. Using the **Shift** and/or **Alt** key provides additional possibilities.

Note: There always needs to be sufficient free space in the timeline to accommodate what you are trying to do.

1. To select an animation block, click it.
2. To select all of the animation keys that are located within an animation block's time-frame without selecting the animation block keys themselves, double-click the animation block.

   Note: This is useful to move or handle globally the other animation keys within an animation block.

3. To copy an animation block and paste it to another location in the timeline, **Ctrl +** drag it to the other location.
4. To extend the length of an animation block, drag the extremity of the animation block in the timeline.

Do this...	To extend the length of an animation block, as well as to...
Drag	Move its dedicated keys.
Shift + drag	Move its dedicated keys along with the standard animation keys that are located within its time-frame.
Alt + drag	Move subsequent animation blocks and their keys, without moving the standard animation keys.
Alt + Shift + drag	Move all subsequent animation blocks, and all keys in the timeline (animation block keys and standard animation keys) that are located within their time-frame.

5. To move an animation block, drag it to another location in the timeline.

Do this...	To move an animation block, as well as to...
Drag	Move its dedicated keys.
Shift + drag	Move its dedicated keys along with the standard animation keys that are located within its time-frame.
Alt + drag	Move subsequent animation blocks and their keys, without moving the standard animation keys.
Alt + Shift + drag	Move all subsequent animation blocks, and all keys in the timeline (animation block keys and standard animation keys) that are located within their time-frame.

6. To perform additional operations on an animation block, right-click it to display the contextual menu and sub-menus.

Option	Description
Convert > Convert Selected Step(s)	Converts the selected animation block keys into regular animation keys. This removes the animation block. **Note:** If there are remaining steps on the timeline, an empty step is created in replacement of previous animation block. Otherwise, there are no steps on the timeline.
Convert > Convert All Steps	Converts all animation block keys into regular animation keys. This removes the animation blocks and all steps on the timeline.
Invert > Invert Step	Converts the selected animation block keys into regular animation keys, and inverts their order. This removes the animation block. **Note:** If there are remaining steps on the timeline, an empty step is created in replacement of previous animation block. Otherwise, there are no steps on the timeline.
Invert > Invert All Steps	Converts all animation block keys into regular animation keys, and inverts their order. This removes the animation blocks and all steps on the timeline.
Mirror > Mirror Selected Step(s)	Reproduces in inverted order the animation block keys of the selected steps at the end of the animation. New animation blocks are created (and possibly empty steps). Applies to motion animations only. For example: • Mirroring an Install step creates a Remove step. • Mirroring a Screw step creates an Unscrew step. • Mirroring Install, Screw and Focus steps creates Unfocus, Unscrew and Remove steps. **Note:** Use **Ctrl** to select several steps.
Mirror > Mirror Animation	Reproduces the animation block keys of the whole animation at the end of the animation, and inverts their order. New animation blocks are created (and possibly empty steps).

Option	Description
Refresh All Steps	Refreshes an animation block if some properties of the animated actor have changed before the animation block, after the animation block has been created.
Revert All Steps	Converts all animation block keys into regular animation keys, and reverts their order. This removes the animation blocks and all steps on the timeline.
Delete Step	Deletes the animation block as well as its dedicated keys. **Note:** You can also select the animation block and press **Del**. **Note:** If there are remaining steps on the timeline, an empty step is created in replacement of previous animation block. Otherwise, there are no steps on the timeline.
Delete All Steps	Deletes the animation blocks and all steps on the timeline.
Clear Steps(s) Selection	Deselects all the steps (steps containing animation block keys, and empty steps) that are currently selected.

Creating Animations by Animating Actors Individually

You can create animations in which you animate actors individually.

Note: You can also use the pre-defined animations from the Animation Library. See *Creating Pre-defined Animations*.

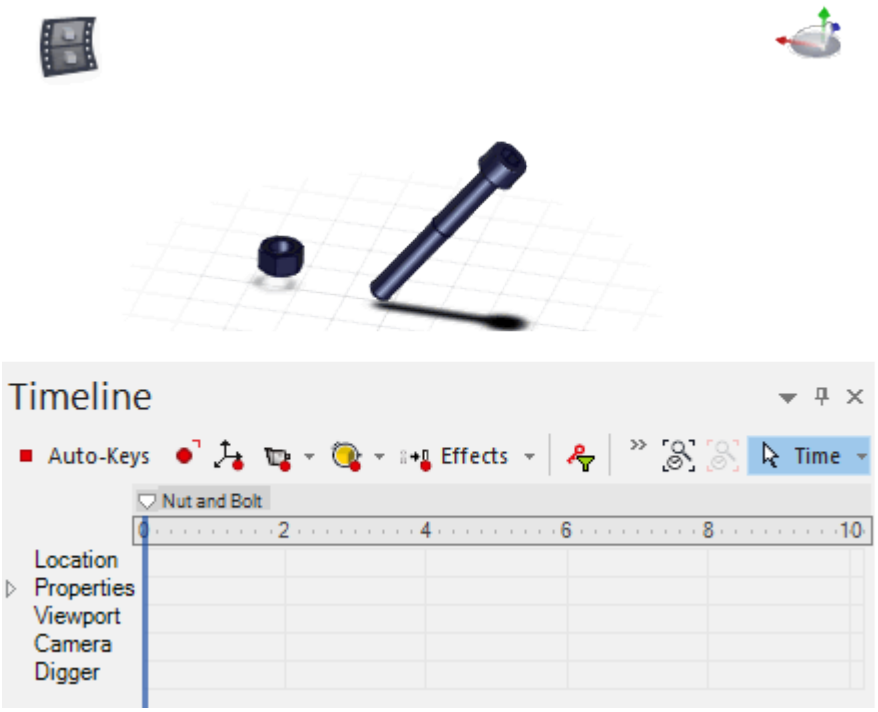
Note: The timeline is active in Animation mode only. If you are in View mode, click **Switch to Animation Mode** in the upper-left corner of the viewport or click **Animation** on the **Home** ribbon tab. By default, the Timeline pane is docked at the bottom of the Composer window.

Before you begin: Make sure you are in Animation mode.

Create a Simple Animation

This topic explains how to create a simple animation with position and color changes.

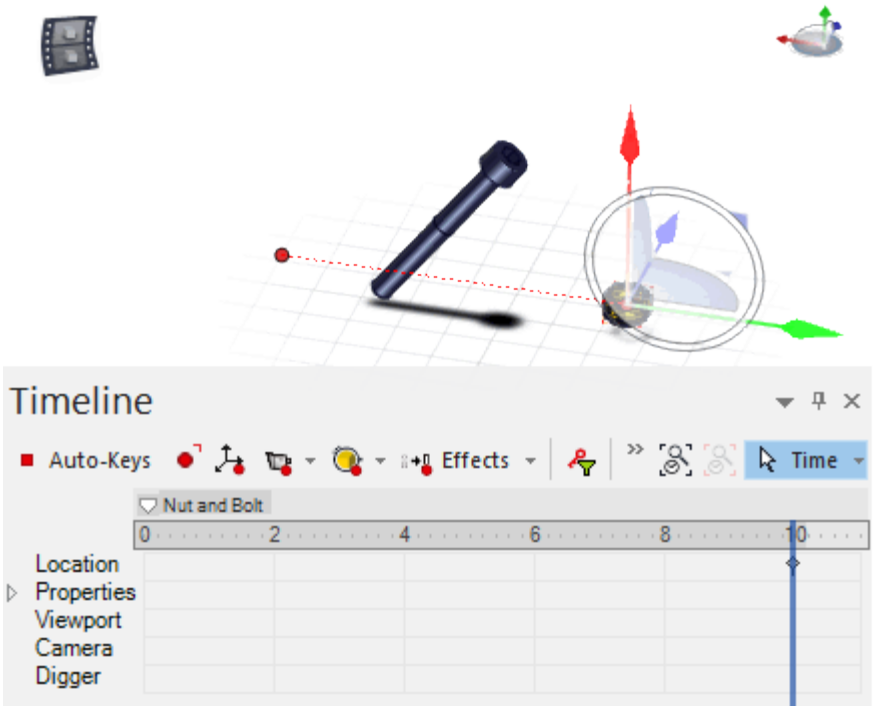
As an example, let's take the following scene, which shows two actors, a nut and a bolt.



1. Drag the timebar to 10.0".
2. Translate the nut along the green axis.
3. If **Auto-Keys** is cleared, click **Set Location Key** to create the key.

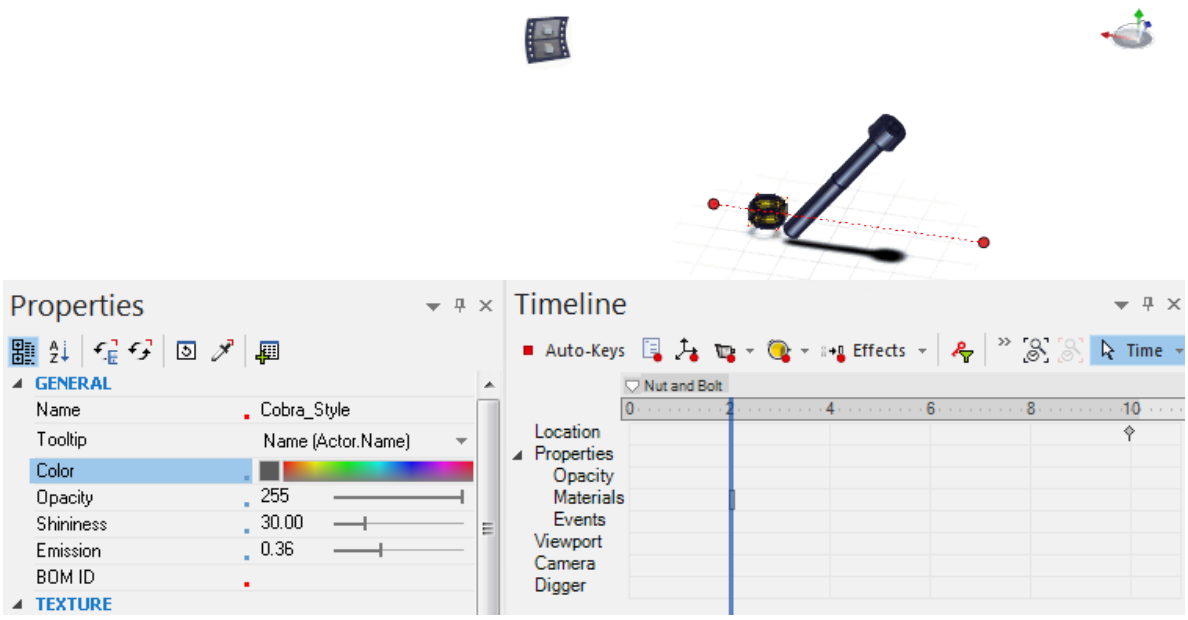
Note: When **Auto-Keys** is selected, keys are created automatically when you change actor properties and locations.

The red dotted line represents the animation trajectory.

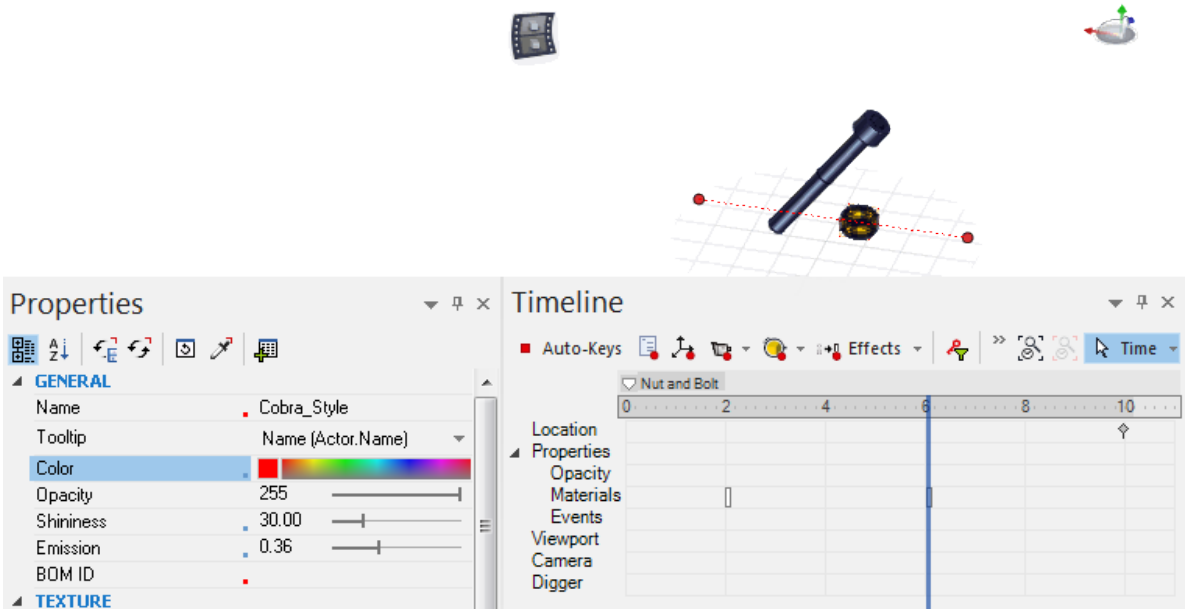


4. To play the animation, click **Play** (Timeline toolbar).
5. Go back to time 2.0" and set a color key for the nut by selecting **Color** in the Properties pane and then clicking **Set Keys** in the Timeline toolbar.

   This records the nut's gray color.



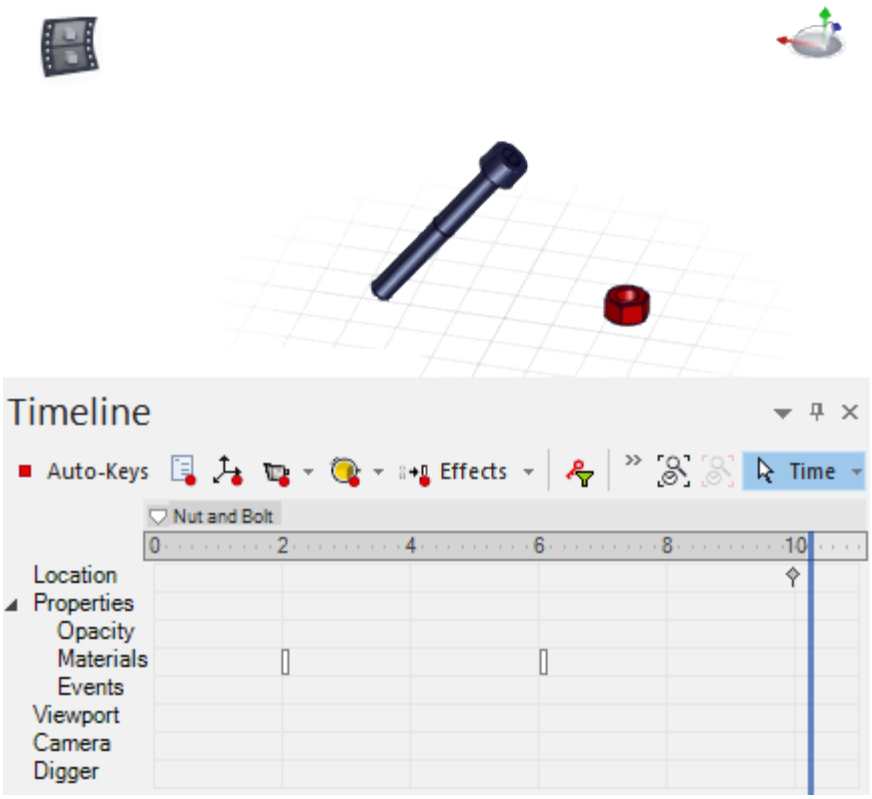
6. Go to time 6.0", change the nut color to red, and create another property key.



Note: You can set other actor properties, such as materials or events for example.

7. Play your animation.

   The nut color and position animate at the same time.



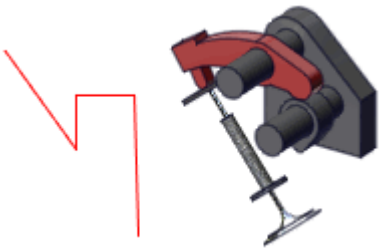
Notes:

- Animations do not record changes to actor visibility (**Visibility** commands, the **h** key, or toggling check boxes in the Assembly or Collaboration panes). These actions do not correspond to property changes. To hide or show actors in animations, while in Animation mode show all actors that participate in the animation (**Show All** or selectively show actors) and then set actor **Opacity** keys as needed.
- A maximum of three cutting planes can participate in an animation.
- Rendering modes are not animated. When inserting more than one view into the timeline, only the rendering mode of the last view is used.
- After you finish an animation, it is strongly recommended that you clean unused keys.

Create a Path from a Line

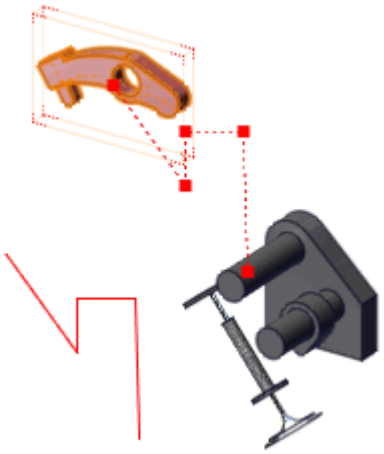
This topic explains how to create a path from an existing line.

Let's take the following scene as an example.



1. In animation mode, position the timebar at the desired time.
2. Select one or more actors or the camera.
3. Click **Animate** > **Create Path from Line (Linear Speed)** .
4. Click a polyline or line detected on geometry.

   A path is created for the selected actors, as well as the corresponding keys on the Location track.



Create a Camera Key

This topic explains how to create a camera key.

1. Click **Animate** > **Create Camera Key** .
2. **Optional:** Create a grid to help you position the camera.
3. Move the timebar to the desired time.
4. Click this command.
5. Click in the scene to place the camera and click again to select the target.
6. In the Properties pane, change path properties as needed.
7. Move the timebar and create additional keys, or press **Esc** when done.
8. Edit the camera path as needed by dragging red path anchors ( ).

Creating and Using Animation Markers and Milestones

You can create animation markers to flag significant points in your animations. You can also create milestones to identify key moments in the timeline. You can then use these markers and milestones to produce a set of images illustrating the 3D scene at given moments in time.

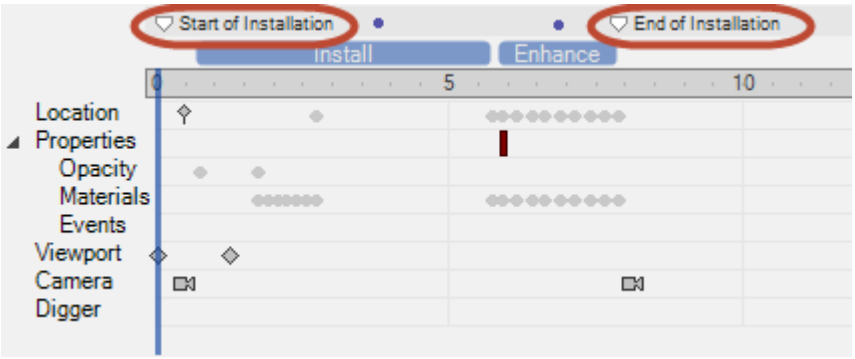
Once created, markers and milestones are listed and can be managed in the Markers pane.

Create and Handle Animation Markers

Animation markers flag significant points in your animations.

Tip: You can use markers to control your animation. For example, you can play an animation until the next marker by defining a **playmarkersequence://** event link.

1. To create a marker, click in the Marker bar at the desired time and type the marker name (`New Marker` by default).



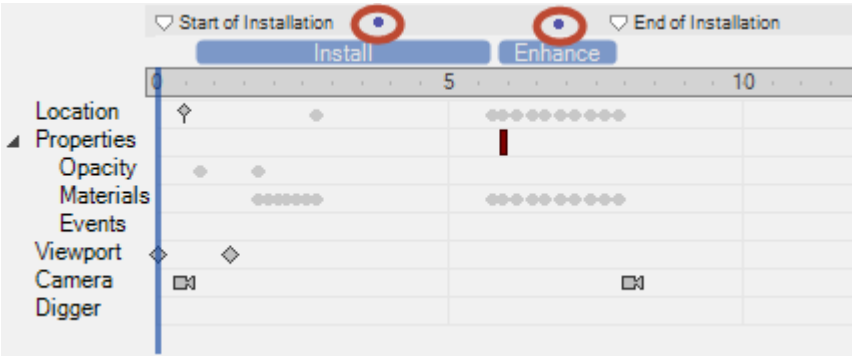
2. To rename a marker, right-click the marker and click **Rename Marker**.
3. To delete:
   - a marker: right-click it and click **Delete Marker** .
   - all markers, right-click in the Marker bar and click **Delete All Markers**.
4. To move:
   - a marker, drag it.
   - a marker, and the subsequent animation blocks, **Alt** + drag the marker.
   - a marker, the subsequent animation blocks, and standard animation keys, **Shift** + **Alt** + drag the marker.

Note: You can also manage markers in the Markers pane.

Create and Handle Milestones

You can create milestones to identify key moments in the timeline, and then use these milestones to produce a set of images illustrating the 3D scene at given moments in time.

1. To create a milestone, right-click in the Marker bar at the desired time and select **Create Milestone**.



2. To delete:
   - a milestone: right-click it and click **Delete Milestone**.
   - all milestones, right-click in the Marker bar and click **Delete All Milestones**.
3. To move:
   - a milestone, drag it.
   - a milestone, as well as the subsequent milestones and animation blocks, **Alt** + drag the milestone.
   - a milestone, as well as the subsequent milestones, animation blocks, and standard animation keys, **Shift** + **Alt** + drag the milestone.

Note: You can also manage milestones in the Markers pane.

Use Markers and Milestones to Produce Images

You can use markers and/or milestones to produce a set of images illustrating the 3D scene at given moments in time, through the High Resolution Image workshop, or the Technical Illustration workshop.

Note: You can generate an image for each marker and/or milestone contained in the timeline. A generated image corresponds to the state of the scene at the specific time where the marker/milestone is located.

1. Click **Workshops** > **Publishing** > **High Resolution Image**, or **Workshops** > **Publishing** > **Technical Illustration** > .

   The corresponding workshop opens. See *High Resolution Image Workshop* and *Technical Illustration Workshop*.
2. In the workshop, choose your options as usual.
3. Click the **Multiple** tab.
   - To generate an image for each marker in the timeline, select **Markers**.
   - To generate an image for each milestone in the timeline, select **Milestones**.
4. Specify a naming convention for image files. You can specify valid file-name characters and the following case-sensitive keywords:

   `%filename%` The file name specified by **File name** in the **Save As** dialog box.

`%viewname%`	The view name, as listed in the Views pane.
`%markername%`	The marker name, as listed in the timeline and in the Markers pane.
`%index%`	A counter from 1 to the number of views. Index values have the same number of characters (1-9, 01-99, 001-999) for all files created.

Using the Timeline

You can create, edit, and play 3D animations using the timeline.

Using the Timeline

You can use the timeline to create, edit, and play 3D animations. The timeline uses a keyframe-based interface. You create keys to capture actor properties and positions, and then Composer smoothly animates the transitions between keys.

Before you begin:

To display the Timeline pane, click **Window** > **Show/Hide** > **Timeline** or **Home** > **Show/Hide** > **Animation** .

Handle the Timeline

The timeline shows some or all of the animation timeline. The vertical bar, called the timebar, indicates the current animation time.

1. Change the current animation time, click on the timeline or key tracks.

   You can also drag the timebar to change the animation time.

   The animation plays as you drag the timebar.

2. To pan the timeline, click the mouse wheel and drag.
3. To zoom (scale) the timeline, roll the mouse wheel.

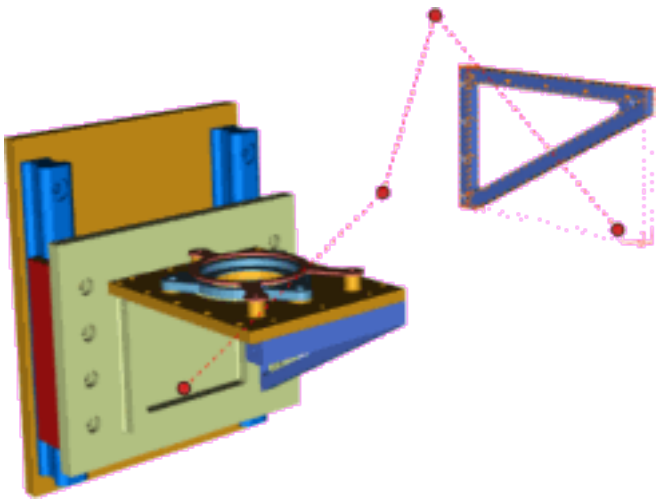
Set Keys

You can set location, properties, viewport, camera, and Digger keys to capture actor properties and positions at given moments.

1. Move the timebar to the desired time.
2. To set location keys:
   a. Move (translate or rotate) one or more actors.

   b. With the modified actors still selected, click **Set Location Key** .

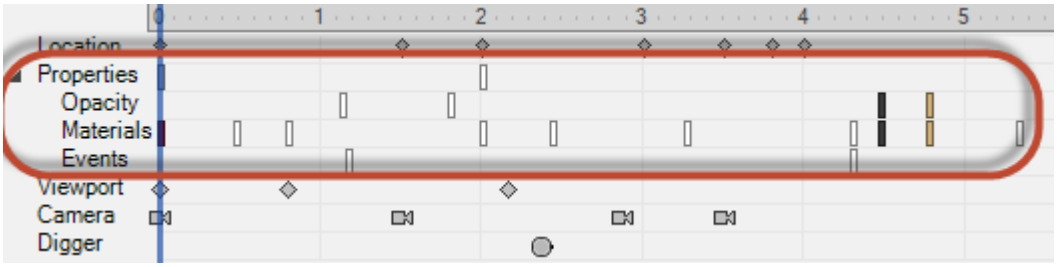
   Selecting an actor with location keys shows the animation path in the viewport:



Here, the brace actor has three location keys (t=2, t=3, t=3.5, t=4). The dotted red line shows the animation path. Red dots (■) correspond to location keys. You can change a key location by dragging ■.

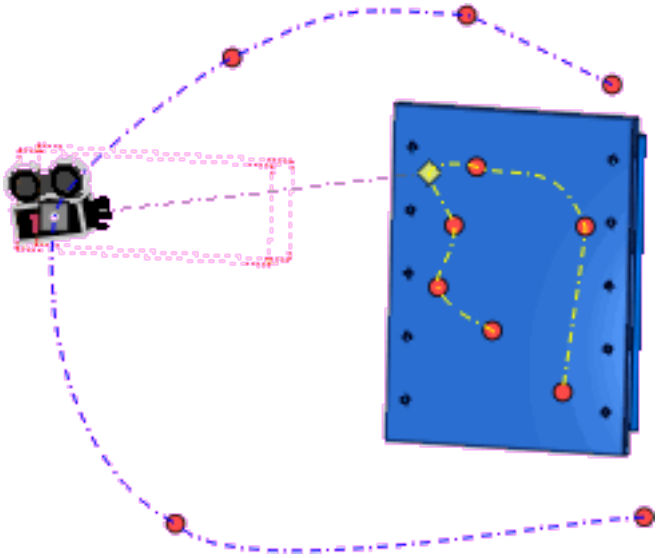
3. To set properties keys:
   a. Select one or more actors.
   b. In the Properties pane, set one or more property values.
   c. With the modified properties still selected (use **Ctrl**+click to select multiple properties), click **Set Keys** .

   The properties are now set to apply at the specified time in the animation. If you defined opacity-, materials- and events-related properties, the related keys are shown in the dedicated timeline track. Other properties keys not related to opacity, materials and events are shown in the Properties track.

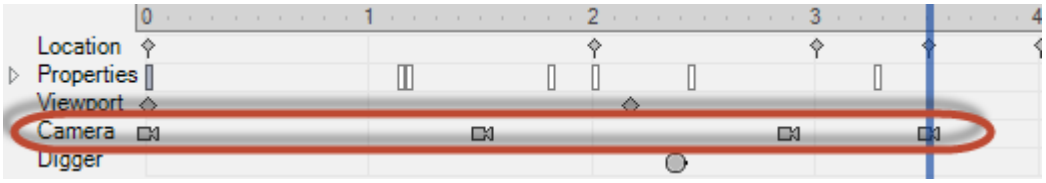


4. To set viewport keys:
   a. Click in the viewport.
   b. In the Properties pane, set one or more property values.
   c. Click **Set Keys** .
5. To set camera keys:
   a. Change the viewport camera orientation (zoom, pan, or rotate the viewport).
   b. Click **Set Camera Keys** .

      Selecting a camera with camera keys shows the animation paths of the camera and its target (center of interest):

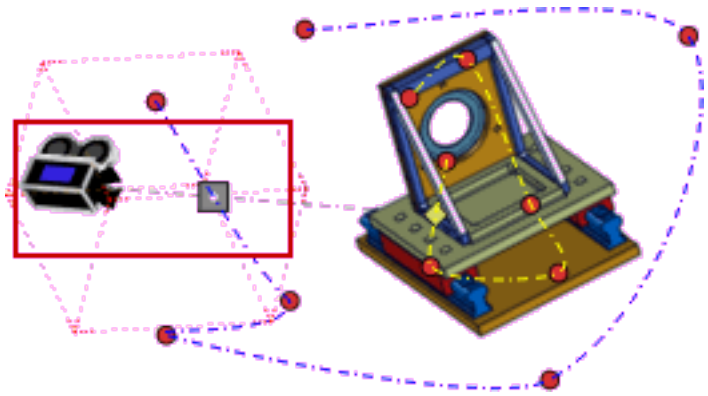


- The blue dashed line is the camera path and the yellow dashed line is the camera target path. Red dots ( ) correspond to camera keys. You can change a key location by dragging .
- The camera center anchor shows the current interpolated position of the camera. Changing the camera location by dragging creates a camera key (red dot) when **Auto-Keys** is selected.



Notes:

- Camera properties, such as **Lock distance to target** being selected, can cause the camera to deviate from the path:



- To attach the camera to an actor, press **Alt** while dragging onto an actor. To detach the camera, press **Alt** while dragging onto empty viewport background.
- The camera target (center of interest, or COI) anchor shows the current interpolated position of the camera target. Changing the target by dragging creates a camera key when **Auto-Keys** is selected.
- To attach the target point to an actor, press **Alt** while dragging onto an actor. To detach the target, press **Alt** while dragging onto empty viewport background.

Tips:

- Use **Home** > **Navigate** > **Attach Camera** commands to facilitate attaching the camera, camera target, or both, to an actor. See *Navigate Commands*.
- Set camera keys after setting all your property and location keys.
- To change the camera path style, set the camera **Path** property. See *Camera Properties*.

6. To set Digger keys:
   a. Activate the Digger.
   b. Use the Digger tools to zoom parts of your model, or change opacity and visibility, for example.
   c. Click **Set Digger Keys**.

Tips:

- You cannot change Digger opacity and therefore cannot fade Digger in or out of an animation. To avoid abrupt appearance of Digger, make Digger initially small and then enlarge it at a slightly later time. Similarly, to simulate fade out, make Digger small before hiding it completely.
- Set Digger keys after setting all your property and location keys.

Manage Keys

Once you have created keys, you can move, copy, delete and scale them.

1. Select a key and perform either of the following operations:

To...	Do this...
Move a key	Drag it.
Copy a key	**Ctrl**+drag it. **Note:** Copying keys by dragging copies key locations; to copy key transformations, use **Copy Selected Keys of the Selected Actor**.
Delete a key	Right-click it and click **Delete Keys**.

2. Select multiple keys by dragging the mouse, and perform either of the following operations:

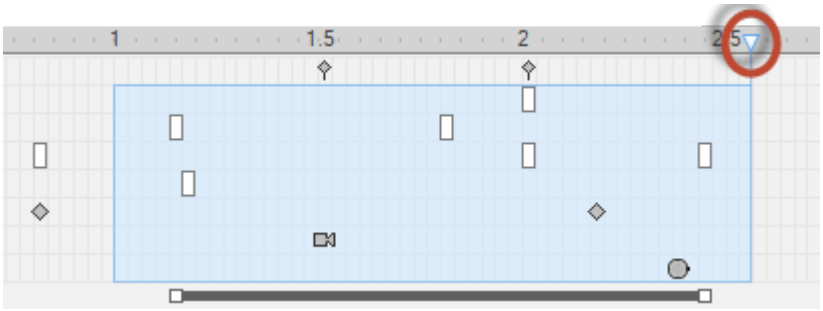
Option	Description
Move the keys	Drag the bar.
Copy the keys	**Ctrl**+drag the bar.
Scale the keys	Drag a bar endpoint. To scale while keeping the original keys, **Ctrl**+drag an endpoint.

Option	Description
Delete the keys	Right-click in the selection and click **Delete Keys**, or press **Delete**.

Notes:

- Copy keys by dragging copies actor locations represented by the keys. To copy actor transformations instead, use right-click commands. See *Right-Click Commands*. For example, when you copy two keys that define a 45-degree rotation of a screw using right-click commands, the new keys apply the transformation a second time, resulting in the screw rotating 90 degrees in total. When you instead copy by dragging, the original screw location is restored and the 45-degree rotation is reapplied.
- Selections can include location, properties, viewport, camera and Digger keys. You can modify your selection by dragging the sides or corners of the selection rectangle.
- Some time selection commands are available from the right-click context menu, such as **Delete Time Selection** and **Invert Time Selection** .
- When the time selection contains several keys, the multiple-key manipulator appears under the key tracks.

- You can scale the time selection by dragging the small triangle in the upper-right corner of the selection. All the selected keys are scaled, and keys to the right of the selection shift accordingly. You can insert time in your animation by selecting a time period that does not contain keys and then scale the selection.



Timeline Commands

The Timeline pane lets you create, edit, and play 3D animations.

To display the Timeline pane, click **Window** > **Show/Hide** > **Timeline** or **Home** > **Show/Hide** > **Animation** .

Note: The timeline is active in Animation mode only. If you are in View mode, click **Switch to Animation Mode** in the upper-left corner of the viewport or click **Animation** on the **Home** ribbon tab. By default, the Timeline pane is docked at the bottom of the Composer window.

Toolbar Commands

Toolbar commands let you control the timeline.

Key-Related Commands

These commands, located to the left of the toolbar, let you perform key-related operation. See *Set Keys*.

Icon	Command Name	Description
	Auto-Keys Mode	Creates keys automatically at the current time when you change any actor property (position, color, and so on). **Note:** Using **Auto-Keys Mode** can result in more keys than you intended. For example, when you move an actor to see what is behind it, **Auto-Keys Mode** creates a key to record the actor's new position even though you did not intend to include the move in the animation. It is recommended that you do not use this mode until you become proficient.
	Set Keys	Records property values for all ( ) or selected ( ) properties of the selected actors at the current time. **Important:** • Select only the properties you want to record before setting keys. Setting unnecessary keys affects performance in large assemblies and complicates animation editing because key filtering displays extra keys. • Animations do not record changes to actor visibility (**Visibility** commands, the **h** key, or toggling check boxes in the Assembly or Collaboration panes). These actions do not correspond to property changes. To hide or show actors in animations, while in Animation mode show all actors that participate in the animation (**Show All** or selectively show actors) and then set actor **Opacity** keys as needed. • Most properties that cannot be animated are marked with . Properties dependent on other properties (for example, the annotation **Text** property) are also unanimatable but are not marked with . Keys for unanimatable properties are always created at time=0,

Icon	Command Name	Description
		regardless of the current timebar location, and apply to the entire animation. Note that **Set Keys** does not create keys for properties with dependencies but **Auto-Keys Mode** does.
	Set Location Key	Records the locations of the selected actors at the current time.
	Set Camera Keys	Records the current camera and target positions at the current time. Camera keys record the orientation and zoom scale of the model.
	Camera Auto-Keys Mode	(Available when **Auto-Keys** is selected.) Creates camera keys automatically at the current time when you change the viewport camera orientation (rotate, zoom, or pan). **Note**: Using **Camera Auto-Keys Mode** can result in more camera keys than you intended. It is recommended that you do not use this mode until you become proficient.
	Set Digger Keys	Records Digger properties at the current time.
	Digger Auto-Keys Mode	(Available when **Auto-Keys** is selected.) Creates Digger keys automatically at the current time when you change Digger properties. **Note**: Using **Digger Auto-Keys Mode** can result in more Digger keys than you intended. It is recommended that you do not use this mode until you become proficient.
	Effects - Fade In	Creates keys for a progressive appearance of the selected actors: 1. **Opacity**=0 (transparent) immediately following the previous **Opacity** key or at time=0. 2. **Opacity**=0 (transparent) 10 frames before the current time. Move this key to change the fade-in duration. 3. **Opacity**=255 (opaque) at the current time. **Note:** You cannot fade in Digger. See **Set Digger Keys** for an alternative approach.
	Effects - Fade Out	Creates keys for a progressive disappearance of the selected actors: 1. **Opacity**=< *current value*> 10 frames before the current time. Move this key to change the fade-out duration. 2. **Opacity**=0 (transparent) at the current time. **Note:** You cannot fade out Digger. See **Set Digger Keys** for an alternative approach.
	Effects - Hot Spot	Creates keys to briefly highlight the selected actors: 1. **Emission**=< *current value*> 5 frames before the current time. 2. **Emission**=1 (full emission) at the current time. 3. **Emission**=< *previous value*> 5 frames after the current time. **Tip**: Add several hot-spot effects to cause an actor to blink.

Icon	Command Name	Description
	Effects - Set Keys with Beginning Properties	Creates keys at the current time that restore the initial values of all keys set in the animation, effectively undoing the animation property and location changes.
	Show Keys for Selected Actors Only	Displays only keys for the current selection. To show only viewport keys, click in empty space of the viewport. **Note:** Does not affect camera and Digger keys.
	Show Keys for Selected Properties Only	Displays only keys for the selected properties in the Properties pane, such as color and opacity, for all actors. To select several properties in the Properties pane, use the **Ctrl** key. If no property is selected, all property keys are displayed. **Tip:** You can combine this option with **Show Keys for Selected Actors Only** to filter on properties for selected actors. **Note:** Does not affect camera and Digger keys.
	Rewind	Moves the timebar to the beginning of the animation.
	Previous Key	Moves the timebar to the previous key.
	Previous Frame	Moves the timebar to the previous frame.
	Play	Plays the animation starting at the current timebar location. **Tips:** • Press and hold **Play** to access additional commands. • If the animation plays beyond your last key, there might be keys for hidden actors. Press **Ctrl+T** to show all actors and then delete unwanted keys. • Press and hold **Play** to access additional commands. • If the animation plays beyond your last key, there might be keys for hidden actors. Press **Ctrl+T** to show all actors and then delete unwanted keys.
	Play Selection	(Press and hold **Play** to access this command.) Plays the animation from the beginning to the end of the selected time period.
	Play Reverse	(Press and hold **Play** to access this command.) Plays the animation backwards starting at the current timebar location.
	Pause	Stops the animation without moving the timebar.
	Stop	Stops the animation and moves the timebar back to where the animation started.
	Next Frame	Moves the timebar to the next frame.
	Next Key	Moves the timebar to the next key.
	Forward	Moves the timebar to the end of the animation.

Icon	Command Name	Description
	Loop Play Mode	Plays the animation continuously.
	Camera Play Mode	Shows the animation from the camera's viewpoint. To show the animation using a fixed viewpoint, turn off this mode. All navigation tools (zoom, pan, and so on) are available when **Camera Play Mode** is off.

Timeline-Related Commands

These commands, located to the right of the toolbar, let you manage the timeline itself.

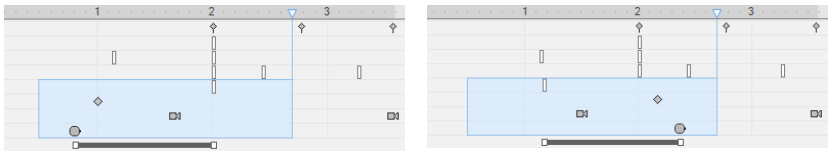
Icon	Command Name	Description
	Zoom Fit All	Sets the timeline scale to fit all the keys.
	Zoom Selection	Sets the timeline scale to fit the selected keys.
	Time - Select	Enables keys selection mode so you can select keys by dragging in the timeline.
	Time - Pan (Middle Mouse)	Enables timeline translation mode so you can display a different portion of the timeline by dragging in the timeline. You can also press the mouse wheel while in another mode to pan the timeline.
	Time - Zoom (Mouse Wheel)	Enables timeline zoom mode so you can change how much of the timeline is visible by dragging in the timeline. You can also use the mouse wheel while in another mode to zoom the timeline.

Right-Click Commands

These commands are available when you right-click in the timeline or keys track.

Note: All right-click copy/paste operations copy actor transformations represented by keys. To copy actor locations instead, drag keys (see *Manage Keys*). For example, when you copy two keys that define a 45-degree rotation of a screw using right-click commands, the new keys apply the transformation a second time, resulting in the screw rotating 90 degrees in total. When you instead copy by dragging, the original screw location is restored and the 45-degree rotation is reapplied.

Icon	Command Name	Description
N/A	**Select All Keys**	Selects all animation keys. You can also press **Ctrl+A**.
N/A	**Delete Keys**	Deletes the selected keys. You can also press **Delete**.
N/A	**Copy Selected Keys of the Selected Actor**	(Available when at least one key is selected.) Copies the selected keys of the selected actor. You can then paste these keys to apply the same animation to other actors. **Note:** This command copies key transformations; to copy key locations, use **Ctrl**+drag.
N/A	**Copy Selected Tracks of the Selected Actor**	(Available when no keys are selected.) Copies the animation tracks corresponding to the currently displayed keys of the selected actor. Use the **Show Keys for Selected Properties Only** filter to control which tracks are copied. You can then paste the tracks to duplicate the animation for other actors.
N/A	**Paste Keys**	(Available when pasting only property keys not in a time selection.) Applies copied property keys at the current time (where you right-clicked) to the selected actors.
N/A	**Paste Keys in Selection**	(Available when pasting only property keys in a time selection.) Applies copied property keys to the selected actors, spacing the keys uniformly in the time selection.

Icon	Command Name	Description
N/A	**Paste Tracks**	(Available when pasting property tracks only (no location track).) Applies the property tracks to the selected actors. Unlike pasting individual keys, you cannot specify where to place the keys.
N/A	**Paste Tracks in Parent**	(Available when pasting a location track.) Applies the entire location track to the selected actors, with location keys relative to parent coordinate systems. Unlike pasting individual keys, you cannot specify where to place the keys; the entire track is duplicated.
N/A	**Paste Tracks in World Coordinate System**	(Available when pasting a location track.) Applies the entire location track to the selected actors, with location keys relative to the world coordinate system. Unlike pasting individual keys, you cannot specify where to place the keys; the entire track is duplicated.
N/A	**Insert View**	Inserts the view selected in the Views pane at the right-click location. The command also creates a marker with the view name. Inserting views is a fast way to create animations. **Note:** If collaborative actors do not appear in the animation, click in the timeline and then change collaborative actor visibility (for example, click **Home** > **Visibility** > **Visibility** > **Show All** or press **Ctrl+T**). To change actor visibility, set **Opacity** property keys. **Tip:** You can also drag a view from the Views pane to the timeline.
	Invert Time Selection	Swaps the key order within the time selection.  Before After
	Delete Time Selection	Removes all keys in the time selection. Keys to the right of the time selection shift to the left. **Note:** The **Delete** key performs **Delete Keys** and not **Delete Time Selection**.
	Select Actors with Selected Keys	Selects the actors in the viewport associated with the selected keys.
	Show Keys for Selected Actors Only	See toolbar command.
	Show Keys for Selected Properties Only	See toolbar command.
	Time Settings	Lets you set frame rate, animation duration, and time scaling. For details, see *Time Settings*.

Customizing Application Preferences

This section describes how to customize application preferences for Composer.

Before starting your first working session, you can customize the settings to suit your working habits. Your customized settings are stored in permanent settings files: they will not be lost at the end of your session.

Accessing and Customizing Application Preferences

Application preferences let you customize application preferences for Composer, as well as manage user configuration profiles.

Notes:

- Application preferences and default document properties are shared by all versions of Composer applications (, ,) installed on a given computer. The registry settings created when you change application preferences or default document properties are not removed when you uninstall a Composer application.
- Administrators can restrict which document properties and application preferences team members can modify. See *Disabling Document Property and Application Preference Modifications*.

Customize Application Preferences

You can configure application preferences .

1. Select **File** > **Preferences...** .

   The **Application Preferences** dialog box appears.

2. Select the appropriate category in the left-hand box.

Options in this category...	Allow you to...
General	Set user interface properties, such as the display language, menu style, and auto-save behavior.
Input	Customize how Composer loads models.
Viewport	Define viewport preferences, such as high-quality rendering effects.
Camera	Set camera preferences.
Selection	Set preferences for actor highlighting and selection behavior.
Navigation	Configure mouse button and wheel behavior.
Hardware Support	Modify graphic card settings.
Application Paths	View or set the paths of internal and external tools used by Composer.
Data Paths	Set data paths. **Note:** Data paths are sorted lists of paths used to locate resources such as files, profiles, and links. Composer uses data paths to resolve external references when the relative path of a resource cannot be found.
Advanced Settings	Control advanced features and resolve issues.

   The options for the corresponding preferences appear.

3. Set these options according to your needs.
4. Click **OK** to save the preferences and exit the **Application Preferences** dialog box.

Use Predefined Configuration Profiles

You can manage user configuration profiles.

Note: **High quality**, **High speed**, and **Safe** profiles affect only preferences critical for rendering quality, performance, and reliability. Because the **Profile** field dynamically computes and displays the profile that

best matches your settings, it is possible to select one profile and have a different profile selected the next time you visit the **Application Preferences** dialog box. However, your preference settings are correct.

1. Select **File** > **Preferences...**.

   The **Application Preferences** dialog box appears.

2. Select the appropriate profile in the **Profile** box:

Option	Description
Standard	Uses settings that are not optimized for a specific work condition. **Note:** This profile disables advanced OpenGL functions by selecting **Standard** on the **Hardware Support** page. Not all rendering effects will be available.
High quality	Optimizes settings for best rendering quality. All advanced OpenGL functions are enabled.
High speed	Optimizes settings for faster performance. For example, **Selection > Highlighting** is disabled. All advanced OpenGL functions are enabled.
Safe	Optimizes settings for reliable graphical behavior. Try this option when highlighting is poor or performance degrades when you rotate actors. **Note:** This profile disables 3D OpenGL hardware acceleration on the **Hardware Support** page. Not all rendering effects will be available.
Customized	Indicates your settings do not match a predefined profile. For example, when the profile is **Safe** and you enable **Show hidden edges**, the profile automatically changes to **Customized**. However, enabling **Show paper** does not change the profile because that setting is not defined by the **Safe** profile.

Share Application Preferences

Application preferences can be saved as `.set` files. You can use `.set` files to transfer application preferences between users.

1. Select **File** > **Preferences...**.

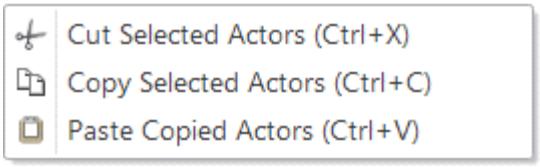
   The **Application Preferences** dialog box appears.

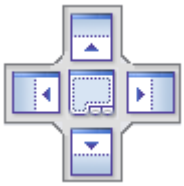
2. Perform one of the following operations:

   - To save the current settings to a new `.set` file, click **Save**, and specify where you want to save the file.
   - To load a profile which has been previously saved as a `.set` file, click **Load**, and browse to select the file.

General

The **General** page lets you set user interface properties, such as the display language, menu style, and auto-save behavior.

Option	Description
Language	Specifies the Composer user interface language, which determines the application resource files to use. The following languages are supported: • Czech • Chinese (Taiwan) • Chinese (Simplified) • English • French • German • Italian • Russian • Japanese • Korean • Polish • Portuguese (Brazil) • Spanish • Turkish You must restart the application for the change to take effect. **Note:** When you change the application language, you must uninstall the current version of Adobe SVG Viewer and install the correct language version from *http://www.adobe.com/svg/viewer/install*. Not doing so might result in viewer issues.
Undo history size	Specifies the maximum number of commands you can undo. Larger values use more memory.
Display mini-toolbar in the viewport	Displays a command toolbar when you right-click in the viewport. The toolbar contains many common commands (including commands to cut, copy, and paste actors) and your three most recently used commands. The mini-toolbar is not configurable. 
Smart docking bars	Simplifies repositioning user-interface components, such as the Properties and Workshops panes. As you drag a pane around the user interface, icons appear that provide placement options. Drag the pane over an icon to highlight its new location and drop the pane to place it.

Option	Description
	
Reset Prompts	Restores prompts to their default behaviors. For example, when you modify a view and then activate a different view, you are prompted to save your changes. When you select **Don't ask this question again**, prompting is disabled. Click **Reset Prompts** to restore prompting.
Reset GUI Layout	Resets toolbars and user-interface layout to their original positions. You must restart the application for the change to take effect.
Theme	Specifies the theme to use for the user interface. You can choose between **White**, **Light Gray** (by default) and **Dark Gray**.
Automatic save	Saves open files at the specified interval (in minutes) in a `Bak` folder under the **User** folder. See *Application Paths*. **Note:** New and updated views are saved, but current (unsaved) view modifications are not.

Input

The Input page lets you customize how Composer loads models.

Option	Description
Check original file changes	Translates only if the CAD file changed since the last translation. Composer and Sync create a checksum when they translate a CAD file to a Composer file and store the checksum in the `.smgGeom` file. If the same CAD file is translated again, the application checks this checksum and performs the translation only if the CAD file changed. The translation log file indicates whether the translation occurred: • Translation skipped: "Up-to-date ==> not overwritten" • Translation occurred: "Not up-to-date ==> need to overwrite"
Open .smg if it exists	When opening a CAD file, opens the Composer `.smg` file instead if one is found with the same name in the same folder. This option avoids translation of the CAD file to Composer format, which improves load time. To re-translate the CAD file (for example, if the model has changed), remove or rename the `.smg` file or clear this option.
Always generate .smg when loading CAD files	Saves the Composer `.smg` file automatically when you open a CAD file. For quicker load time in future Composer sessions, open the `.smg` instead of the CAD file.
Compute construction edges on loading	Computes construction edges when loading a CAD file. This option is useful for rendering modes with outlines but without construction edges. For example, to render **Smooth with Outline** mode but without **Construction Edges**, Composer must calculate outlines and construction edges to suppress construction edges. If construction edges are already computed, rendering is faster. **Note:** This option increases load time. If construction edges are not calculated on loading, they are calculated when necessary.
Delete Thumbnail History for Open Preview	Deletes temporary folders and thumbnails, which frees disk space and memory. The thumbnails are displayed on the Open dialog box for models that have been previously opened. Thumbnails are regenerated when needed.
Delete Temporary Files	Deletes all temporary files from the default Composer work folder. You cannot have any files open in Composer. By default, temporary files are deleted automatically after 15 days.
SOLIDWORKS version	Specifies which SOLIDWORKS version to run (when multiple versions are installed). Select **Auto detect** when you have only one version.

Viewport

The Viewport page lets you define viewport preferences, such as high-quality rendering effects.

High quality rendering / On demand

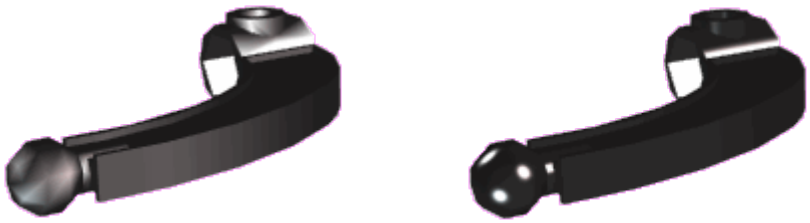
Composer supports advanced rendering effects for creating high-quality images.

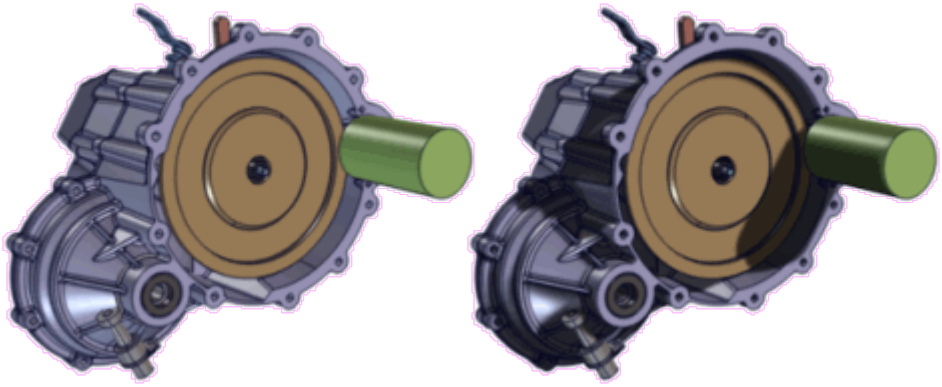
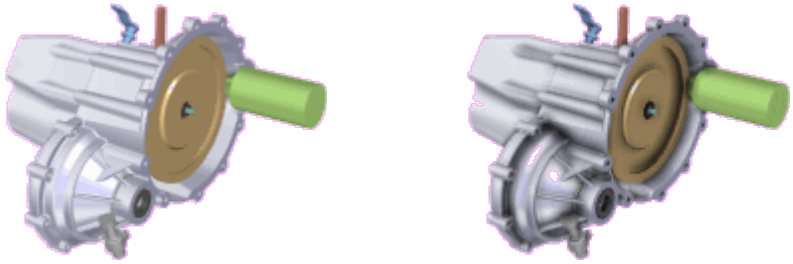
You can choose when to apply effects to your models:

- **Real time** - Applies the effect while navigating and performing transformations in the viewport.
- **Real-time preview** - Applies an approximation of the effect in real time and then applies the full effect on idle. For example, shadow mapping can be too compute intensive for real-time rendering, but a real-time approximation is important when positioning lights.
- **On idle** - Applies the effect automatically during computer idle time (not while navigating or performing transformations).
- **On demand** - Does not apply the effect automatically. To apply on-demand effects, click **Render** > **On Demand** > **High Quality** (ribbon) or press **A** while in the viewport.

Note: Not all options are available for all effects.

Important: For all high-quality rendering effects except **Anti-aliasing**, the **HardwareSupport.Advanced** option must be enabled on the **Advanced Settings** page, and the effect must be supported by your graphics card. See *Advanced Settings*.

Option	Description
Per-pixel lighting	Configures per-pixel lighting (PPL), also known as Phong shading. When enabled, Composer displays shaded surfaces based on the color and illumination at each pixel. PPL can improve lighting of models with poor tessellation. For details, see **Per-pixel lighting** in *Viewport Properties*. Choose the effect status: • **Enabled** - Enabled for all documents. • **Disabled** - Disabled for all documents. • **Use document settings** - Obey the **Lighting** > **Per-pixel lighting** viewport property.  Disabled Enabled
Shadows	Configures shadow mapping. When enabled, geometry actors cast and receive shadows, making rendering for lighted scenes more realistic. For details, see **Shadows** in *Viewport Properties*. Choose the effect status: • **Enabled** - Enabled for all documents. • **Disabled** - Disabled for all documents. • **Use document settings** - Obey the **Lighting** > **Shadow mapping** viewport property.

Option	Description
	 Disabled Enabled
Ambient occlusion	Configures the ambient occlusion (AO) shading effect. When enabled, surfaces take into account light attenuation from nearby actors. For details, see **Ambient occlusion** in *Viewport Properties*. Choose the effect status: • **Enabled** - Enabled for all documents. • **Disabled** - Disabled for all documents. • **Use document settings** - Obey the **Lighting** > **Ambient occlusion** viewport property.  Disabled Enabled
Depth of field	Configures depth of field (DOF) behavior. When enabled, portions of the scene away from the camera focal point appear blurred. For details, see **Depth of field** in *Viewport Properties*. Choose the effect status: • **Enabled** - Enabled for all documents. • **Disabled** - Disabled for all documents. • **Use document settings** - Obey the **Depth of field** viewport property.

Option	Description
	Disabled Enabled
Anti-aliasing	Configures model anti-aliasing. Anti-aliasing smooths rough edges (jaggies) to give the appearance of higher resolution by taking into account how much an ideal edge overlaps adjacent pixels. For details, see *Anti-Aliasing Tab*. Disabled Enabled
Hardware Anti-aliasing	Enables real-time hardware multisample anti-aliasing (MSAA) to increase the quality of 3D and 2D images. Select **Disable** to disable MSAA, or select a sampling resolution: **2**, **4**, **8**, **16**, or **32 samples**. Higher values produce better results but can degrade performance. The recommended value is 8, but the optimal value is hardware-dependent. If you select a value higher than your graphics card supports, the highest supported value is used. **Notes:** • Even when supported by your graphics card, **32 samples** might require more video memory than is available. The result is a black viewport. To resolve the problem, reduce the sampling resolution or disable hardware MSAA. • **HardwareSupport.Advanced** must be enabled. See *Advanced Settings*

Note: The Glow effect is not configurable at the application level. It is always **Use document settings** and **Real time**.

Jittering options

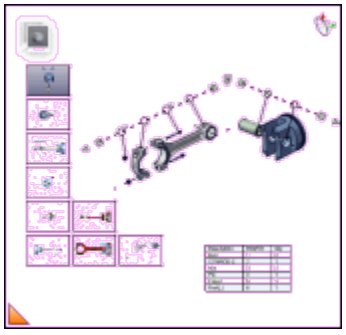
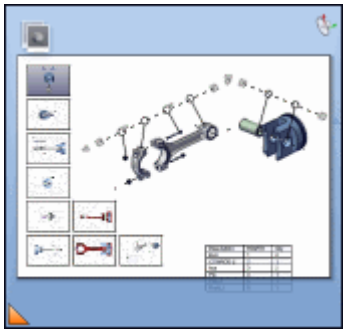
Set these options when you have selected **Jittering** for **Anti-aliasing**.

Option	Description
Number of passes	(Available when **Jittering** is selected.) Specifies the number of internal renderings made to create the effect. More passes take longer to perform but produce better results.

Option	Description
Radius	(Available when **Jittering** is selected.) Specifies the portion of a scene that appears sharp. The image becomes blurred as you move away from the focal point. The higher the value, the larger the depth of field (less blur).

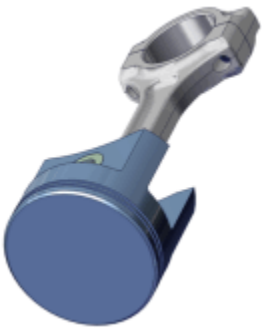
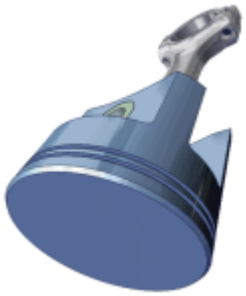
General

Define general viewport preferences.

Option	Description
Display statistics	Displays statistics (such as the number of actors, triangles, and points) at the bottom of the viewport during navigation. **Tip:** Press **S** to toggle this feature when navigating the scene.
Use default GUI font for text (must reload open documents)	Uses the Composer graphical interface font (computer-dependent) for collaboration text, such as labels and text 2D panels. When this option is cleared, collaboration text is Arial Unicode MS by default. To change an actor font, set the **Text** > **Font** property in the Properties pane. **Note:** Use Unicode fonts to ensure that foreign-language characters render correctly. If you frequently work with multiple languages, consider defining a Composer style to specify the font or install the associated language pack provided by Microsoft.
Show paper	Displays paper margins in the viewport.  Disabled  Enabled A4 Landscape **Note:** Define the paper space in (Default) Document Properties - Paper Space. See *Paper Space*

Camera

The **Camera** page lets you set camera preferences.

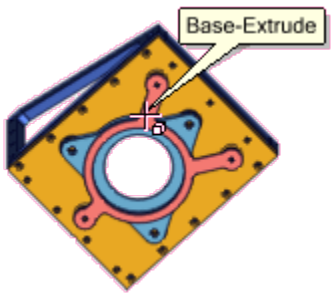
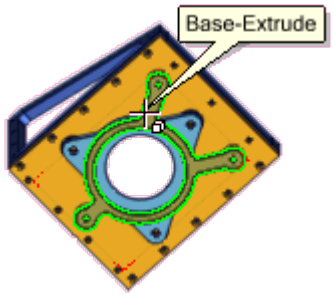
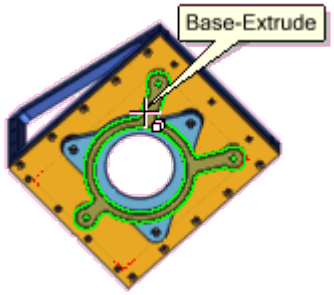
Option	Description
Default perspective	Defines the perspective angle when in perspective mode. In perspective mode, actor sizes depend on their distance from the camera viewpoint. Perspective mode is the view normally seen by the eye. Parallel lines recede into the distance to a vanishing point.  45 degrees  180 degrees Orthogonal mode eliminates the effect of distance from the camera (actor sizes remain constant).
Minimum FPS	Defines the minimum number of frames per second (fps), between 0 and 30. During navigation, the 3D kernel adapts the level of detail to respect the fps.
Free rotation (no constraints)	Eliminates vertical constraint during rotation. **Tip:** You can also enable free rotation by pressing **Ctrl** while rotating (**Ctrl**+right mouse button).
Inertia	Causes the camera to continue moving after rotating or panning the model. The faster you rotate or pan the model, the more it moves when you stop.
Navigation mode common to all viewport panes	Uses the same navigation mode for all panes of a document viewport. To use different modes (for example, to use **Rotate Mode** in one pane and **Pan Mode** in another), clear this option. **Tip:** To create multiple viewport panes, click **Window** > **Viewport** > **Layout**. **Note:** This option does not affect viewports of different documents.
Volatile navigation mode (auto-revert to selection mode)	Enables **Select Mode** automatically after using another mode (**Pan**, **Rotate**, **Zoom**). To retain the last mode you selected, clear this option.
Keyboard navigation	Enables the **Pan increment** and **Rotate and roll increment** options, which let you specify the increment values used to pan, rotate, and roll using keyboard shortcuts.
Pan increment	Specifies the increment value used to pan using **Ctrl+arrow keys**. The default value is 5 pixels.
Rotate and roll increment	Specifies the increment value used to rotate using **Shift+arrow keys** and to roll using **Alt+arrow keys**. The default value is 1.00 degree.

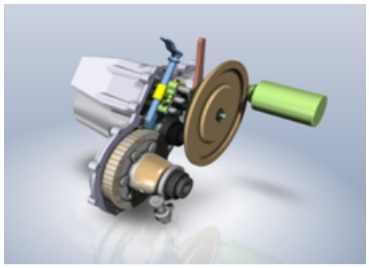
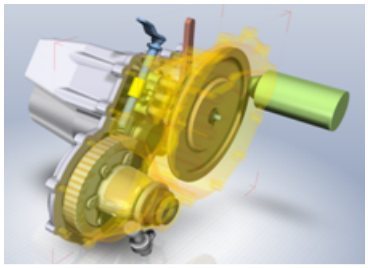
Selection

The Selection page lets you set preferences for actor highlighting and selection behavior.

General

Customize general selection preferences.

Option	Description
Highlighting	Highlights the actor under the mouse pointer to help you select the right actor. Highlighting is also known as preselection and previsualization.  Disabled  Enabled
Tooltip	Displays a tooltip for the actor under the mouse pointer. Disabled  Enabled
Mouse sensitivity	Specifies how reactive **Highlighting** and **ToolTip** are to mouse movement.
Follow viewport selection changes in the tree view	Selects actors in the Assembly or Collaboration pane when selected in the viewport, scrolling the tree view as needed.
Highlight in the viewport invisible actors belonging to the selection	Highlights invisible actors (that is, actors whose visibility is switched off) in the viewport, when they are selected (in the Assembly tree or using another method). Clear if you do not want invisible actors that are selected to appear highlighted in the viewport. **Notes:** • The status of this option has no impact on the selection itself. • When an invisible actor is part of a custom hotspot that is enabled, this actor will remain highlighted in the viewport in all cases.

Option	Description
	 Disabled  Enabled

Gizmos

Gizmos are graphic objects that lets you manipulate actors in 3D.

For more information, see *About Gizmos*.

Option	Description
Gizmos	Displays gizmos on actors when performing transformations.
Gizmo size	Specifies the gizmo size.

Navigation

The Navigation page lets you configure mouse button and wheel behavior.

Mouse Button Customization

Customize how the mouse buttons work.

Mouse Button	Keyboard Key	Description
	+ (none)	Specifies the right-click action.
	+Ctrl, **Alt**, or **Shift** key	Specifies the right-click action with **Ctrl**, **Alt**, or **Shift** pressed.
	+ (none)	Specifies the wheel-click action.
	+Ctrl, **Alt**, or **Shift** key	Specifies the wheel-click action with **Ctrl**, **Alt**, or **Shift** pressed.
	Reverse mouse wheel	Reverses the mouse wheel action. For example, roll up to zoom in instead of zooming out.

Note: See *Actions* below for a description of all actions.

Mouse Behavior Customization Commands

These commands let you specify a default mouse behavior.

Option	Description
Set as SOLIDWORKS	Uses the default SOLIDWORKS mouse behavior.
Reset	Uses the default Composer mouse behavior.

Actions

All actions that can be associated to mouse button and wheel behavior are described here.

Action Name	Description
None	No action.
Zoom	Zooms the model in and out.
Zoom paper	Zooms the paper space.
Pan	Moves the camera across the scene.
Pan paper	Moves the camera across the paper space.
Rotate	Turns the model in 3D about one axis.
Rotate roll	Turns the model on a drawn axis between the camera and the center of the scene.
Rotate view point	Turns the camera in 3D.
Rotate free	Turns the model in all directions (no fixed axis).

Hardware Support

The Hardware Support page lets you modify graphics card settings.

Notes:

- You must restart the application for changes to hardware settings to take effect.
- Not all graphics cards support all hardware-related settings.
- For additional hardware settings, see *Advanced Settings*.

Option	Description
Enable 3D OpenGL hardware acceleration	Enables graphics card acceleration. Clear this option if you experience serious graphics rendering problems. **Notes:** • Disabling this option might significantly degrade graphics performance. • If you experience graphical display issues, press **R** while in the viewport to reset the OpenGL engine.
Advanced	Uses OpenGL frame buffer object (FBO) and other extensions to provide off-screen rendering. Enabling this setting: • Is required for some capabilities such as cutting plane per-actor color capping, style preview-image generation, and high-quality rendering effects such as ambient occlusion. • Improves Technical Illustration workshop results when using color regions and shadows. • Improves Simplification - Occlusion results. • Might avoid screen refresh problems associated with other rendering techniques, such as p-buffers and auxiliary buffers. • Might reduce bitmap output problems, such as gray or black images. **Note:** This option is the same as **HardwareSupport.Advanced** on the **Advanced Settings** page.
Standard	Disables FBO and other advanced extensions. You can selectively enable or disable rendering techniques, such as use of p-buffers and auxiliary buffers.
Enable p-buffer	Enables off-screen rendering with OpenGL using pixel buffers. Select this option to resolve problems with screen captures, printing, saved images, and other graphics operations. Rendering might also be hardware accelerated.
Static p-buffer	(Available when **Enable p-buffer** is selected.) Uses static pixel buffers.
Enable direct swapping to refresh	Enables direct swapping to refresh. Clear this option if you have screen display problems such as highlighting problems.
Enable aux. buffers	Enables auxiliary buffers. Clear this option if the previous options do not solve your graphics problems.
Enable OpenGL display lists	Enables OpenGL display lists. A display list is a series of graphics commands that define an output image. Clear this option if you have problems such as invisible text.
Enable text reset	(Available when **Enable OpenGL display lists** is selected.) Resets text display. Select this option if you have problems displaying text.

Application Paths

The Application Paths page lets you view or set the paths of internal and external tools used by Composer.

Note: Only **Textures** paths are stored in profile (`.set`) files.

Option	Description
Install	(Read-only) Shows the Composer installation folder.
Bin	(Read-only) Shows the folder containing Composer binaries.
HTML	(Read-only) Shows the templates folder used for HTML page generation.
User	Specifies the folder containing user data, such as log and settings files.
Textures	Specifies the folder containing texture images.
PATH	(Read-only) Shows the PATH environment variable.

Data Paths

Data paths are sorted lists of paths used to locate resources such as files, profiles, and links. The application uses data paths to resolve external references when the relative path of a resource cannot be found.

Data Paths

Data paths are sorted lists of paths used to locate resources such as files, profiles, and links. The application uses data paths to resolve external references when the relative path of a resource cannot be found.

Option	Description
(Data path file)	Specifies the data path file.
Path / Description	Shows the data paths and descriptions (if any) stored in the specified data path file.
Resolve relative references on save	Changes the behavior on save. You can disable the relative path resolution completely (**Always**) or only for unresolved paths (**Only resolved paths**). The default behavior on save is to always resolve relative paths (apply modifications on these paths as described above).

About Data Paths

Data paths are sorted lists of paths used to locate resources such as files, profiles, and links. The application uses data paths to resolve external references when the relative path of a resource cannot be found.

General Information

This topic provides general information about data paths.

Data paths:

- Are not used when resource paths are absolute.
- Unify and extract the location of absolute paths from data files for easy modification.
- Support local, UNC, HTTP, and FTP paths.
- Are stored in files (`DataPath.xml` by default) that can be shared by users working on the same project.
- Provide a mechanism for specifying common paths to avoid path duplication:
  - **Global** (`DataPath.CommonGlobalList`) paths are appended to all other path lists
  - **Profiles** (`DataPath.CommonProfileList`)paths are appended to profile path lists

Notes:

- Path order is important; when a resource is found, the search stops.
- Data paths do *not* support paths with variables (such as `%USERPROFILE%\folder`).
- The first time a user runs Composer, a `DataPath.xml` file is created in the `User` folder. See *Application Paths*.
- Searching many paths to locate resources increases document load time. For best performance, minimize the number of paths and list heavily used paths first.
- Edit data path files with a text editor. You cannot edit the file from the Data Paths page.

Specifying the DataPath File

Specify your data path file on the **Data Paths** page.

The default is `DataPath.xml` in your *User* folder. This location is stored in the following registry setting:

```
HKEY_CURRENT_USER\Software\Dassault Systemes\Composer\Preferences\
DataPath.PathFolderDataPath
```

To have multiple users on the same machine reference the same data path file, define a `HKEY_LOCAL_MACHINE` key:

```
HKEY_LOCAL_MACHINE\Software\Dassault Systemes\Composer\Preferences\
DataPath.PathFolderDataPathInstall
```

This `HKEY_LOCAL_MACHINE` key is not defined by default. The `HKEY_CURRENT_USER` value overrides `HKEY_LOCAL_MACHINE`.

Note: The full paths for these keys are operating-system dependent.

Behavior on Save

When a `.smgXml` file is saved, changes might be applied to its references to keep the link between the child files (which are not saved) and the root (which can be stored in another folder).

In this case:

- Absolute references are not modified.
- Relative references resolved during loading using data paths are not modified. However, if a relative reference is resolved through the parent file paths, the absolute resolved file path is used to compute the new relative path to its parent.
- Missing files cannot be resolved, so their parent file paths are used to try to compute their new relative paths.

This behavior is available for project (`.smgProj`), product (`.smgXml`), and scenario (`.smgSce`) files. You can change the behavior using the **Resolve relative references on save** option. You can disable the relative path resolution completely (**Always**) or only for unresolved paths (**Only resolved paths**). The default behavior on save is to always resolve relative paths (apply modifications on these paths as described above).

Tags

The following tags can appear in a data path XML file.

Tag	Description
Common	
`DataPath.CommonGlobalList`	Paths appended to all other path lists
`DataPath.CommonProfileList`	Paths appended to all profile path lists
Composer Files	
`DataPath.AnimationLibrary`	Animation library files (`.xml`)
`DataPath.GeometryList`	Geometry files (`.smgGeom`)
`DataPath.MetaPropertyList`	Meta-property definition files (`.smgMeta`)
`DataPath.ProductList`	Product files (`.smgXml`)
`DataPath.ScenarioList`	Scenario files (`.smgSce`)
`DataPath.ViewList`	View files (`.smgView`)
Resources	
`DataPath.LinkList`	Resources referenced by event links and Link actors
`DataPath.TextureList`	Texture image files (all supported image-file formats)
Profiles	
`DataPath.BOMList`	BOM workshop profiles (`.smgBOMSet`)
`DataPath.ClashList`	Clearance Checking workshop profiles (`.smgClashStaticSet`)
`DataPath.ClashRTList`	Interactive Clearance Checking profiles (`.smgClashRTSet`) **Note:** Profiles are not available in the Interactive Clearance Checking workshop.
`DataPath.FilterList`	Filters workshop filter definitions (`.smgFilterSet`)
`DataPath.HiResList`	High Resolution Image workshop profiles (`.smgHighResSet`)
`DataPath.ImportProfiles`	Profiles with custom import options to use when importing CAD data (`.xml`)
`DataPath.Profiles.PublishHTML`	HTML profiles (`.smgPublishHtmlSet`). These profiles define the features in HTML output.
`DataPath.Profiles.VideoCamera`	Video workshop profiles (`.smgVideoCameraSet`)
`DataPath.Profiles.ViewList`	Views workshop profiles (`.smgViewSet`)
`DataPath.SimplificationList`	Simplification workshop profiles (`.smgLODSet`)
`DataPath.StyleList`	Styles workshop style definitions (`.smgStyleSet`, `.sset`)
`DataPath.VectoList`	Technical Illustration workshop profiles (`.smgVectoSet`, `.vset`)

Example

The following example shows the syntax of a data path file.

Notes:

- Search order is determined by the path order in the XML file, *not* by the number at the end of the `Path` tags (`<Path1>`, `<Path2>`, etc.). When a resource is found, the search stops.
- The optional `Description` parameter provides additional information about the path.

- Search order is determined by the path order in the XML file, *not* by the number at the end of the `Path` tags (`<Path1>`, `<Path2>`, etc.). When a resource is found, the search stops.
- The optional `Description` parameter provides additional information about the path.


```
<CLitDataPathSet>
     <DataPath.CommonGlobalList >
          <Path2 Value="chemin1" Description="Global resource location"/>
     </DataPath.CommonGlobalList>

     <DataPath.CommonProfileList >
          <Path0 Value="C:\My Documents\Composer\User"/>
     </DataPath.CommonProfileList>

     <DataPath.FilterList >
          <Path0 Value="http://datapath/Composer"/>
          <Path2 Value="path1"/>
          <Path1 Value="path2"/>
     </DataPath.FilterList>

     <DataPath.GeometryList >
          <Path2 Value="\\server1\Geometry\ProductID\" Description="ACME
project files"/>
          <Path1 Value="\\server2\Geometry\ProductID\"/>
     </DataPath.GeometryList>

     <DataPath.LinkList >
          <Path2 Value="http://globalweb/Composer"/>
          <Path1 Value="C:\Documents and Settings\dgoss\My Documents"/>
          <Path3 Value="ftp.3ds.com/fra/files"/>
     </DataPath.LinkList>

     <DataPath.ScenarioList >
          <Path2 Value="\\server1\Scenario\animation1\"/>
          <Path1 Value="c:\Scenario\animation1"/>
     </DataPath.ScenarioList>
     ...
</CLitDataPathSet>
```

Advanced Settings

The Advanced Settings page lets you control advanced features and resolve issues.

Display Commands

The icons available at the top of the page let you configure how the settings list is displayed.

Icon	Command Name	Description
	Categorized	Lists settings by category.
	Alphabetic	Lists settings alphabetically.
	Show Advanced Preferences Only	Displays advanced settings only. To list settings available from other (Default) Document Properties pages, clear this option.

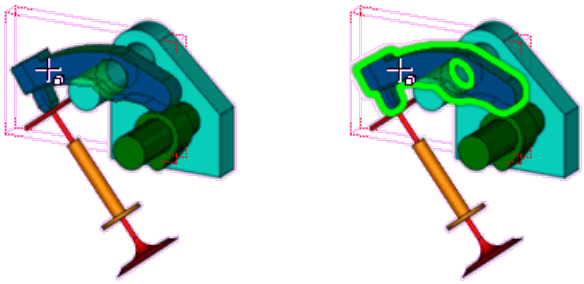
Settings

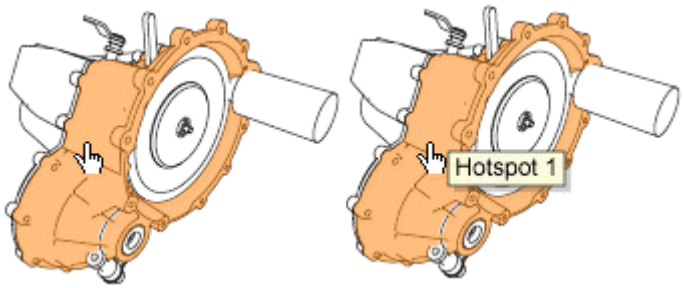
Advanced settings let you control advanced features and resolve issues.

Category	Preference	Description
General	**CreateAsChildIfPossible**	With fully-shattered files, places entities under the root instead of as children of the selected part to avoid breaking the fully-shattered structure. Typically used for CSZ, lights, and grids.
	CrossHighlighting	Enables pre-selection and selection cross highlighting of product manufacturing information (PMI) and their associated geometry.
	IOSaveSmgGeomAs	For internal use only.
	ProfilesLoadOnDemand	Loads workshop profiles on demand only (that is when selecting a particular profile in the Profile list of a given workshop). This can be useful when many profiles are defined, or for profiles stored on a network. By default, this option is selected and profiles are loaded on demand. Clear the box if you want all profiles in all workshops to be loaded once the workshop is opened. If you change this option, you need to restart Composer for this change to be taken into account. **Note:** Depending on the number and location of profiles to load, loading all profiles at once can be time-consuming.
	PropertiesValueNbOfDecimal	Specifies the number of decimal places displayed for floating-point values, including meta-properties of type **Float**, in the Properties pane. Valid values are 0 to 6. **Notes:** • Floating-point properties with slider controls always display 2 decimal places and are not affected by this option. • To specify the number of decimals for floating-point values displayed in the viewport, set **Number of decimals** on the **[Default] Document Properties - Units** page. See *Units*.
	ShowDiggerCP	Displays the Digger tool cutting plane. To show the cross section without the plane, clear this option.
	SimplificationMethod	For internal use only.

Category	Preference	Description
	SplitVideoFiles	Creates multiple video files, each no larger than 2 gigabytes (GB). An `.avi` file cannot exceed 2 GB. When this option is cleared, long animations might exceed 2 GB, resulting in no file being created. **Note:** Because the application does not know what video codec you are using and at what compression level, the 2 GB limit is computed using raw video (before compression). Enabling this option when generating compressed video might produce sub-parts smaller than 2G (after compression).
	AdvancedCurvesDetection	Increases the precision of radius measurements for some models and improves detection for models with very high tessellation (low chordal error). This option negatively impacts performance, so enable it only when you have problems.
	AutoSave	Automatically backs up the currently open Composer files in a `Bak` folder, at the interval specified by the **AutoSaveInterval** setting. The `Bak` folder is located in the `User` folder specified in the Application Paths page.
	AutoSaveInterval	Specifies the interval, in minutes, at which the currently open Composer files are to be backed up in the `Bak` folder.
	AutoSaveVersioning	Allows versioning by creating an additional backup version of the currently open Composer files in the `Bak` folder, at the interval specified by the **AutoSaveInterval** setting. In this case, for a given Composer file, backup versions are saved in a dedicated folder in the `User\Bak` folder (the folder name being the same as the file name). The file name format is filename_YYYYMMDD_HHMM (current year, month, day, hour, minute). Clear if you want each backup to overwrite the previous one.
	AutoSaveVersioningMaxNumberOfFiles	When **AutoSaveVersioning** is selected, specifies the maximum number of backup files to keep. The higher the number, the more disk space will be required. **Note:** You must enter a value between 1 and 100.
	DisableMatchingProperties	Defines properties as read-only to prevent value modification in the Properties pane. Specify a regular expression (regexp) that matches the properties to disable. For example, to prevent changes to CAD metadata and geometry actor names, specify: `(Meta\..*)|(Actor\.Name)`This regexp matches all properties starting with `Meta.` and the property `Actor.Name`. For more information about regular expressions, see *Reference Information: Regular Expression Syntax*. **Note:** Disabling `Actor.Name` also disables renaming of collaborative actors in the Properties pane. To rename collaborative actors, visit the Collaboration pane, right-click the actor name and click **Rename Actor (F2)**. **Tip:** To get internal property names (for example, `Actor.Name`), use **Insert Property** on the Text pane, or use **File** > **Properties** > **Show XML**. Administrators can create the following string registry value to disable properties for all users on the computer: `HKEY_LOCAL_MACHINE\Software\[Wow6432Node\]Dassault Systemes\Composer\Preferences\DisableMatchingProperties`This `HKEY_LOCAL_MACHINE` value overrides all user-specified values.
	Prevent Saving Documents	Removes save capabilities by disabling all **Save** and **Save As** menu items.
	SupportEmailDump	Prepares and email message with dump and log file attachments when a Composer application crashes. You can then provide a recipient list and send the email.
	VideoImageFormat	Lets you specify the image format of the animation frame while creating videos. The available image formats are BMP (default option), PNG, JPEG, and TIFF.
Input	**ForceNetGUIDResolutionAtLoading**	For internal use only.

Category	Preference	Description
	IOCV5FullyShatteredInCacheMode	Lets memory be saved during conversion in fully-shattered mode. However, some CATProducts might not be converted.
	IOCheckTesselation	Select this option if converting a native file yields bad results, specifically a point or triangle of the mesh outside the bounding box of the model.
	IOErrorLevel	Specifies that the Composer Converter (and Sync when calling Composer Converter) creates output files for successful translations only. To create output files following non-fatal errors, such as when a resource is not found, clear this option. For details about Composer Converter return values, see the *Composer Programming Guide*.
	IOGenerateUnicodeOBJ	When saving to Alias Wavefront (.obj) format, generates files with Unicode encoding. To generate Wavefront files with ANSI encoding (for use by applications that do not support Unicode), clear this option. **Note:** Any Unicode characters in geometry names will be lost.
	IOPreview	Controls generating a preview thumbnail of the opened file: • **0**: No preview • **1**: Preview generated on hardware (to avoid graphics card issues) • **2**: Preview generated using the graphics accelerator
	IOProERemoveRevisionNumber	Removes revision numbers from the file names generated from a Pro/ENGINEER file conversion.
	IOSolidWorksTimeOut	Specifies the time, in seconds, to wait before starting another conversion from SOLIDWORKS. The default is 120. Increase this time for large assemblies in fully-shattered mode. **Note:** This parameter is not available in the user interface. It must be set as a registry setting.
	IOU3dQualityOutput	Specifies U3D output quality: • **0**: Fast export but larger file size • **1**: Slow export but smaller file size • **2**: Compromise between the two
	IOVRMLExportNaming	When saving as VRML a file that contains nodes starting with a digit, adds an underscore character '_' before the first digit (instead of just replacing the digit with an underscore character '_'). For example, an actor called `12345` will be renamed `_12345` instead of `_2345` as is the case by default.
	IOVRMLExportWriteNormals	When saving as VRML, writes normal directions for all faces to VRML (`.wrl`) files. To omit normals, which produces smaller files, clear this option.
	IOVRMLExportZIP	When saving as VRML, creates compressed VRML (`.wrl`) files, which are typically much smaller than uncompressed files. Not all applications can read compressed VRML. **Note:** Both compressed and uncompressed VRML files have `.wrl` file extensions.
	IOWriteStatisticsFile	For internal use only.
	VertexWelding	Specifies the distance between vertices as a percentage of an actor's bounding box for which Composer considers vertices to be the same and merges them. Use this option when there are extra lines in outlines (including vector output) caused by small holes in the mesh. For example, specify 0.01 to merge vertices closer than 0.01% of the bounding box. To disable this option, specify 0.

Category	Preference	Description
		Important: • A change to the outline calculation algorithm in V6R2011 improved vectorization in most cases but could produce extra lines for mesh with small holes. Specify a value of 0.01 to restore pre-V6R2011 outline calculation. • Vertex welding is performed at file load time (before outline calculation) and is persistent. When you save your document, the geometry is different from the original. It is recommended that you use this option only when there is a problem with outlines.
Viewport	**AnnotationRelativeComposer** **AnnotationRelativePlayer**	Enables the **Size in paper space** text property by default for new annotation and measurement actors created from Composer (**AnnotationRelativeComposer**) and Composer Player (**AnnotationRelativePlayer**).
	CurvesHighLighting	Highlights actor curves when using commands requiring curve detection. Used primarily for debugging.
	PickingDepth	Increase this value if you have 3D selection issues. A larger value increases selection accuracy but affects performance.
Hardware	**HardwareSupport.Advanced**	Same as **Advanced** on the **Hardware Support** page. See *Hardware Support*.
	HardwareSupport.DedicatedDepthBuffer	Allows Composer to create its own depth buffer. Enable this option if ambient occlusion or silhouettes render poorly. Choose a format that is supported by your graphics card. • **Disabled** - Uses your graphics card's built-in depth buffer. Choose this option unless you have rendering problems. • **RGBA8** - Best choice for some older cards. • **R32F** - Best choice for most newer cards. • **RGBA32F** - Best choice for newer cards that do not support **R32F**. **Note:** If the viewport becomes black, try another setting.
	HardwareSupport.HighLightEffect	Displays bright green lines around highlighted actors.  Disabled Enabled
	HardwareSupport.MirrorBufferSize	Specifies the size of the mirror buffer. Reducing the value can improve performance but might result in mirror reflection pixelation.
	HardwareSupport.ShadowBufferSize	Specifies the size of the shadow-map buffer. Reducing the value can improve performance but might result in decreased shadow quality and artifacts.
	HardwareSupport.SilhouetteShader	Uses the OpenGL silhouette shader to provide fast silhouette rendering. To use Composer's internal silhouette rendering technique, clear this option. **Disabled** / **Enabled** **Speed**: Slower (depends on model size) / Faster

Category	Preference	Description
		Disabled / **Enabled**
		Line color and width: Obeys outline settings / Black, fixed width
		Accuracy: Accurate (no hardware dependencies) / Possible unwanted artifacts or hatch lines with older graphics cards, such as NVidia Quadro series 5 (FX [x]5xx) and older (for example: FX 1400, FX 3450, FX 4000, FX 1500, FX 4500)
		Note: Due to a technical limitation, the OpenGL silhouette shader draws silhouette lines for 3D panels.
Views	**Cache.ViewsImages**	Generates an image file for each created view.
	ViewScale	Specifies the scale of view thumbnails.
Interactive clash detection	**ClashInteractiveRatio**	For internal use only.
Technical Illustration	**DetailLevel**	Improves the precision of the color region for vector images published using the Technical Illustration workshop. Enter a value above 100 to use this option rather than the less precise **Level of Detail** slider available in the **Color Region** tab of the **Technical Illustration** workshop, which uses a value range of 0 to100. A value lower than or equal to 100 is not taken into account.
		Note: Increasing the value increases the precision but may affect performance when generating technical illustrations. The maximum value allowed by this option depends on your graphics card, therefore, it is recommended to test various values to find the proper balance between precision and performance.
	ExternalVectorViewWindow	Displays SVG previews (from the Technical Illustration workshop) in an Internet Explorer window. To display SVG previews in the Composer viewport vector pane, clear this option.
		Note: Because a 64-bit version of Adobe® SVG Viewer is not available, **ExternalVectorViewWindow** is ignored on 64-bit operating systems. SVG previews are always displayed in Internet Explorer.
	SvgOutput.ShowPaper	Includes only the portion of the viewport scene within the paper space in SVG images. To include the entire scene, clear this option.
	SvgOutput.ShowTooltip	Includes hotspot tooltips in SVG output. To suppress tooltips, clear this option.
		 Disabled Enabled
	SvgOutput.WriteUnit	Includes a measure unit for line thickness when generating technical illustrations in SVG format.

Category	Preference	Description
	VectoShowEllipsesInBlue	Displays ellipses generated by the **Ellipses generation** option (Technical Illustration workshop) in blue. Useful for debugging.
Geometry	**CuttingLinesPrecision**	Specifies the geometry simplification factor which manages how cutting lines are displayed. By default, this simplification factor is 1/2500 of the cutting line width.
	MergeKeepDraws	Improves performance of geometrical operations on geometry resulting from the **Merge Geometry** command at the cost of slower rendering. This option affects internal details of the merge operation; the result as shown in the Assembly pane is the same.
Debug information	**ShowDebugPropertiesInPropertiesPane**	Includes debug properties in the **Properties** pane. Debug properties are informational only and do not change the 3D scene. See *Debug Properties*.

Licensing and System Requirements

For information about SOLIDWORKS Composer licensing, go to *help.solidworks.com*, select your language and version, then **SOLIDWORKS Installation** > **License Administration**.

For information about SOLIDWORKS Composer system requirements, go to *http://www.solidworks.com/sw/support/SystemRequirements.html*.

Tools

If you are facing performance-related issues when loading Composer files (.smg or .smgXml) containing large amounts of Product Manufacturing Information (PMI), you can use the Composer PMI Remover to remove this PMI from specified files. This may help reduce loading time.

About the Composer PMI Remover

The Composer PMI Remover is provided as a tool external to the Composer application. It provides you with a way to strip Composer files out of Product Manufacturing Information (PMI), which is often responsible for performance issues at loading time.

When .smg or .smgXml files take a long time to load in Composer, it may be because they contain a lot of Product Manufacturing Information (PMI).

Actually, PMI increase the size of Composer documents. The more PMI there is in a document, the larger the file size, and the slower the loading time in Composer. Removing PMI from .smg or .smgXml files reduces their size, and consequently reduces the time it takes to load these files in Composer.

The Composer PMI Remover removes PMI from .smg or .smgXml files you specify. It is a batch file located in the `Tools\Composer_PMI_Remover` folder of the Composer installation directory.

The gain in loading time directly depends on the amount of PMI removed by the tool. Therefore, there will be no gain if there is no or just a few PMI in your documents.

Note: This tool is provided as is without any warranty, as a sample of how Composer documents can be post-processed.

Using the Composer PMI Remover

If you are facing performance-related issues when loading Composer files (.smg or .smgXml) containing large amounts of Product Manufacturing Information (PMI), you can use the Composer PMI Remover to remove this PMI from specified files. This may help reduce loading time.

Before you begin: The following must be installed on your computer:

- Windows Script Host: lets you run scripts.

  Note: This is installed by default on Windows operating systems.

- Microsoft XML Core Services (MSXML) 3.0 or 6.0: allows some applications to build XML-based applications.

  Note: If Composer is installed on your computer, then MSXML should already be installed as part of the operating system prerequisites.

- 7-zip: lets you unzip .smg files (.smgXml files do not require unzipping).

  Note: You can download 7-zip for free from http://www.7-zip.org. A 64-bit version is preferable.

1. Open a command prompt window, and go to the `Tools\Composer_PMI_Remover` folder located in the Composer installation directory.
2. Run `Composer_PMI_Remover "Path_to_Input_Folder" /o "Path_to_Output_Folder"`. All available arguments are described in the table below.

Argument	Usage	Description	Example
"Path_to_Input_Folder"	Required	Path to the folder containing the Composer documents (.smg, .smgXml) to process.	`Composer_PMI_Remover "C:\My Documents\Composer Data With PMI"`
/o "Path_to_Output_Folder"	Optional (but recommended)	Path to the folder where the processed Composer documents (.smg, .smgXml) will be written. Already-existing files will be overwritten. **Warning:** By default, the output folder is set to the input folder, which means that input files will be overwritten if you do not specify this argument. We strongly recommend that you specify an output folder.	`Composer_PMI_Remover "C:\My Documents\Composer Data With PMI" /o "C:\My Documents\Composer Data Without PMI"`
/f levelFrom	Optional	Level, in the product structure tree, starting from which PMI will be deleted. The root node is at level 0. PMI should	`Composer_PMI_Remover "C:\My Documents\Composer`

Argument	Usage	Description	Example
		normally be under the root node, so its level should be 1 or more. **Note:** By default, all PMI are taken into account, starting from the root node.	`Data With PMI" /o "C:\My Documents\Composer Data Without PMI" /f 2`
/t levelTo	Optional	Level, in the product structure tree, up to which PMI will be deleted. **Note:** By default, all PMI are taken into account, up to the last child node.	`Composer_PMI_Remover "C:\My Documents\Composer Data With PMI" /o "C:\My Documents\Composer Data Without PMI" /f 2 /t 5`
/7z "Path_to_7z.exe"	- May be required for .smg files - Unnecessary for .smgXml files	Path to 7z.exe (if required). **Note:** Specifying this argument is not necessary when 7z.exe has been properly installed on your computer (that is, in the majority of cases). If it has not been properly installed, then the Composer PMI Remover is unable to locate 7z.exe. In this case, only .smgXml files are processed and a message is displayed in the command prompt window to inform you that .smg files have been skipped. To process them, you must then specify this argument.	`Composer_PMI_Remover "C:\My Documents\SMG Data With PMI" /o "C:\My Documents\SMG Data Without PMI" /7z "C:\Program Files\7-Zip\7z.exe`

When the operation is over, the command prompt window displays information regarding the file size reduction of your documents.

Reference Information: Regular Expression Syntax

Regular expressions can be used in the Filters workshop and the Search pane, as well as for the **DisableMatchingProperties** advanced setting. This topic lists the regular expression syntax and abbreviations.

Regular Expression Syntax

This table lists the meta-characters that you can use as regular expressions.

Metacharacter	Meaning
.	Matches any single character.
[ ]	Indicates a character class. Matches any character inside the brackets (for example, `[abc]` matches "a", "b", and "c").
^	If this meta-character occurs at the start of a character class, it negates the character class. A negated character class matches any character except those inside the brackets (for example, `[^abc]` matches all characters except "a", "b", and "c"). If ^ is at the beginning of the regular expression, it matches the beginning of the input (for example,`^[abc]` will only match input that begins with "a", "b", or "c").
-	In a character class, indicates a range of characters (for example, `[0-9]` matches any of the digits "0" through "9").
?	Indicates that the preceding expression is optional: it matches once or not at all (for example, `[0-9][0-9]?` matches "2" and "12").
+	Indicates that the preceding expression matches one or more times (for example, `[0-9]+` matches "1", "13", "456", and so on).
*	Indicates that the preceding expression matches zero or more times.
??, +?, *?	Non-greedy versions of ?, +, and *. These match as little as possible, unlike the greedy versions that match as much as possible (for example, given the input "<abc><def>", `<.*?>` matches "<abc>" while `<.*>` matches "<abc><def>").
( )	Grouping operator. Example: `(\d+,)*\d+` matches a list of numbers separated by commas (for example, "1" or "1,23,456").
{ }	Indicates a match group.
\	Escape character: interpret the next character literally (for example, `[0-9]+` matches one or more digits, but `[0-9]\+` matches a digit followed by a plus character). Also used for abbreviations (such as `\a` for any alphanumeric character; see the following table). If \ is followed by a number n, it matches the nth match group (starting from 0). Example: `<{.*?}>.*</\0>` matches "<head>Contents</head>".
$	At the end of a regular expression, this character matches the end of the input (for example,`[0-9]$` matches a digit at the end of the input).
|	Alternation operator: separates two expressions, exactly one of which matches (for example, `T|the` matches "The" or "the").
!	Negation operator: the expression following ! does not match the input (for example, `a!b` matches "a" not followed by "b").

Abbreviations

This table lists supported abbreviations, such as `\d` instead of `[0-9]`.

Abbreviation	Matches
\a	Any alphanumeric character: ([a-zA-Z0-9])
\b	White space (blank): ([\\t])
\c	Any alphabetic character: ([a-zA-Z])
\d	Any decimal digit: ([0-9])
\h	Any hexadecimal digit: ([0-9a-fA-F])
\n	Newline: (\r|(\r?\n))
\q	A quoted string: (\"[^\"]*\")|(\'[^\']*\')
\w	A simple word: ([a-zA-Z]+)
\z	An integer: ([0-9]+)

Administration

This section describes ways in which the administrator can customize the Composer environment.

Disabling Document Property and Application Preference Modifications

Administrators can restrict which document properties and application preferences team members can modify by disabling (making read-only) Document Properties, Default Document Properties, and Application Preferences pages.

To disable document properties and application preferences, create string values under the following registry key: `HKEY_LOCAL_MACHINE\Software\Dassault Systemes\Composer\Preferences`. Each string represents the corresponding **Document Properties** value. Separate multiple string values with a semicolon (`;`).
To disable the Input, Hardware Support, and Advanced Settings pages, define: `HKEY_LOCAL_MACHINE\Software\Dassault Systemes\Composer\Preferences\DisableApplicationPreferencesPages` as: `Input;Hardware_Support;Advanced`

String Value	String Data, separated by semicolons (;)
`DisableDocumentPropertiesPages`	• `Security` • `Signature` • `Viewports` • `Viewports_Background` • `Selection` • `Image_Quality` • `Input` • `Feature_Filter` • `Update` • `Output` • `Animation` • `Image_Output` • `History` • `Exchange` (Right Manager) • `Project` • `Paper_Output` • `Units` • `Advanced`
`DisableDefaultDocumentPropertiesPages`	Same as `DisableDocumentPropertiesPages`
`DisableApplicationPreferencesPages`	• `General` • `Input` • `Viewports` • `Camera` • `Selection` • `Navigation` • `Hardware_Support` • `Application_Paths` • `Data_Paths` • `Advanced` • `Profiles` (disables the **Profile** list.

About Profiles for Workshop Settings

Profiles store workshop settings for future use and facilitate sharing settings between users.

For example, you can create several Technical Illustration workshop profiles to save combinations of frequently used settings and share the profiles with team members. Styles (Styles workshop) and filters (Filters workshop) are also types of profiles.

Note: Sync can use profiles when creating and updating content.

Location of Profiles

This section explains where profiles are located on your computer.

Composer saves user-defined profiles as XML files in the `User\Profiles` folder. See *Application Paths*.

Predefined (system) profiles are located in `<install_dir>\bin`. To locate shared profiles, add folders to the **Profiles** list in the data path file. See *Data Paths*.

Note: Profile names act as identifiers and are used to retrieve profiles and the data they contain. To avoid issues, take the following precautions:

- Do not rename profiles.
- Use unique profile names.

Workshops that Use Profiles

This section lists the workshops that use profiles.

Workshop	File Extension
Styles	`.smgStyleSet`, `.sset` (legacy)
Filters	`.smgFilterSet`
Views	`.smgViewSet`
BOM	`.smgBOMSet`
Technical Illustration	`.smgVectoSet`, `.vset` (legacy)
High Resolution Image	`.smgHighResSet`
Video	`.smgVideoCameraSet`
Simplification	`.smgLODSet`
Clearance Checking	`.smgClashStaticSet`

Note: When publishing Composer documents to HTML (**File** > **Publish** > **HTML**), you can select profiles (`*.smgPublishHtmlSet`) that define the HTML output. Unlike other profiles, these profiles are located in `< install_dir>\Profiles` and are not editable through a Composer workshop. See *Publish to HTML* for details.

Locked and default profiles

When you modify settings in a workshop, Composer automatically saves the changes to the current profile unless it is locked.

Some workshops have default, locked profiles that define system defaults. These profiles are not stored as files and, since they are locked, cannot be modified.

Tip: For the Styles workshop, your administrator can override default style settings by editing the `<install_dir>\bin\_Default Style.smgStyleSet` file, in which case you should select **_ Default Style** as your default style.

Locked profiles have a lock icon in the profile list.

To lock a profile, include the following property in the settings file: `<Profile.Modifiable Value="0"/>`. To allow modifications, set the value to `"1"`.

Technical Illustration Workshop vs. Other Workshops

In the Technical Illustration workshop, you cannot modify default profiles. If you change the values of a default profile, you are offered to store these values in a new profile.

In the other workshops that use profiles, you can overload the values of default profiles during your session. If you change the values of a default profile, these values remain in use during your session, and are not saved when closing Composer.

Commands Available in Worshops that Use Profiles

This section lists profile-related commands available in the workshops that use profiles.

Icon	Command Name	Description
N/A	**Profile**	Specifies the current profile.
	Sort By Category	Sorts profiles by category of location, that is Composer default path profiles, user-defined path profiles, or other path profiles (such as network locations).
	Sort Alphabetically	Sorts profiles alphabetically.
	Quick Style	(Styles workshop only.) See the *Styles* tab.
	New	Creates a new profile with default settings. **Note:** In the Technical Illustration workshop only, creates a profile with the current settings.
	Copy	Creates a new profile with the current settings or the settings of the current profile (depending on the workshop). **Note:** Not available in the Technical Illustration workshop. Use **New** .
	Rename	Renames the profile. You cannot rename locked profiles.
	Delete	Deletes the profile. You cannot delete locked profiles.

Defining Custom Import Profiles

You can define profiles with custom import options to use when importing CAD data. Import profiles are defined in XML file format.

Notes:

- The import options for CAD files are configured both for the active document and as document defaults in **File** > **Properties** > **(Default) Document Properties** > **Input**. It is on this **Input** page that you can select which import profile to use when importing CAD data. See *Input*.
- To define custom import profiles, basic knowledge of XML is required.

1. On your computer or network, browse to the folder containing import profiles.

   This location is specified in the **Data Paths** page of the **Application Preferences** dialog box, under **CATIA Composer files** > **Import Profiles**. See *Data Paths*.

2. Copy the XML file containing the profile that you want to use as basis, and paste it to a new file in the same folder.

   For example, to customize the 3DXML import profile, copy and paste `3DXML.xml`.

3. Rename the file as required, `3DXML_custom.xml` for example.
4. Open the file and edit it in the editor of your choice. A text editor is sufficient.

```
<Profile Name="3DXML">
  <PropSet>
      <ImportCurves Value="0"/>
      <ImportAsBodies Value="1"/>
      <MergeFileInOneActor Value="0"/>
      <ImportMassProperties Value="0"/>
      <ImportPoints Value="0"/>
      <ImportTextures Value="1"/>
      <ImportPMIs Value="1"/>
      <ImportPMIsOverrideColor Value="0" R = "0" G = "0" B = "0"/>
      <ImportFreeFaces Value="0"/>
      <Importhiddencomponents Value="1"/>
      <ImportGraphicData Value="0"/>
      <ImportCATIAV4hierarchy Value="0"/>
      <ImportMetas Value="1"/>
      <ImportCoordinateSystem Value="0"/>
      <ImportNodeFeatureName Value="0"/>
      <ImportNodeUseInstanceName Value="0"/>
      <OverloadActorNamesInAssemblyTree Value="0"/>
      <OverloadedActorPropertyName Value="V_Name"/>
  </PropSet>
</Profile>
```

5. In the `Profile` element, change the value of the `Name` attribute to `3DXML_custom`, for example.

Note: This name will appear as the profile's name in the **Import profile** box of the **Input** page.

6. In the `PropSet` list:
   a. For all elements (except `OverloadedActorPropertyName`), change the values of the attributes as required, where:
      - `Value="0"` means that the option should not be selected by default in the **Input** page.
      - `Value="1"` means that the option should be selected by default.
   b. For the `ImportPMIsOverrideColor` element, also enter RGB values to use for the color of imported PMI.
   c. For the `OverloadedActorPropertyName` element, change the value of the attribute to the name that should be appended to imported meta-properties, when overloading actor names in the assembly tree.
7. Save the XML file.
8. To test the import options, select **File** > **Properties** > **(Default) Document Properties** > **Input**, and in the **Import profile** box, select the import profile, **3DXML_custom**, for example.

Interface Description

This section describes the Quick Access toolbar, Status Bar, keyboard shortcuts and dialog boxes that are specific to Composer.

Quick Access Toolbar

The `Quick Access Toolbar` provides quick access to frequently used command.

By default, the `Quick Access Toolbar` contains a number of commands which are listed in the table below.

You can customize it by adding new commands. To do so, click , and then select commands or click **More Commands**.

Icon	Command Name	Description
	Save	Saves the active document.
	Undo	Cancels the last action. Specify the maximum number of actions you can undo in *Application Preferences - General*.
	Redo	Restores the previously undone action.

Customizing the Quick Access Toolbar

You can customize the Quick Access Toolbar according to your needs.

Before you begin: To display this dialog box, in the Quick Access Toolbar, click **Customize Quick Access Toolbar** and click **More Commands**.

Add a Command to the Quick Access Toolbar

You can add commands you use frequently to the Quick Access Toolbar.

1. For **Category**, select the ribbon tab containing the command you want to add, or select **Popular Commands**, **Commands Not in the Ribbon**, or **All Commands**.
2. Under **Commands**, click the command to add and click **Add**>>.
3. To change command order, click or .

Remove a Command from the Quick Access Toolbar

You can remove commands you no longer use frequently from the Quick Access Toolbar.

1. In the right pane, click the command.
2. Click **Remove**.

Perform Other Customization Operations

You can customize the Quick Access Toolbar in other ways.

1. To restore the default Quick Access Toolbar configuration, click **Reset**.
2. To display the Quick Access Toolbar below the ribbon instead of above it, select **Show Quick Access Toolbar** below the Ribbon.

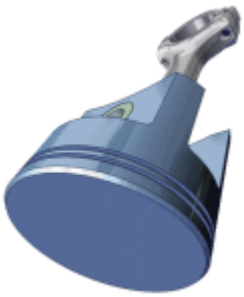
Status Bar

The status bar is located at the bottom of the Composer window. It displays instructions for using commands and other useful information, and it contains several commands.

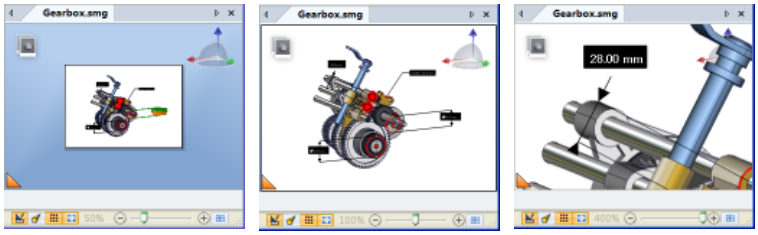
Tip: To configure which commands appear in the status bar, right-click the status bar and select or clear commands.

Icon	Command Name	Description
N/A	**Total Actors**	When no actor is selected, displays the total number of actors in the model (including collaborative actors as well as the Compass, BOM pane, camera, and ground). Click to display a dialog box detailing: • the total number of geometry actors in the model • the total number of Assembly groups in the model • the total number of Collaborative actors in the model • (in fully-shattered mode only) the total number of actors that are not loaded • the maximum depth of the assembly tree **Note:** In fully-shattered mode, all numbers take into account actors that are not loaded.
N/A	**n of n Actors**	Displays the number of selected actors. Click to display a dialog box detailing: • the total number of geometry actors in the model • the total number of Assembly groups in the model • the total number of Collaborative actors in the model • the depth range for the selection (minimum depth - maximum depth) **Note:** In fully-shattered mode, all numbers take into account actors that are not loaded.
	Design Mode	When cleared, simulates the behavior of the Composer file in Composer Player. For example, clear **Design Mode** to test event links.
	Camera Perspective Mode	Toggles between perspective and orthogonal projection modes. In perspective mode, actor sizes depend on their distance from the camera viewpoint. Perspective mode is the view normally seen by the eye. Parallel lines recede into the distance to a vanishing point. Orthogonal mode eliminates the effect of distance from the camera (actor sizes remain constant).

Orthogonal Mode



Perspective Mode

Icon	Command Name	Description
		Notes: • You can change the default perspective angle. See *Camera*. • To ensure smooth animation between views, use the same mode for each view.
	Grid Mode	Snaps actors to grid lines when you create or translate actors. Also, actor rotation snaps to 45 degree increments. For example, create a grid and enable **Grid Mode** to draw polylines or to position collaborative actors. See *Tools Commands*.
	Show/Hide Paper	Displays paper margins (paper space) in the viewport. Disabled Enabled Letter, Portrait **Notes:** • Define the paper space. See *Paper Space*. • Paper space is always displayed when the Technical Illustration or High Resolution Image workshop is open.
	Zoom Paper Level Zoom Paper	Displays the current paper zoom scale. Zooms the paper space from 10% to 400% of the viewport size. To zoom, drag the slider or click or . You can also zoom the paper space by pressing **Ctrl** while rolling the mouse wheel.  50% 100% 400%
	Fit Paper to Viewport	Resets the paper space to fit the viewport (100% zoom). **Tip:** You can also double-click in the viewport outside the paper space.

Keyboard Shortcuts

Keyboard accelerators let you perform Composer commands more quickly than graphical commands. This section lists the keyboard shortcuts used by default in Composer.

To create and manage shortcuts, right-click the ribbon and click **Customize Quick Access Toolbar**. In the **Customize** dialog box, for **Keyboard shortcuts**, click **Customize**.

Note: Single-character shortcuts, such as **H** to hide an actor, are hardcoded in the application and are not displayed in the Customize dialog box.

Keys	Description
Alt	Enables curve detection mode. Available only in transformation modes: rotate, translate, and explode.
Alt+Enter	Displays the Document Properties dialog box.
Esc	Quits the current function.
Space Bar	Displays Digger.
Tab	Hides temporarily the actor under the mouse pointer.
Tab+Shift	Restores actor visibility, one after the other, after hiding with **Tab**.
F1	Displays the appropriate online help topic (contextual help).
F2	Edits the text (rename).
F4	Redoes the last operation (undo).
F11	Toggle full-screen mode.
Shift+click	Toggles the selection.
Ctrl+click	Adds to the selection (multi-select).
Delete	Deletes selected actors.
Ctrl+A	Selects all.
Ctrl+B	Toggles actor bounding boxes.
Ctrl+C	Copies selected actors.
Ctrl+D	Displays Digger.
Ctrl+E	Creates a new view.
Ctrl+F	Shows/hides the Search pane.
Ctrl+G	Shows/hides the ground actor.
Ctrl+I	Inverts the selection.
Ctrl+J	Applies on-demand rendering effects, such as anti-aliasing, to the viewport.
Ctrl+K	Copies the current viewport image to the Windows clipboard (captures the screen) so you can paste it (**Ctrl+V**) into another application.To capture a portion of the viewport, enable the **Detail View** in the High Resolution Image Workshop. See *High Resolution Image Workshop*.
Ctrl+L	Toggles viewport lighting.
Ctrl+N	Displays the New Project dialog box.
Ctrl+O	Displays the Open dialog box.
Ctrl+P	Displays the Print dialog box.
Ctrl+R	Restores actor's neutral position.
Ctrl+S	Saves the active document.

Keys	Description
Ctrl+T	Shows/hides all actors.
Ctrl+V	Pastes actors.
Ctrl+W	Shows/hides the ground shadow.
Ctrl+X	Cuts selected actors.
Ctrl+Y	Redoes the last operation.
Ctrl+Z	Undoes the last operation.
Ctrl+arrow keys	Pans the camera (same as **middle-click**).
Shift+arrow keys	Rotates the camera (same as **right-click**).
Alt+Left/Right arrow keys	Rolls the camera (same as **Alt+right-click**).
Ctrl+Alt+F	Zooms to fit the model.
Ctrl+Alt+Up arrow	Plays/pauses the animation.
Ctrl+Alt+Down arrow	Stops the animation.
Ctrl+Shift+0 through 9 Ctrl+Shift+P	Enables rendering modes.
Ctrl+Shift+B	Subscribes the selection to the style.
Ctrl+Shift+F	Front/back camera view.
Ctrl+Shift+N	Applies the style to the selection.
Ctrl+Shift+R	Right/left camera view.
Ctrl+Shift+T	Top/bottom camera view.
+ (or Up arrow)	Increases navigation speed in Fly Through mode.
- (or Down arrow)	Decreases navigation speed in Fly Through mode.
A	Applies on-demand rendering effects, such as anti-aliasing, to the viewport.
H	Hides the selected actor.
I	Toggles inertia mode.
K	Keeps hidden an actor that was hidden with **Tab**.
P	Plays/pauses the animation.
R	Refreshes the scene by resetting the OpenGL engine. Use this command if you have graphical display issues.
S	Show statistics, such as the number of model actors and triangles, in the lower-right corner of the viewport when navigating the model.
T	Shows/hides collaboration actors.
X	Displays Digger.

Dialog Boxes

This section describes Composer dialog boxes. Most dialog boxes support context-sensitive help. Press **F1** or click the **Help** button.

Add Child Scenario

The **Add Child Scenario** dialog box lets you apply a scenario from the current or another project to a node.

For a scenario to have an effect, the actor GUIDs (globally unique identifiers) must match.

To display this dialog box, right-click a node in the Assembly tree and click **Scenario** > **Apply Scenario to Node**.

Main area

Options in this category are general.

Command Name	Description
File name	Specifies the Composer scenario (`.smgSce`) file.
Files of type	Always **Scenario (.smgSce)**.
Recent folders	Lists folders you have recently visited.
Open	Opens the selected scenario.

Apply mode

Options in this category enable you to define the apply mode.

Command Name	Description
Apply mode	Specifies the apply mode: • **Merge** - Merges the animation with any existing animation keys. • **Replace** - Removes any existing animation keys.
With reference	Creates a link to the child scenario file from the parent scenario file. The link is dynamic, so changes to the child scenario are automatically applied. To include (flatten) the child scenario file in the parent, clear this option.
Force resolution	Forces a scenario from a node. For example, if the GUID of the scenario is a.b.c, you can apply it to the sub-product "c" only.

Time stretching

Options in this category allow to define time stretching.

Command Name	Description
Start position	Specifies the starting point of the animation.
End position	Specifies the ending point of the animation. If not selected, the animation plays until the end.
Invert	Swaps the start and end positions to play the animation in reverse.

Configure Columns

The **Configure Columns** dialog box lets you configure the columns in the Assembly and BOM panes.

To display this dialog box, click **Configure Columns** in the Assembly or Collaboration pane toolbar, or click **Configure BOM Columns** in the BOM pane toolbar.

Command Name / Icon	Description
Multi columns	(Assembly pane only.) Lets you select multiple columns to display in the Assembly pane. By default, only actor names are displayed.
Available properties	Specifies which properties you can select: • **Properties** - Lists Composer properties, such as color and opacity. • **Meta-Properties** - Lists CAD and user-defined properties. • **Evaluated Properties** (BOM tree only) - Lists computed values, such as **Qty (Bom.quantity)**.
Move Down	Moves the selected property down in the list, which moves the corresponding column to the right.
Move Up	Moves the selected property up in the list, which moves the corresponding column to the left.
Rename	Renames a column. To rename a column, select a column, click the button, and type a new name. **Tip:** You can also rename a column by selecting the property and pressing **F2**.
>>	Adds displayed columns by moving the properties selected under **Available properties** to **Displayed properties**.
<<	Removes displayed columns by moving the properties selected under **Displayed properties** to **Available properties**.
Display common root	(Available for BOM tree only. Applicable to string properties and meta-properties only.) Displays the shared initial string, if any, when multiple actors have the same BOM ID. For example, if **Bolt_1**, **Bolt_2**, and **Bolt_3** have the same BOM ID, the **Name (Actor.Name)** property displays **Bolt_**. When the option is cleared, **Name (Actor.Name)** has no value. **Note:** This option is not global for all columns. Set this option for each column whose corresponding property supports it.
Load	Loads a Composer tree configuration (`.smgTreeConfig`) file, which contains column configuration information.
Save	Saves the column configuration as a Composer tree configuration (`.smgTreeConfig`) file.
Set as Default	Sets the current column configuration as the default for new documents.

Customize

The **Customize** dialog box lets you configure the Quick Access Toolbar and define keyboard shortcuts.

To display this dialog box, in the Quick Access Toolbar, click **Customize Quick Access Toolbar** and click **More Commands**.

For more information on customizing the Quick Access Toolbar, see *Customizing the Quick Access Toolbar*.

To customize keyboard accelerators, click **Customize** next to `Keyboard shortcuts`. In the **Customize Keyboard** dialog box, define the shortcuts and then click **Close**.

Notes:

- Do not assign shortcuts to single characters, like "c" or "4". Doing so makes those characters unavailable when typing text such as label and property values.
- Composer has several hardcoded single-character accelerators. For a list of these and other default shortcuts, see *Shortcuts*.

Level of Detail

The **Level of Detail** dialog box lets you choose which actor mesh detail level to load.

You can define multiple LODs from Sync during the conversion process to Composer format.

To display this dialog box, right-click a node in the Assembly tree and click **Product** > **Load Products (Choose LOD)**.

Command Name	Description
Use level of detail	Specifies the LOD to load: **Based on bounding box**, **Low**, **Medium**, or **High**. For details, see *[Default] Document Properties - Project*.

Meta-Properties

The **Meta-Properties** dialog box lets you manage CAD metadata and user-defined properties.

To display this dialog box, click **Manage Meta-Properties** in the Properties pane toolbar.

General Information

Meta-properties have a number of similarities with regular properties.

- View and edit meta-properties in the Properties pane. CAD metadata and user-defined properties are listed under **User properties**.
- Change meta-property values as needed in views or during animations.
- Meta-property definitions and neutral values are stored in Composer `.smgXml` files. Meta-property values for views and animations are stored in `.smgView` and `.smgSce` files, respectively.

Create user-defined properties to add complementary information to products.

For metadata from customer systems, such as PLM environments, a Composer integration is required to extract the correct metadata. Create an XML file to describe your meta-properties (see *Example XML Description* below).

Creation of Meta-Properties

To create a meta-property, click . In the **Create meta-property** dialog box, type the property name and click **OK**.

Note: Meta-properties must have a `"Meta."` prefix. The prefix is added automatically when you create a meta-property from this dialog box. If you create XML to import meta-properties, ensure that the property names start with `"Meta."`.

Deletion of Meta-Properties

To delete a meta-property, click , select the meta-property to delete, click and then click **Yes**.

Warning: Deleting a meta-property removes the property from all actors.

Definition

Options in this category are related to the definition of meta-properties.

Command Name	Description
Name	Shows the name of the meta-property you are creating, or an existing meta-property you selected by clicking . **Notes:** • A meta-property name can only contain Latin alphanumeric characters. • You cannot modify the definition of existing meta-properties. When you select an existing meta-property, all fields are read-only. • For technical illustrations generated in the CGM format, and compliant with the S1000D 4.x standard, `CGM_ApplicationStructureIdent`, `CGM_ApplicationStructureName`, `CGM_Id`, and `CGM_hotspotTitle` specify the value used in the XML

Command Name	Description
	companion file for the corresponding attribute of the hotspot element. See *Options Tab*.
Label	Specifies the name of the meta-property without the `"Meta."` prefix. **Note:** The label corresponds to the text that is displayed in Composer wherever the meta-property is used (Properties pane, workshops, etc.). You can use non-Latin alphanumeric characters for this label.
Type	Specifies the property data type, which determines the values you can assign the property. Select one of the following: • **String** • **Bool** (Boolean true or false) • **Int** (integer) • **Float** (floating point number) • **Date** • **Color**
Animatable	Allows the meta-property to change during animations. The Properties pane marks properties that cannot be animated with .
Mergeable	Specifies the property is mergeable. When cleared, Composer hides the property with merging actors with different property values.
Visible	Displays the property in the Properties pane.
Unit	(Available when **Type** is **Int** or **Float**.) Specifies the units for integer and floating-point properties.
Bounded	(Available when **Type** is **Int** or **Float**.) Specifies minimum (**Min**) and maximum (**Max**) values for integer and floating-point properties.

Property

This category enables you to specify what to do with the meta-property.

Command Name	Description
Include the meta-property to the selection	Adds the new meta-property to the selected actors.

Example XML Description

The following example shows meta-property definitions defined in a `.smgXml` file.

Note: Meta-property names must have a `Meta.` prefix.

```
<Server Type="PropertyDefinitions">
     <MetaProperties>
          <Meta Name="Meta.Description" Type="String"
DefaultLabel="Description" Mergeable="1" AnimAble="1" VizAble="1"
VizOrder="-1"/>
          <Meta Name="Meta.PartNumber" Type="String"
DefaultLabel="PartNumber" Mergeable="1" AnimAble="1" VizAble="1"
VizOrder="-1"/>
          <Meta Name="Meta.Revision" Type="String" DefaultLabel="Revision"
 Mergeable="1" AnimAble="1" VizAble="1" VizOrder="-1"/>
     </MetaProperties>
</Server>
```

```
...... ......
<Actor.Name Value="F0189-CAGE-E1.1"/>
<Meta.PartNumber Value= "67725" />
<Meta.Revision Value=" 1.a "/>
```

You can also store Meta-property definitions in separate `.smgMeta` files to facilitate reuse. For example, a `.smgXml` file can reference a meta-property definition file: `<Server Type="PropertyDefinitions" FileName="metas.smgMeta"/>` where `metas.smgMeta` contains:

```
<MetaProperties>
    <Meta Name="Meta.Description" Type="String" DefaultLabel="Description"
 Mergeable="1" AnimAble="1" VizAble="1" VizOrder="-1"/>
    <Meta Name="Meta.PartNumber" Type="String" DefaultLabel="PartNumber"
Mergeable="1" AnimAble="1" VizAble="1" VizOrder="-1"/>
    <Meta Name="Meta.Revision" Type="String" DefaultLabel="Revision"
Mergeable="1" AnimAble="1" VizAble="1" VizOrder="-1"/>
</MetaProperties>
```

Note: The data-path mechanism is used to locate external meta-property files. See *Data Paths*.

New Project

The **New Project** dialog box lets you create a new Composer project.

To display this dialog box, click **File> New Project**. Specify the project name, location, and loading options, and then click **OK**. In the Add Products dialog box, select one or more product (`.smgXml`) files to add to the project. For fully-shattered assemblies, specify the top-level assembly `.smgXml` only (not the `.smgXml` of all subassemblies and parts).

Project

Options in this category allow you to define the project.

Command Name	Description
Name	Specifies the project name. Composer creates a `.smgProj` project file and folder of the specified name in **Folder**.
Folder	Specifies where the project file and folder are created.

Paths

Specifies the top-level product, scenario, and view files that are created in the project folder. These read-only values are generated from your **Name** and **Folder** values.

Command Name	Description
Product	Displays the project top-level product (`.smgXml`) file. This file references the products you add to the project.
Scenario	Displays the project scenario (`.smgSce`) file.
Views	Displays the project views (`.smgView`) file.

Geometry

Specifies how geometry is loaded.

For option descriptions, see *(Default) Document Properties - Project*.

Open Files

The **Open Files** dialog box lets you load models as separate documents or merge models with the active document.

Composer can import data directly from CAD systems (such as SOLIDWORKS and Pro/ENGINEER) and supports many CAD-neutral formats (such as IGES and STEP). For details, see *Supported Import Formats*.

To display this dialog box, click **File> Open**.

Note: Composer files are always forward compatible: you can open files created by older versions of Composer in a newer version. Composer files are not always backward compatible: opening files created by a newer version in an older version might not work, depending on the changes between the versions, and is not supported.

Command Name	Description
Open	Opens the selected files as separate documents. **Tip:** You can also open a file by dragging it from Windows Explorer to the document tabs area above the viewport.
Merge into the active document	Opens the selected files and places all objects in the active document. **Tip:** You can also merge a file by dragging it from Windows Explorer into the viewport containing an open document. **Note:** When you merge documents together, it is recommended that they have the same paper space defined.
Merge into a new document	Opens the selected files and places all objects in a new document.
Preview	Displays a thumbnail image of the model, which are available for all `.smg` files and files previously opened in Composer.
SOLIDWORKS	(Available when a SOLIDWORKS file is selected.) Specifies which configuration to convert. If the **Import meta-properties** import option is selected, the name of the selected configuration is added as a meta-property. **Notes:** • SpeedPak configurations are supported. The SpeedPak components are switched to their parent configurations and are translated to SOLIDWORKS Composer. • SOLIDWORKS is intended for a single interactive user only. Running SOLIDWORKS without an active Windows session is outside the scope of the End User License Agreement (EULA). **Tip:** You can export to Composer (`.smg`) directly from SOLIDWORKS using the SOLIDWORKS plug-in. Download the free plug-in from the Composer resource center at *http://3ds.com*. Once installed, the **Composer** menu appears on the SOLIDWORKS menu, and the SOLIDWORKS Save As dialog box includes the **Composer (*.smg)** file type. Exporting from SOLIDWORKS uses the Composer default document properties. **Important:** SOLIDWORKS stops support of Windows XP from 2013 onwards. Therefore, if you are running Composer with Windows XP, you may encounter compatibility issues importing data from SOLIDWORKS 2013.
Import	Lets you configure native CAD import. For details, see *Input*.
Refinement	Determines faceting precision, so parametrizes the density of polygons to tessellate the CAD model. For details, see *Input*.
Project	(Available when a Composer project (`.smgProj`) file is selected.) Lets you configure how geometry is loaded. For details, see *Project*.

Command Name	Description
PDF	(Available when a PDF file is selected.) Lets you select which 3D scenes in the PDF file to open.

Tip: Very large models might be divided into several sub-models. You can reassemble the sub-models into the complete model or merge models from different CAD solutions. To assemble models:

1. Open the sub-models in the same document window using drag-and-drop or **File** > **Open** .
2. Move these parts (using selection and navigation tools) until the complete model is reconstituted.

Publish to HTML (Save As)

The **Save As** dialog box lets you publish the active Composer document as an interactive HTML page that will let users replay your Composer experience in a browser.

To display this dialog box, click **File> Publish** > **HTML**.

Note: Dedicated plug-ins are necessary to read Composer content in either Internet Explorer or Mozilla Firefox. It is recommended to install Composer Player (free or with Player Pro), as the necessary plug-ins for both browsers are automatically installed and registered at the same time. In the case of Internet Explorer, you also have the option to accept the installation of this plug-in (based on ActiveX) the first time you access a published Composer HTML experience.

Save Options

The pages at the bottom of the dialog box let you set document properties.

Save Option	Description
Security	**Important:** Setting a password when publishing to HTML is useless, as no password prompt will appear when opening the file. Indeed, when you publish to HTML, the application creates an SMGXML file, and it is not possible to set a password for the SMGXML extension. This is only possible for the SMG extension. See *Security*.
Signature	See *(Default) Document Properties - Signature*.
HTML Output	See *HTML Output* below.
SMG Output	See *(Default) Document Properties - Output*.
Animation	See *(Default) Document Properties - Animation*.
History	See *Document Properties - History*.
Right Manager	See *(Default) Document Properties - Right Manager*.

HTML Output

These options let you customize the HTML output.

Command Name	Description
Select a profile	Specifies the features included in the HTML output: **Simple** **BOM** **Full** **Meta-properties** **PMI** **View**
Use Composer Player 64-bit version (CAB file)	Includes the 64-bit version of Composer Player plug-ins. To include the 32-bit version, clear this option.

Publish to PDF

The **Save As** dialog box lets you publish the active document as a PDF document.

To display this dialog box, click **File> Publish** > **PDF**.

The option pages at the bottom of the dialog box let you set PDF publication options.

Note: The Composer PDF integration uses PDFNet SDK, copyright © PDFTron™ Systems Inc., 2001-2010, and distributed by Dassault Systèmes under license. All rights reserved.

Template

These options are available when you select **Template** in the **Save As** dialog box.

Option	Description
Use custom template	Specifies a custom PDF template in which the Composer document is embedded. Browse to select a `.pdf` file. Sample templates are available in: `< Composer_ install_dir>\Pdf`You can create templates using Adobe Acrobat®. For details, see *About the Creation of PDF Templates* . To use a standard template, clear this option.
Embedded 3D file	Specifies what file format to include in the PDF document: • **U3D** - Embeds the 3D content in the PDF file using the Universal 3D (U3D) format, which is an open standard format used for visualization and publication. Viewing U3D content uses the Acrobat U3D interface and viewing capabilities. Specify additional options on the U3D options page. **Notes:** • For information about controlling U3D Models with Acrobat JavaScript, see the *Composer Programming Guide*. • U3D is fully supported by Adobe Reader 7 and later, Adobe Acrobat 7 and later, and Adobe Acrobat 3D. • U3D is the only format which exports Composer animations. Therefore, it is based on the content available in Animation mode. Assembly nodes which are not selected in the Assembly pane will not be exported. • **SMG (enhanced content)** - Embeds the 3D content in the PDF file using the Composer SMG format. SMG format gives users the full Composer experience, similar to the Composer authoring environment. The free Composer plug-in for Adobe Acrobat is required to view the 3D content. **Note:** The Acrobat plug-in is included in Composer and Composer Player installations. You can download Composer Player from the Composer resource center at *http://www.3ds.com*. Before installing Composer or Composer Player, make sure you have run Adobe Reader at least once. If you omit to do so, the Adobe Reader plug-in will not be properly installed. Note that the version of Adobe Reader used to install the plug-in is the last one you launched on your computer. Installing Composer Player installs the plug-in files `PlayerControl.dll` and `PlayerReader.api`. The location of the files depends on what you have installed (Composer, Adobe Reader, or Adobe Acrobat). If the files are installed in `<Composer_install_dir>\Plugins\Acrobat\Reader\Plug_Ins`, then you must copy these files to `<Reader_install_dir>\plug_ins` or `<Acrobat_install_dir>\plug_ins`. • **Preview image only** - Embeds a snapshot of the current viewport as a 2D image in the PDF file.

U3D options

These options are available when you select **U3D** in the **Save As** dialog box.

Option	Description
Generate	Generates views or marker buttons: • **Views (no animation, no collaborations)** - Adds view buttons to the PDF page, allowing users to easily switch between model views. **Note:** Due to problems with the Acrobat © JavaScript engine, selecting this option removes animations. • **Markers (no BOM)** - Adds marker buttons to the PDF page, allowing users to easily play animation marker sequences. Note: This option is available when the document has at least one animation marker and **Generate BOM table** is not selected.
Labels	(Available when **Generate** is selected.) Displays text labels for the view or marker buttons. **Note:** You must select **Labels** or **Icons**, or both.
Icons	(Available when **Generate** is selected.) Displays thumbnail images for the view or marker buttons. **Note:** You must select **Labels** or **Icons**, or both.
Generate BOM table (no animation, no markers)	Generates an interactive bill of materials (BOM) table using the groups created in Composer (BOM workshop). Selecting a part from the table highlights it in the 3D scene, and clicking a part in the scene selects it in the table. **Note:** Due to problems with the Acrobat © JavaScript engine, selecting this option removes animations.
Show toolbar	Displays the Adobe 3D toolbar when the model is activated. When this option is cleared, you can right-click the image to show the toolbar.
Activate on page open	Activates the model when the PDF file is opened. When this option is cleared, users must click to activate the model.

Image

These options are available when you select **Image** in the **Save As** dialog box.

Option	Description
High quality preview image	Exports a high-quality preview image of the current viewport. This image is displayed in the PDF page when you select **Preview image only** for **Embedded 3D file**, and for **U3D** and **SMG** content prior to the model being activated. To generate a low-resolution image, clear this option.
Remove ground	(Available when **High quality preview image** is selected.) Removes the grid from the preview image.
White background	(Available when **High quality preview image** is selected.) Sets the preview image background color to white.

Troubleshooting

If you encounter issues when opening PDFs published from Composer, .

Important: Before opening a PDF containing SMG data in Adobe Reader X or later, you need to make sure that protected mode is disabled in Adobe Reader.

To disable protected mode:

- In Adobe Reader XI, select **Edit** > **Preferences** > **Security (Enhanced)** > **Sandbox Protection** and clear **Enable Protected Mode at startup**.
- In Adobe Reader X, select **Edit** > **Preferences** > **General** and clear **Enable Protected Mode at startup**.

Note: Acrobat Reader options are found under **Edit** > **Preferences**.

Issue	Workaround
Model does not display.	Make sure you are using Acrobat Reader 7.07 or later. Acrobat Reader 7.0 can read the files but does not support JavaScript added by Composer.
Animations stutter or are unusually The camera cannot be moved. slow.	Make sure **Preferred Renderer** on the 3D tab is not set to **DirectX 9**.
The camera cannot be moved.	Select **Enable camera animations** on the 3D tab.
JavaScript-controlled actions do not work.	Select **Enable Acrobat JavaScript** on the JavaScript tab.
There are rendering errors.	Clear **Enable double-sided rendering** on the 3D tab.

Save Package As

The **Save As** dialog box lets you save the active document as an auto-executable (`.exe`) file, which also contains Composer Player.

For details about the package format, see *File Types*.

To display this dialog box, click **File** > **Save As** > **Package**.

Main Area

Command Name	Description
File name	Specifies the package name.
Save as type	Always **Composer Package (.exe)**.
Recent folders	Lists destination folders you have accessed recently.

Save Options

Command Name	Descriptionh
Security	Manages the Composer document password and reduces accuracy for the entire geometry. For details, see *Document Properties - Security*.
Signature	Adds a logo and a placeholder for text. For details, see *Document Properties - Security*.
SMG Output	Sets the points coordinates compression during the file import. For details, see *(Default) Document Properties - Output*.
Package Output	Specifies the language for the Composer Player user interface and online help. Select **Same as application** or select from the installed languages. **Note:** The Composer Player documentation is not bundled in the package. It is accessed online.
Animation	Specifies frame-rate and maximum steps between frames. Those settings are part of the document properties to be changed according to computer performance. For details, see *(Default) Document Properties - Animation*.
History	Reports your document modifications: user, date, version, and optional comments. For details, see *Document Properties - History*.
Right Manager	Defines access to Composer collaboration tools. For details, see *(Default) Document Properties - Right Manager*.

Scale Geometry

The **Scale Geometry** dialog box lets you resize the selected geometry actors in the world coordinate system.

To display this dialog box, select one or more geometry actors, and then click **Geometry** > **Geometry** > **Scale** .

Command Name	Description
Uniform	Maintains the aspect ratio. Specify **X**, and **Y** and **Z** values are set automatically.
X	Specifies the scaling factor in the X direction. For example, 0.5 reduces the size in half, and 1.25 increases the size by 25 percent.
Y	(Available when **Uniform** is cleared.) Specifies the scaling factor in the Y direction.
Z	(Available when **Uniform** is cleared.) Specifies the scaling factor in the Z direction.

Note: You can also scale using **Geometry** properties in the Properties pane. This scaling is performed according to the local coordinate system and can be animated.

Search Pane

The **Search** pane lets you find actors based on property and meta-property values.

To display this pane, click **Search Actors** (Assembly or Collaboration pane toolbar).

Notes:

- To search with properties not available in the Search pane, or to perform more complex searches with multiple properties, use the Filters workshop.
- For fully-shattered structures, you can search for geometry actors when the geometry is not loaded. Composer loads the geometry of matching actors when you display them.
- Because the Search pane is a pane and not a dialog box, you do not have to dismiss it when you are done. You can even dock the pane in the Composer window for future use.

Main Area

Options in this category are generic.

Command Name	Description
Search	Specifies the search string.
Property	Specifies the property or meta-property to search for.
Operator	<table><tr><th>Symbol</th><th>Meaning</th></tr><tr><td>=</td><td>Equal to</td></tr><tr><td>≠</td><td>Not equal to</td></tr><tr><td><</td><td>Less than</td></tr><tr><td>≤</td><td>Less than or equal to</td></tr><tr><td>></td><td>Greater than</td></tr><tr><td>≥</td><td>Greater than or equal to</td></tr><tr><td>≡</td><td>Equal to (Case sensitive)</td></tr><tr><td>≢</td><td>Not equal to (Case sensitive)</td></tr><tr><td>contains</td><td>Contains the specified substring</td></tr><tr><td>wildcard expr.</td><td>The search string is a wildcard expression. The wildcard character (*) matches any string. For example, *PN65* searches for any string containing "PN65".</td></tr></table>

Command Name	Description
	<table><tr><th>Symbol</th><th>Meaning</th></tr><tr><td>reg. expr.</td><td>The search string is a regular expression. For more information about regular expressions, see *Reference Information: Regular Expression Syntax* .</td></tr><tr><td>Is used</td><td>This operator is usable on any type of property. It checks that the property is available on an actor. Can be used to find all actors containing certain meta-properties.</td></tr></table> Specifies the search scope:
Apply to	Specifies the search scope: • **Visible actors** - Searches visible geometry actors only. • **Selection** - Searches the selected actors. • **All actors** - Searches all actors in the open document.
Include	Specifies what kind of actors to include in the search: • **All Actors** - Searches geometry and collaborative actors. • **Collaborative Actors** - Searches collaborative actors only. • **Geometry Actors** - Searches geometry actors only. **Note:** If collaborative actors are found with the Assembly pane as the active pane (**All Actors** or **Collaborative Actors** selected), the Assembly pane will remain active. The same is true if geometry actors are found with the Collaboration pane as the active pane (**All Actors** or **Geometry Actors** selected).
Match case	Sets filter parameters as case sensitive.
Ignore nodes	Excludes assembly groups from the search.
Ignore leaves	Excludes parts (geometries) from the search.

Matching actors

Options in this category enable you to define how to handle matching actors.

Command Name	Description
Select	Selects the matching actors.
Show	Displays the matching actors if hidden.
Zoom to fit	Zooms to the matching actors.

Non-matching actors

Options in this category enable you to define how to handle non-matching actors.

Command Name	Description
Ghost	Displays all non-matching actors in semi-transparent mode. **Note:** As the ghost functionality is not available for collaborative actors, this search option does not apply to them.
Hide	Hides all non-matching actors.

Buttons

Options in this category enable you to define how to handle buttons.

Command Name	Description
Next	Displays matching actors in the order listed in the Assembly tree.
Previous	Displays the previous matching actor.
Search all	Displays all matching actors at once.

Secure 3D Brush

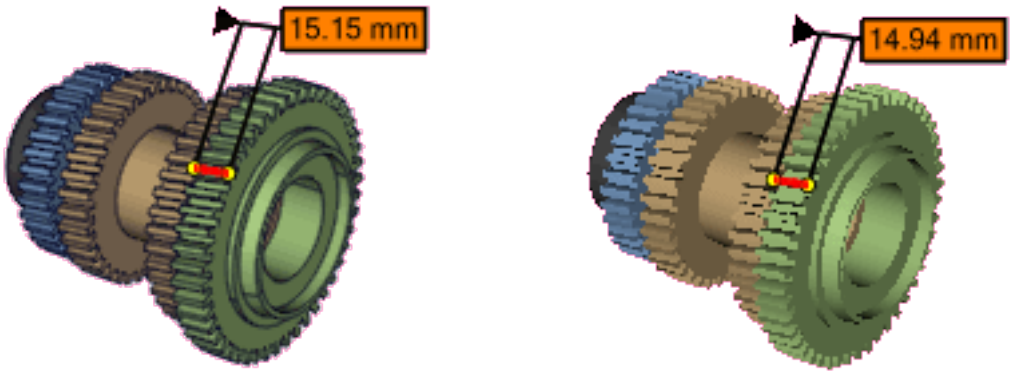
Secure 3D Brush protects your intellectual property (IP) by degrading information at the geometrical level while preserving total model coherence.

To display this dialog box, optionally select one or more geometry actors, and then click **Geometry** > **Secure** > **Secure 3D Brush**. Once you have selected your options, in the viewport, hold down the left-mouse button and drag over the selected actors. Press **Esc** when finished.

Important: You cannot undo the effect of Secure 3D Brush.

Notes:

- Secure 3D Brush affects only selected actors. When no actors are selected, it affects the entire model.
- Measurement collaborative actors added to secured models do not have accurate values, and some measurements are not possible.
- Secure 3D Brush moves tessellation vertices to reduce accuracy. To remove tessellation vertices without affecting model accuracy, use *Decimation Tab*.
- You can degrade the geometry of the entire model when you save it by selecting the **Reduce accuracy** option.
- The Composer degradation approach prevents unauthorized reverse engineering because it is not based on a technology that traps the list of graphic primitives as they are sent to the graphic card (which is the case for Acrobat3D ®, for example).
-



Before After

Command Name	Description
Radius	Defines the size of the area where degradation is applied.
Precision	Specifies the amount of accuracy loss. To transform the geometry, a grid is created. Each point of space is located in a box of this grid. The new coordinate of the point running is the center of the grid. Therefore, according to the dimensions you define, the maximum loss of information is controlled.
Show	Displays Secure 3D Brush in the viewport.

Select Pane

The **Select** pane lets you select parts and assemblies based on their hierarchy level in the assembly tree.

To display this pane, in the Assembly or Collaboration pane toolbar, click **Select Actors**. This tool is useful to select assemblies and subassemblies at the same time, or to help generate BOM IDs on groups.

Note: Because the **Select** pane is a pane and not a dialog box, you do not have to dismiss it when you are done. You can even dock the pane in the Composer window for future use.

Command Name	Description
Actor level	Specifies which level or levels to consider. The levels available in the list depend on the selected actor in the assembly tree.
Select actors from the current levels to the selected level	Selects all the groups/parts from the selected level up to the targeted one. If this option is cleared, only the targeted levels are selected.
Select matching actors	Selects matching actors in the assembly tree and the viewport.
Add to the selection	Adds matching actors to the selection (similar to pressing **Ctrl**).
Remove from the selection	Removes matching actors from the selection (similar to pressing **Shift**).

Select Language

The **Select Language** dialog box appears when no Composer language has been specified.
The language you select determines which language resources Composer uses, such as the graphical user interface and help files.

You can change the Composer language later from *Application Preferences - General*.

Select a Link

The **Select a Link** dialog box lets you define actor and hotspot event links.

When a user clicks the actor or hotspot, the link performs the defined operation, such as displaying a file, activating a view, or playing an animation.

To display this dialog box, select an actor or hotspot, click in the **Event** > **Link** property (Properties pane), and then click the ellipsis [...].

To define a link, select a link type in the **URL** field, specify an appropriate target for that type, and then click **OK**.

Note: Only **file://**, **http://**, and **ftp://** links are valid in vector output. Composer-specific links (such as **view://** and **play://**) are ignored.

Link Type	Description
file://	Opens a file. Type the full path to the file or use the file browser. **Tip:** Selecting a file from the browser sets **URL** to **file://** automatically. **Note:** The **Pack linked resource** property appears in the Properties pane when you define a **file://** link. It specifies whether the linked file is included in the Composer document.
http://	Displays the specified Web page in a browser.
ftp://	Displays the specified FTP location in a browser.
view://	Activates the specified Composer view. **Tip:** You can also create a **view://** link by **Ctrl**+dragging a view from the Views pane onto an actor. To create a 2D panel linked to a view, **Ctrl**+drag a view into empty viewport background.
next://	In animation mode, plays the animation from the current time to the next marker. In view mode, activates the next view. Because the link definition is relative (does not name a specific marker or view), you do not have to modify the link when you add or remove markers or views. Use **next://** to step through all your markers or views. To include the entire animation, define markers at the beginning and end of your animation. **Tip: Author** > **Panels** > **Image 2D** >**Next Button** creates a 2D panel configured as a "next" button.
previous://	In animation mode, moves the animation timebar to the previous marker. In view mode, activates the previous view. Because the link definition is relative (does not name a specific marker or view), you do not have to modify the link when you add or remove markers or views. Use **previous://** to step through all your markers or views in reverse order. To include the entire animation, define markers at the beginning and end of your animation. **Tip: Author** > **Panels** > **Image 2D** > **PreviousButton** creates a 2D panel configured as a "previous" button.

Link Type	Description
first://	In animation mode, moves the animation timebar to the first marker. In view mode, activates the first view. Because the link definition is relative (does not name a specific view or marker), you do not have to modify the link when you add or remove markers or views. **Tip: Author** > **Panels** > **Image 2D** > **FirstButton** creates a 2D panel configured as a "first" button.
last://	In animation mode, plays the animation from the current time to the last marker. In view mode, activates the last view. Because the link definition is relative (does not name a specific view or marker), you do not have to modify the link when you add or remove markers or views. **Tip: Author** > **Panels** > **Image 2D** > **LastButton** creates a 2D panel configured as a "last" button.
marker://	Moves the animation timebar to the specified marker.
play://	Plays the animation from the current time (select **[Current position]**) or specified marker to the end of the animation.
playmarkersequence://	Plays the animation from the current time (select **[Current position]**) or specified marker to the next marker.

Send by E-mail

The **Send by E-mail** dialog box lets you e-mail the active document.

To display this dialog box, click **File> Publish** > **E-mail**.

Command Name	Description
Attached file	Specifies the document format to send: • **Composer package (.exe)** - Sends a self-extracting executable that includes the Composer document and Composer Player. • Composer document (.smg) - Sends the Composer document only.
Rename to pass through firewalls	(Available when **Composer package (.exe)** is selected.) Uses a `.ex_` extension (instead of `.exe`). Many e-mail applications and firewalls do not accept `.exe` attachments because they are considered unsafe. The e-mail recipient can rename the file before opening it.
Password protection	Password-protects the attached file. The e-mail recipient must provide the password to open the file.
Language	Specifies the language for the Composer Player user interface and online help, and for the e-mail text. Select **Same as application** or select from the installed languages. **Note:** The Composer Player documentation is not bundled in the package. It is accessed online.

Text Pane

The **Text pane** lets you specify tooltip text for geometry actors and text for collaborative actors such as labels and text 2D panels. You can also embed properties and meta-properties in your text.

To display the **Text pane**, select an actor. In the Properties pane, for the **Tooltip** or **Text** property, select **String**. Click the **Tooltip string** or **Text string** property and then click the ellipsis [...].

Note: If the property has no ellipsis [...], it does not support the Text pane. Type your text (optionally with property keywords) directly in the property field.

When you type in the large text box in the middle of the Text pane, the corresponding text in the viewport updates in real time. Because the Text pane is a pane and not a dialog box, you do not have to dismiss it when you are done. You can even dock the pane in the Composer window for future use.

Command Name	Description
Insert Property	Embeds properties or meta-properties in your text. The text updates automatically when property values change. **Notes:** • You cannot insert all property types. For example, you cannot insert check box, combo box, or color properties. • Property names are case sensitive. To insert a property: **1.** Click **Insert Property**. **2.** To insert a property of an actor other than the current actor (for tooltip text) or associated actor (for collaboration text), select an actor in the viewport, Assembly pane, or Collaboration pane. **3.** In the Properties pane, click a property. A property keyword is inserted in your text. To insert properties manually, type a property keyword:
Add new line after inserting property	Starts a new line (as though you pressed **Enter**) after inserting a property with **Insert Property**.

Keyword	Description
`$(PropertyName)`	Inserts the specified property of the current actor (for tooltip text) or associated actor (for collaboration text). For example, to insert the **Opacity** property, type: `$(Actor.Alpha)`. To insert the **Author** meta-property: `$(Meta.Author)`.
`$(ParentLevel#PropertyName)`	Inserts the specified property of a parent of the current actor (for tooltip text) or associated actor (for collaboration text). For example, to insert the **Name** of the parent's parent (level-2 parent), type: `$(2#Actor.Name)`
`$(NetGUID#PropertyName)`	Inserts the specified property of an actor specified by Net GUID. For example, to insert the **Shininess** of a bolt: `$(ABolt1.ABolt.APartBody.AManifold Solid_13209.PBolt#Actor.Shininess)` **Tip:** You can view Net GUIDs from the Properties pane; see *Debug Properties*.

Time Settings

The **Time Settings** dialog box lets you change timeline and animation settings.

To display this dialog box, click **Animate** > **Settings** > **Time Settings** .

Timeline

This category enables you to define timeline options.

Command Name	Description
Start time	Specifies the earliest time visible in the timeline. When you change the value, **Length** updates automatically.
End time	Specifies the latest time visible in the timeline. When you change the value, **Length** updates automatically.
Length	Specifies the amount of time shown in the timeline. When you change the value, **End time** updates automatically.
Update markers when moving keys	Moves markers when moving keys. When this option is not enabled, you can dynamically enable it by pressing **Shift** when dragging a key.

Animation

This category enables you to define animation length.

Command Name	Description
Length	Rescales the entire animation. Existing keys are adjusted. You can also drag the mouse on the timeline for the entire timeline or just a range.

Update Composer Document

The **Choose Update File** dialog box lets you apply changes in CAD files to the corresponding Composer (`.smg` or `.smgXml`) documents while preserving all 3D scene enrichments and animations.

Important: Perform updates while in Animation mode to avoid changes to collaborative actor visibility in animations.

To display this dialog box, click **File> Update> Composer Document**.

Updates work by matching net GUIDs (globally unique identifiers) of actors in the Composer file you are updating to those in the up-to-date CAD file. Net GUIDs are character strings that uniquely identify each actor and are based on actor names. For example, a car assembly has a **Door** subassembly and a **Handle** part. The net GUID for the handle is **ADoor-1.PHandle-1**, where **A** means assembly, **P** means part, and **-1** is the instance number.

Important: Updates require that net GUIDs never change. Because net GUIDs are based on actor names, do not rename actors in the Composer document or CAD file and do not rearrange actors in the Composer Assembly tree.

Tip: You can view net GUIDs from the Properties pane; see *Debug Properties*.

Notes:

- You can update from original CAD files or different versions of Composer `.smg` or `.smgXml` files.
- New geometry is automatically added to and old geometry is automatically deleted from the updated file.
- The **Define actor visibility in views by** option (see *[Default] Document Properties - Update*) determines whether new actors resulting from updates are visible or hidden in views.
- Some import options can affect net GUIDs; for example, for SOLIDWORKS files, you must select **Merge file in one actor by part**.
- For SOLIDWORKS and Pro/ENGINEER, update from the same assembly level only. Subassembly names might differ in Composer and these CAD systems (SOLIDWORKS and Pro/ENGINEER), in which case the update would fail.
- Both geometry and meta-properties are updated.
- Significant changes in the CAD product structure, such as changing parent-child relationships, are not supported.
- When updating sub-parts, updating the same instances under the same node is not supported. When a parent node has child nodes that are instances of the same object, only the first instance and its children are updated.
- Updates delete some objects, like assembly groups, primitives, and dummy objects, created in Composer inside the product structure unless created directly under the root node, because these objects do not exist in the CAD files. Updates also delete meta-properties created in Composer for the same reason; meta-properties from CAD files are retained.
- Kinematics (parent/child links) cannot be applied to actors in the Composer file.
- When updating, use the same import options used to create the Composer file. You can view document import options from **Document Properties - Input**. See *Input*
- Detail views (created with Digger, the High Resolution workshop, or the Technical Illustration workshop) do not update automatically. You must manually update detail views.

Command Name	Description
Preview	Displays a thumbnail image in the preview area. Previews are available for all `.smg` files and other files previously opened in Composer.

Command Name	Description
File name	Specifies the CAD (or Composer) file from which you are updating. The default is the original CAD file from which the current Composer document was generated. Paths to original CAD files are stored in Composer files. The scope of the actors to be updated depends on the input file you specify. For example, if you update a document with a sub-part file, only the sub-parts are modified. **Note:** If **Open .smg if it exists** (*Application Preferences - Input*) is selected, the update uses the `.smg` file with the same name in the same folder instead of the CAD file. You can update using the `.smg` file or temporarily disable this option.
Files of type	Specifies the type of file. You can update from a Composer file or from a native CAD file.
Recent folders	Lists folders you have recently visited.
SOLIDWORKS	(Available if a SOLIDWORKS file is selected.) Specifies which configuration to open. If the **Import meta-properties** import option is selected, the name of the selected configuration is added as a meta-property. **Note:** SpeedPak configurations are supported. The SpeedPak components are switched to their parent configurations and are translated to SOLIDWORKS Composer.
Import	Lets you configure native CAD imports. For details, see *Import*.
Refinement	Determines faceting precision, so parametrizes the density of polygons to tessellate the CAD model. For details, see *Refinement*.

Video Compression

The **Video Compression** dialog box lets you select a video encoder (codec) to compress your video.

Compressing your video reduces file size and improves performance but might decrease quality.

To display this dialog box, click **Save Video As** in the Video workshop. Then, in the Save Video dialog box, specify the file name and click **Save**.

Command Name	Description
Compressor	Lets you select a compressor from the video encoders installed on your computer. Select **Full Frames (Uncompressed)** for uncompressed video.
Compression Quality	(Not available for all compressors.) Specifies the compression level. For some compressors, click **Configure** to set the compression quality. Lower compression quality produces smaller file sizes of lesser image quality.
Configure	(Not available for all compressors.) Lets you specify compressor options such as compression level. For some compressors, use **Compression Quality** instead.
About	Displays version and copyright information for the selected compressor.

Note: Some video encoders require certain viewport sizes. If you get the error "Could not set format. Please change your settings.", try setting **Change window resolution** to a different value.

Windows

The **Windows** dialog box lets you manage documents when you have multiple files open.

To display this dialog box, click **Window** > **Window** > **Switch Windows** > .

Command Name	Description
Select window	Lists the open documents. Select one or more documents to operate on, or double-click a document to activate it.
Activate	Makes the selected document active and closes the Windows dialog box.
OK	Closes the dialog box.
Save	Saves the selected documents.
Close Windows	Closes the selected documents. A prompt appears when there are unsaved changes.
Cascade	Arranges the selected documents in overlapping windows.
Tile Horizontally	Arranges the selected document windows one above the other.
Tile Vertically	Arranges the selected document windows side-by-side.
Minimize	Minimizes the selected document windows.

Reporting a Problem

You can send us an e-mail with support material which will help us fix the problem.

If Composer crashes, a dialog box appears and one or more of the following files are created:

- `ComposerERRORLOG.TXT`
- `ComposerCRASH.DMP` - Requires the `dbghelp.dll` file, which is typically available on Windows XP machines. If you do not have this file, ask support to send it to you.
- `ComposerLOG.XML`

In the dialog box, click **Send Error Report to your support** to create an e-mail with these files as attachments.

- You can specify recipients and then send the e-mail.
- Or, click **Don't Send to your support** if you do not want to send an e-mail.

Tip: Use the `SupportEmailDump` option to specify whether an e-mail message is generated (but not sent) automatically. See *Advanced Settings*.

Important: If a crash occurs while using a package, the crash report dialog box does not appear, but `ComposerExplorerERRORLOG.TXT` and `ComposerExplorerCRASH.DMP` are created.

Crash files are written to the **User** folder by default. See *Application Paths*. If the application cannot generate files at the specified location, they are created where the package was executed.

About APIs (Application Programming Interfaces)

The Composer includes the following capabilities:

- Command-line interface for Composer and Sync
- Composer Player API for Composer Player and Player Pro
- Composer API
- API for Composer Player Studio

For details, see the *Composer Programming Guide* online help: click **Help** > **Programming Guide**.

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c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.

d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.

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[This is the first released version of the library GPL. It is numbered 2 because it goes with version 2 of the ordinary GPL.]

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The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is in some sense simply using the library, and is analogous to running a utility program or application program. However, in a textual and legal sense, the linked executable is a combined work, a derivative of the original library, and the ordinary General Public License treats it as such.

Because of this blurred distinction, using the ordinary General Public License for libraries did not effectively promote software sharing, because most developers did not use the libraries. We concluded that weaker conditions might promote sharing better.

However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

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5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

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