

Synfig Studio 0.62.01 User Manual

Chapter 1

Introduction

1.1 Overview

Synfig Studio is open-source 2D vector animation software. It is designed to produce film-quality animation with fewer people and resources.

According to Wikipedia, animation is the rapid display of a sequence of images in order to create an illusion of movement. Traditionally 2D animation is created by drawing each displayed image individually. Those images are called "frames" and thus such method called "frame-by-frame animation". To create good illusion of movement you need to draw many frames, that's why his method requires a lot of time and resources.

Synfig Studio is built to eliminate the need to draw each frame individually. There are two techniques for that:

- Morphing animation
- Cutout animation

Morphing is a technique that takes two images and creates a smooth transition between them. In the process of transition one shape is deforms to another and this deformation is usually defined by control points. In Synfig Studio images constructed from vector shapes and the morphing is done in automatic way. That allows to create animation by drawing only key positions at relatively wide time intervals. Artist can draw as many frames as he need to create basic sense of motion for the scene and Synfig Studio takes responsibility to create in-between frames.

Cutout animation is created by splitting objects into parts and applying some simple transformations to them (like translation, rotation or scale) at different moments of time. Synfig Studio uses those values to interpolate the motion for in-between frames. Cutout animation can be produced from bitmap images or vector graphics.

In both cases the role of Synfig Studio is to fill the gaps between drawn frames (also called "keyframes") to produce smooth and fluid animation. This process is called "tweening". But tweening is not the only advantage of Synfig Studio.

Although Synfig Studio is not directly intended to draw animation frame-by-frame, it can be used to bring your hand-drawn frame-by-frame animation to the film-quality level. That's achieved by converting bitmap data of each frame to vector format. This process is called "tracing". There are lot of effects built into Synfig Studio allowing to achieve a professional look for your animations.

Whether you do frame-by frame animation or not, Synfig Studio can give you flexible control over the repeated data, such as colors, outline characteristics, textures, images and many more – even animation trajectories and their sets (actions). Reusing repeated data is achieved via linking. It is power of Synfig Studio, which is especially important for big animation projects.

You can not just link pieces of artwork data, but also define relations between them using a set of functions. That allows to create automatic animation based on the defined laws and bring whole animation process to the new level.

To crown it all, Synfig Studio is powerful software targeted on creation of animation of any complexity.

Chapter 2

Diving In

2.1 Getting Started

2.1.1 Introduction

When you start Synfig Studio, you will see windows like on screenshot below.

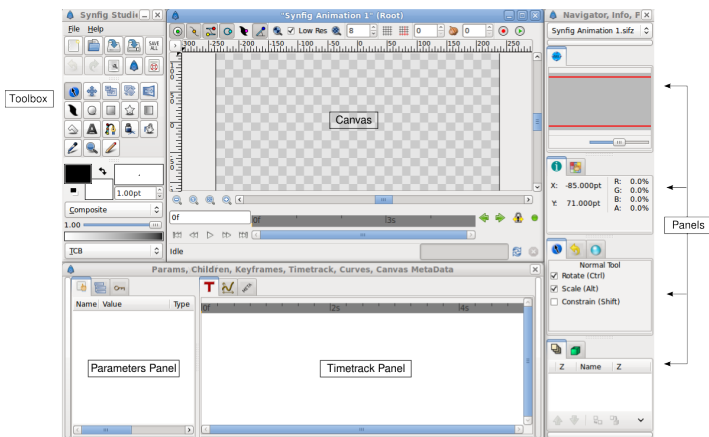


Figure 2.1: Default interface layout of Synfig Studio

The main components of the Synfig Studio interface are:

- **Toolbox** — is the main Synfig Studio window. Closing that window means exiting from application. It contains system menu and buttons, tools and more to create and edit your artwork.

- Canvas — this is where your artwork and animations will appear.
- Panels — contain tools and information about certain elements of your project. Some panels will even allow you to modify those elements.

Note

If your Synfig Studio interface layout looks different, fortunately the arrangement shown in the screenshot is pretty easy to recover. In the "File" menu from the Toolbox select "Panels" → "Reset Windows to Original Layout".

The window at the center is called Canvas Window. Each time you start Synfig Studio, a new Canvas Window is opened. This window represents the Root Canvas, not that that means much to you at the moment, but that's OK — We're just trying to show you around. In the upper left corner of the Canvas Window, you'll see a button with a caret. If you click on this caret button, the canvas window menu will pop up. (By the way, if you right-click in the canvas area and there is not a Layer under the mouse position, this menu will also appear.) So now you know where the **most important canvas menu** is, right in the Canvas Window. Good.

The other two windows (one on the bottom, and one to the right) are customizable dock dialogs. Each dock dialog contains a set of panels, arranged horizontally or vertically. Some panels share the same space inside the dock dialog and you can switch between them by clicking on their tabs. You can rearrange the contents of dock dialogs as you wish by dragging the panel tab to where you want it. You can even create a new dock dialog by dragging a tab out of its dock dialog.

If you accidentally close a panel (by dragging it out of the dock dialog, and closing the new dock dialog that gets created), no worries. Simply go to the Toolbox, select "File" → "Panels" in toolbox menu and then click on the name of the panel you need.

The **most important panels** are:

- Layers Panel — This panel shows you the hierarchy of layer of your working canvas. It also allows you to manipulate these layers.
- Params Panel — This panel shows you the parameters of the layer currently selected. When multiple layers are selected, only the parameters that the selected layers have in common are displayed.
- Tool Options Panel — This panel shows you any options specific to the currently selected tool.
- Navigator — This shows a thumbnail image of what the currently selected canvas looks like. You can also zoom in and move the focus around with this panel.

- **History Panel** — This shows you the history stack for the current composition. You can also edit the actions in history.

There are many panels in Synfig Studio. If you have no idea what a panel does, simply hold your mouse over its icon and a tooltip will pop up describing its function.

2.1.2 Under the hood

Synfig Studio, like most every other competent graphics program, breaks down individual elements of a canvas into layers. However, it differs from other programs in two major ways:

1. An individual layer in Synfig usually represents a single "Primitive". I.e. a single region, an outline of a region, an imported image, etc... This allows you to have a great deal of flexibility and control. It is not uncommon for a composition to have hundreds of layers (organized into a hierarchy for artist's sanity of course).
2. A layer can not only composite information on top of the image below it, but also distorts and/or modify it in some other way. In this sense, Synfig's Layers act much like filters do in Adobe Photoshop or the GIMP. For example, we have a Blur Layer, Radial Blur Layer, Spherize Layer, Color Correct Layer, Bevel Layer, etc...

Each layer has a set of parameters which determine how it behaves. When you click on a layer (either in the canvas window, or in the illustrated Layers Panel), you will see its parameters in the Params Panel.

Synfig Studio has an **autorecovery** feature. If it crashes, even if the current file has not been saved, it will not lose more than 5 minutes of work. At restart it will automatically prompt the user to recover the unsaved changes. Unfortunately history isn't recovered yet.

2.1.3 First steps

Let's create something fun so that we can play with it!

First, go over to the toolbox and click on the Circle Tool (if you don't know which one it is, just mouse over them until you find the one with the tooltip that says "Circle Tool").

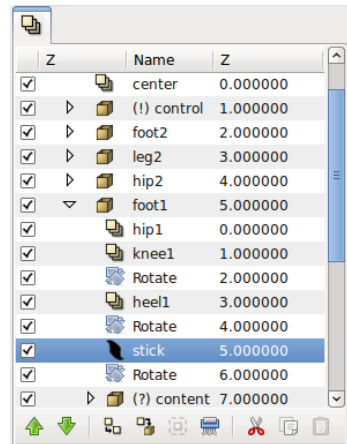


Figure 2.2: Layers Panel

Development Notes:

You may find that Synfig Studio is SLOW, making it practically unusable on hardware that is over 3 years old even if it behaves acceptably on recent hardware. The biggest reason for this is that all of the color calculations are done in floating point — to enable High-Dynamic-Range Imaging.

HOWEVER, some major re-implementations and optimizations are to be made that should quite dramatically improve the performance of Synfig on all platforms. The goal is not a 200% speed increase, but at least a **2000% speed increase**. Currently there is a work in progress in development branch implementing those optimization via OpenGL. It already shows very promising results, but is not ready for usage yet.

When you click on the circle tool, you should notice that the Tool Options Panel changed. But we'll get to that later.

Note

Some users might experience the following problem: when you click-drag on the canvas using the Circle Tool, either nothing seems to happen or you end up making insanely huge circles. This is a known problem. To fix this go to "File" → "Input Devices" and **disable all the devices** you can find there (such as Macintosh mouse button emulation or USB Optical mouse). If you have an extended input device that you want to use, such as a pressure-sensitive pen, then enable it in this screen. After this change Synfig will work as expected.

With the Circle Tool selected, you can now create circles in the Canvas Window. This works as you might expect — click on the canvas, drag to change length of the radius, and release the mouse button when you are done. Go ahead and create two circles (or more, if you fancy). If you accidentally release the mouse button before dragging, you end up creating a circle with 0 radius and it is effectively invisible! No need to worry, you can easily fix this. In the Params Panel, you can change the parameters of the selected object. If you just made a 0 radius circle, it should be the current selected object. You can change its radius to some value other than 0, say 10, and manipulate it to your liking with the canvas ducks later.

Now go back to the toolbox and click on the Transform Tool (the blue circle with the arrow on it). After you do this, click on one of your circles. You will then see a Bounding box (which is kind of useless at this point in time, but I digress), a green dot at the center, and a cyan dot on the radius. Those dots are called *ducks*. If you want to modify the circle, grab a duck and drag it around. Easy!

You can select a Layer by clicking on it. If you want to select more than one layer, hold down **Ctrl** key while you are clicking — this works in both the Canvas Window and the Layers Panel. Try it!

You can also select multiple ducks. You can do this in several ways. First, you can hold down **Ctrl** and individually click the ducks that you want selected, but this can be tedious. However, there is a much faster method — just create a selection box by clicking the mouse and dragging it over the area of ducks that you want selected.

Go ahead, select two circles and select all of their ducks. With several ducks selected, moving one duck will move all of the ducks. This behavior is dependent on the Transform Tool. Thus, a more descriptive name for this tool might have been the "move" or "translate" tool.

The rotate and scale tools work much like the Transform Tool, except in the case where you have multiple ducks selected. It is much easier to just try it than read about it. Select a few circles, select all of their ducks, and try using the rotate and scale tools.

Note that, duck manipulation tools have options associated with them. If a particular tool isn't doing what you want, take a look in the Tool Options Panel to see if it is set up the way you want.

2.1.4 Linking

Now let's try linking. Let's say we always want these two circles to be the same size. Select two circles, and then select both of their radius ducks (the cyan dots).

To select multiple ducks, either drag a rectangle around them, or select the first one, then hold the **Ctrl** key while selecting the rest. Once you have the two radius ducks selected, right click on either duck and a menu will pop up. Click on "Link". Boom. The parameters are linked together. You can prove it to yourself by selecting just one of the circles and changing its radius — the other one will change as well. Neat stuff, eh?

Linking is a fundamental concept in Synfig. You can create links not only between ducks, but also between parameters as well by selecting multiple layers, right clicking on the parameter in the param tab, and selecting "Link".

Digression

This is how outlines are attached to their regions — but I'm getting ahead of myself. At the moment, the fundamental power and flexibility of linking in Synfig Core is beyond what Synfig Studio currently allows for. This will change in the future. Anyway, back on track...

2.1.5 Color selection

Let's say you want one of the circles to be a different color. If you look in the toolbox below the tools, you'll see the outline/fill color selector, the outline width selector, and some other stuff like the default blend method and gradient. The outline/fill color widget works exactly as you might expect — you can click on the fill color, and a modest color chooser will appear. Now to can change the color pretty easily.

But sometimes you just want to click on a color and go. This is where the palette editor tab comes in. Its functionality isn't quite 100% yet (ie: saving and loading custom palettes hasn't been implemented yet), but the default palette is pretty decent. Click on the Palette Editor panel tab and have a look — it's the one with the palette-ish looking icon. Clicking on colors with the left mouse button will immediately change the default outline color and clicking with the middle mouse button will change fill color.

That's all great, but we still haven't changed the color of the circle. There are three ways to do this. The first is to select the circle layer you want to modify, go to the Params panel and double-click on the "Color" parameter. A color selector dialog will then show up, and you can just tweak away. But let's say you already selected your color as the default fill or outline color. Then you can right-click on the Color parameter in the Params panel and select "Apply Fill Color" or "Apply Outline Color" at your preference. Finally, you can just click on the "Fill Tool" from the toolbox, and then click on the circle in the canvas window. Boom. Circle changes color. This works with more than just circles, but we'll get to that in a sec.

Try playing around with the circles for a bit. Muck around with the parameters, and see what happens. To get you started, try out to set the Feather Parameter to 5.

2.1.6 Digging deeper

Of course, so far you just found out how to use the basic features of Synfig Studio but not how you animate a drawing. This is covered in the next chapter.

2.2 Animation Basics

2.2.1 Introduction

Creating an animation in Synfig Studio is really easy. It basically means to change a drawing — you just need to create the first stage and last stage of a change, and Synfig will take care of the steps in between.

Let's see a simple example. Consider a moving light like the one at the front of the Knight Rider car. Drop the realism, you get a circle moving from left to right and back. In other words, you need to create three 'steps' or 'stages':

1. The circle is on the left.
2. The circle is on the right.
3. The circle is back on the left.

Let's do it.

2.2.2 Setting up the workspace

Start Synfig Studio. New file is automatically created at the start. Click the 'caret' menu (between the horizontal and vertical rules, in the top left hand corner of the canvas), then select "Edit" → "Properties". A canvas properties dialog will appear.

Development Notes:

The canvas properties dialog is a mess, we know. We will have it re-designed into something much more comprehensible some time in the future. For now, ignore the "Image Area" and "Locks and Links" sections.

Give a name and description for your canvas, then click "Apply" (don't click "Save" yet — we're not quite done with the 'Properties' dialog). Go to the "Time" tab and make sure to edit "End Time". Change '5s' to '2s' — that will make our animation to be 2 seconds long.

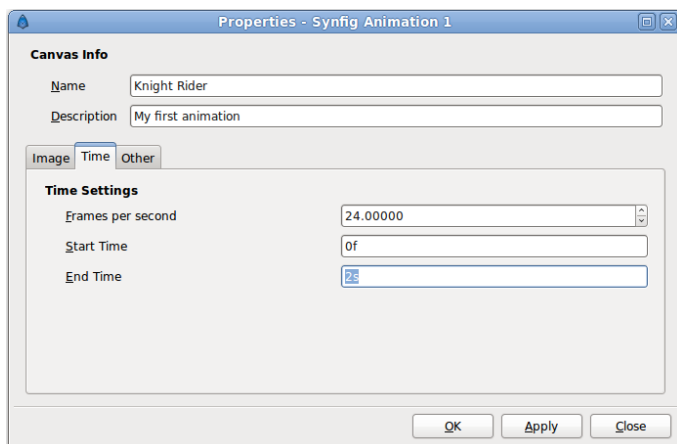
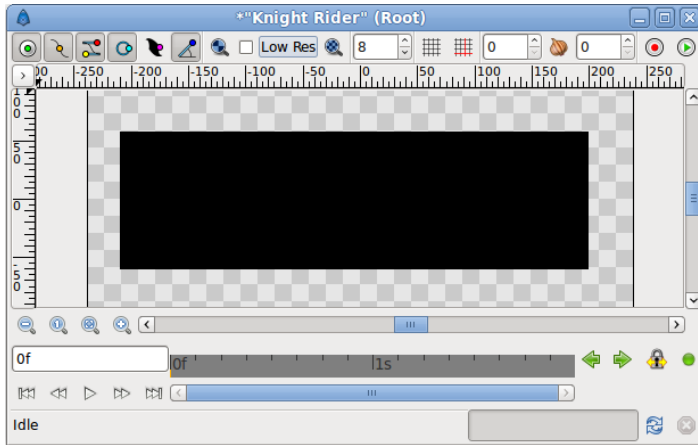
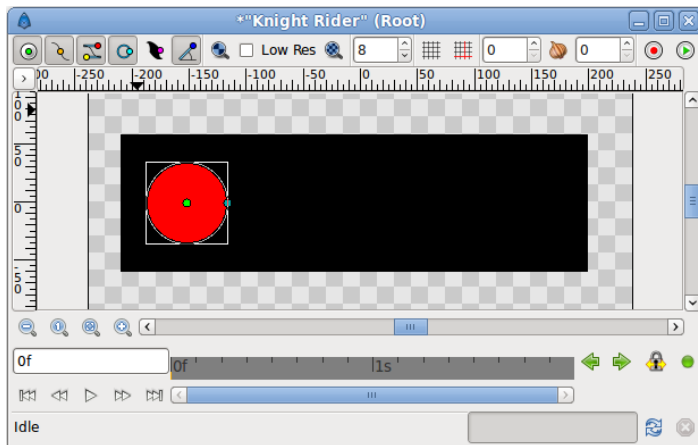


Figure 2.3: Canvas Properties Dialog

Now create a simple black rectangle that will serve as our background. It's not necessary to make it cover the whole canvas. Also, uncheck "Low Res" checkbox at the top of the canvas window to disable low resolution view mode – that will make your image look sharper. Generally, having that option enabled increases canvas redraw speed, but that's not what we need now.



We now need a circle. Change the fill color to red, and create a circle. It doesn't matter if it's not perfect: You can edit it. Activate the Transform Tool, and click the circle. It will go into a sort of editing mode which is easy to detect by the small green dot in the middle and the white rectangle around it. You can move the red circle by grapping it on its green dot in the middle.



These are the first steps to draw an object and to move it, but not yet an animation, you may say. Indeed. Let's have a look how this works.

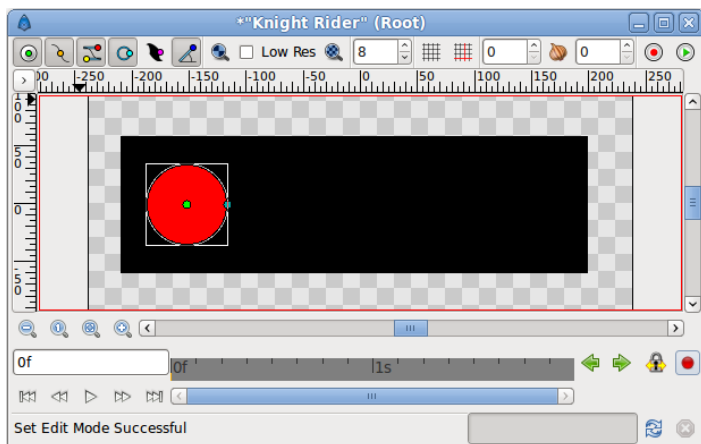
2.2.3 Adding movement

In the beginning, you entered a value of 2 seconds in the Properties dialog. Because the length of your animation is non-zero, your canvas window (the one where you draw) got a grey time slider at the bottom. You can click on it, and a small orange indicator will appear indicating your position in time. Try clicking in several places on the time slider and notice that the entry field on the left of time slider changing its values to something like "12f", "1s 15f", etc. You can set your position on the timeslider by changing values in that field. For example, if you enter "1s" and press **Enter**, the orange indicator will move in the middle of time slider, and entering "2s" will move it to the end of time slider.

Note

In the last case orange indicator will become invisible, because 2s is right at the boundary of time slider, just belive me — it's there.

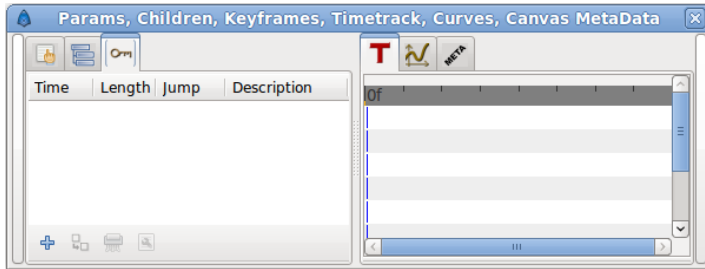
But when you changing your position on the time slider nothing changes on the canvas. This is because you need to switch to "Animate Editing Mode" first by clicking the green dot just to the right of the grey time slider. You will note that your canvas gets a red outline; it reminds you that changes to your objects now affect your animation.



Previously, three 'steps' or 'stages' were mentioned. These are represented by so-called 'keyframes' (Just in case you're familiar with video encoding: No, that's not the same!). A keyframe is an image in time where something important happens with your objects.

Go to Keyframes panel — just click on the little tab one with the small key icon in the bottom window — to be able to edit keyframes. Now press the small button

with 'plus' sign and you should get a new entry in the list displaying "0f, 0f, (JMP)".



Now, go to the "1s" mark in the timeslider. The small orange indicator should move there. Then add another keyframe by clicking the small plus sign. Repeat the process with the time slider indicator set to "2s" (it's at the end of your animation). You should have three keyframes in the list, now.

Time	Length	Jump	Description
0f	1s	(JMP)	
1s	1s	(JMP)	
2s	0f	(JMP)	

2.2.4 The s's and f's: Understanding the Timeline

By now, you may have figured out what those mysterious '1s 10f'-type marks represent. They indicate a specific point on the timeline, expressing a location in terms of seconds (s) and frames (f).

By default each second is divided into 24 frames, much like a meter on a measuring tape is divided into 100 centimeters. The frame markings begin at zero (0) and go up to 24, whereupon a new second is entered and the framecount returns to zero.

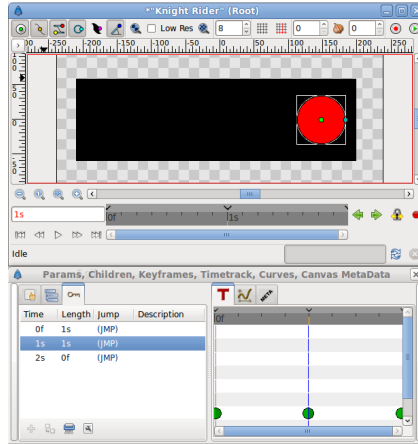
For example, when five whole seconds and three frames have passed, using this timeline notation would be "5s 3f".

2.2.5 The Keyframe List

The keyframe list is rather easy to understand. It displays "Time" which is basically the start time, "Length" which is self-explanatory, "Jump" which we'll cover next, and "Description" which is, again, self-explanatory.

Now, you might be wondering about the entries called " (JMP) ". In fact, these are links just like web links: click them, and the indicator in your timeslider will jump to the correct time.

You can use this to edit your image for a given moment in time. For instance, you can now jump to the first second, and move the red circle to the right. There! You made your first movement, your first animation with Synfig!



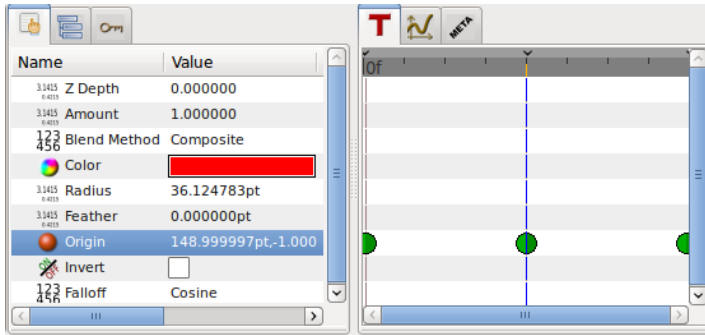
Wondering where the animation is? Just click to an arbitrary position on the timeslider: You will note that the red circle is in a new position, one that you didn't specify! So what happened? Synfig figured out what you would like to do, namely move the circle, and drew all the images between these states. Each image will later make a frame in your animation and the circle will appear to be moving.

Note

Notice, that you don't need to go to the last keyframe at '2s' and move your circle back to the left. Keyframes make synfig remember image state at particular time. That's why when we modified circle position at '1s', it stays on the left at '2s' (as well as at '0s'). If you switch back to Params Panel, and look at the Timetrack Panel you'll notice a three green dots appeared on the right of "Origin" parameter. Those are called Waypoints and they used to indicate changes of parameter over time.

2.2.6 Rendering your animation

Before you can see your animation, you need to process (or render) your work. There are two ways to do so: using the synfigstudio (what you have been using so far) or the command-line program synfig.



Close the animate editing mode by clicking on the red dot in the timeline editing widget, and save your file; for instance under the name `BasicKnightRider.sif`. Then click the 'caret' menu button and select "File" → "Render". Change the file-name to `BasicKnightRider.gif` in the same location you saved `BasicKnightRider.sif` and choose "gif" target format instead of "Auto", then click Render. Depending on your processor speed it should take a few moments, but finally the image window status bar should say "File rendered successfully".

Note

The "magick++" target (if it is available) produces much better gifs than the "gif" target because it can optimise the palette for the image.

Open `BasicKnightRider.gif` in Firefox or another application that is able to show animated gif's. However, Firefox will replay the GIF all the time which makes your short animation a rather long one. If you're now seeing a red circle moving from the left to the right and back, congratulations! You just made your first animation!

Note

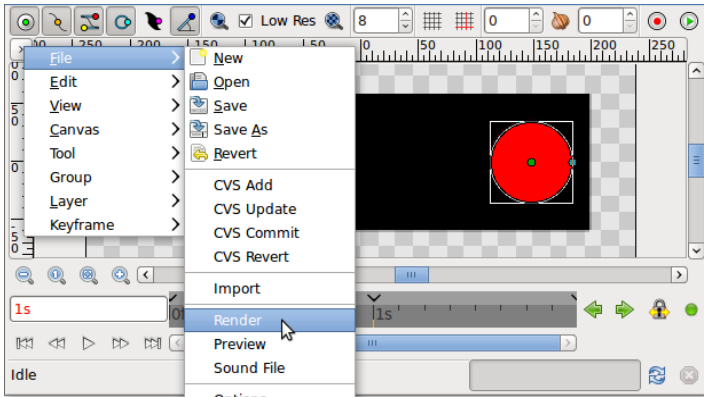
You can also preview your animation. Press the 'caret' menu button in the upper left corner of the image window and choose "File" → "Preview".

If you would rather use the command line instead of the menu to render your animation, then open a terminal (on Windows, go "Start" → "Run", type "cmd" and press **Enter**), change to the directory you saved the file, and type something like

```
synfig -t gif BasicKnightRider.sif
```

A few messages appear that don't matter right now. Depending on your processor speed it should take a few moments, but finally a line like

```
BasicKnightRider.sif ==> BasicKnightRider.gif: DONE
```

Warning!

The version you are using may not support the GIF output format at the moment, it depends on the version and compilation settings.

should appear, then you are done and can view your animated gif using firefox or another program as mentioned above.

2.2.7 Conclusion

Of course, the position of an object is not the only thing you can change with Synfig Studio. Other possibilities include its size, its outline, its color, etc. Synfig comes with several example files that should let you dig deeper into the possibilities.

2.3 Adding Layers

2.3.1 Introduction

In the previous tutorial, you made your first simple animation by changing the attributes of primitive objects, such as: position, color, and size. These simple types, however, are seldom sufficient to create advanced characters and objects. To do so, Synfig uses layers. They are similar to layers used in other drawing applications in that they are used to separate different elements of an image.

However, Synfig's layers are different from layers in other programs in at least three respects:

1. Every object, element, and effect gets its own layer.
2. You can organize layers into hierarchical groups.

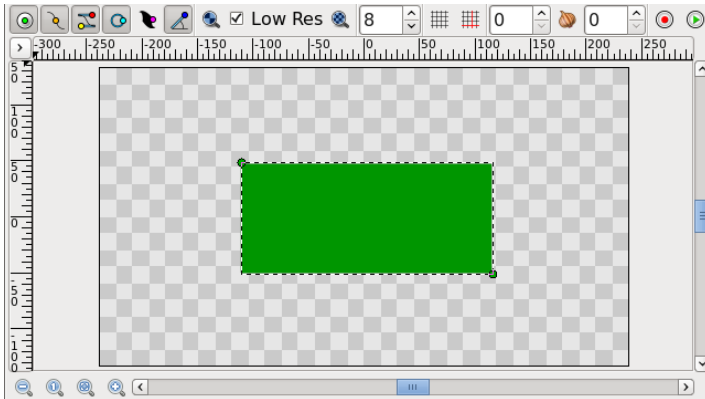
3. You can use upper layers to change the behavior (or look) of underlying layers.

As you will see, layers are an extremely important aspect of Synfig, much more so than most graphics programs. Understanding the concept of layers is an important part in understanding how Synfig works.

2.3.2 Combining layers

So let's look at a simple example of how we can combine two layers to create a gradient effect on a rectangle.

Create a new file with 0 duration. There's no need to bother with a timeline at this point. Next, create a simple rectangle with the Rectangle Tool.

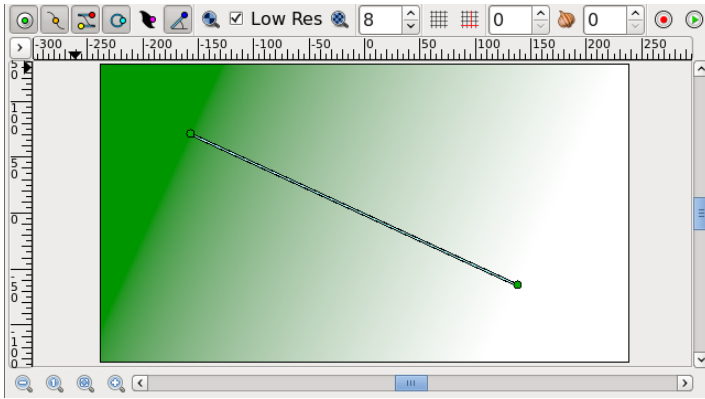


Pick the Gradient Tool from the Toolbox, press left mouse button on the canvas, drag to change gradient direction and release button when you are done. You should note that another layer was added in the Layers Panel called **Gradient**. This is nothing special.

You now have a gradient, but it is not what you wanted: it spreads across the whole canvas. The goal was to have a gradient in the rectangle. So, let's fix this now.

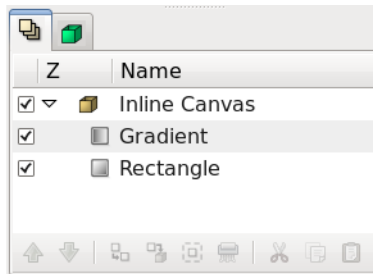
In the Layers Panel, select both the gradient and the rectangle layer. Then, right-click and select "Encapsulate" from the menu. The view of your Layers Panel should change now, showing a small box called Inline Canvas with an arrow in front. By clicking on the arrow you can expand the inline canvas to see its contents, your previous two layers: the gradient and the rectangle.

You can treat this layer like any other layer — move it around, duplicate it, copy and paste it. If you want to change the name of it to something more descriptive, just select the layer in the layer tab and click on its label. Then you just edit it in place. You can do this for ANY layer, and are strongly encouraged to do so.



Note

If you see no gradient but just a plain color, that means that you probably just clicked on the canvas without dragging your mouse. To fix that pick the Transform Tool, click into the canvas to activate the gradient's ducks. You need to grab the one you see and move it a bit until a gradient appears.

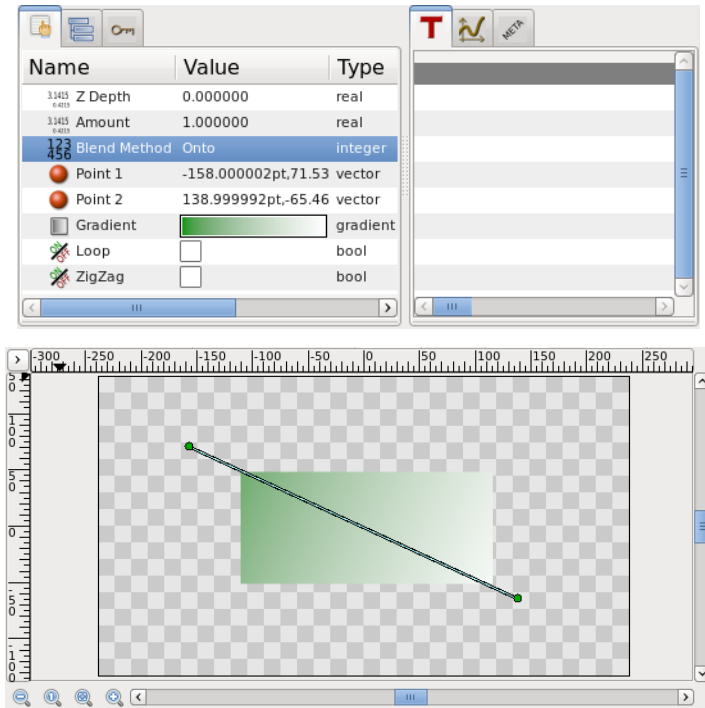


2.3.3 Using locality

However, there is still a problem: the gradient still covers the whole canvas although we wanted it to be restricted on the rectangle. To do so, activate the gradient layer in the Layers Panel. Now go to the Params Panel (by default it resides in the bottom window), and search the attribute called "Blend Method". Double-click the entry and select "Onto" from the drop-down menu.

The gradient should now be restricted to the rectangle. Congratulations! You just made your first effect by interacting layers with Synfig.

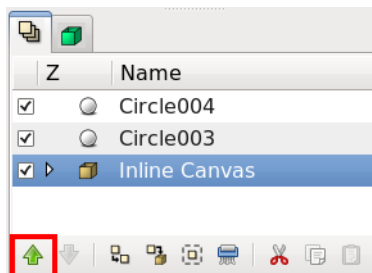
If only for the additional organization, encapsulating layers into inline canvases dramatically improves the ease of use of Synfig Studio. But lots of programs can do this. The concept of *scope* as just demonstrated sets Synfig apart from other programs with layer hierarchies. The key point is that layer can **only** modify the data that it



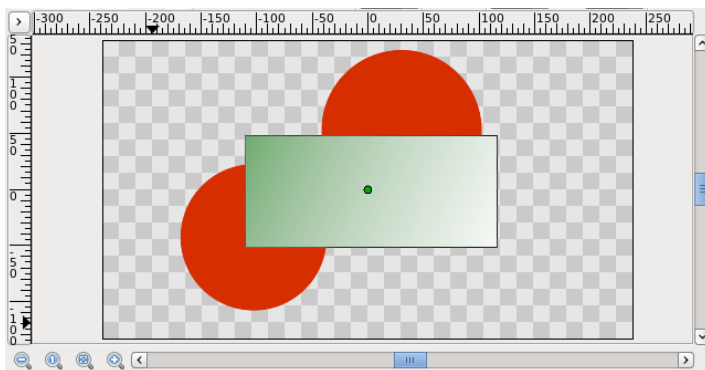
gets from **directly below** it. In other words, if you were to throw a Blur Layer on top of the layers inside the inline canvas we created, it would just blur them — anything under the inline canvas would not be blurred! Let's try it.

2.3.4 Using layers to modify other layers

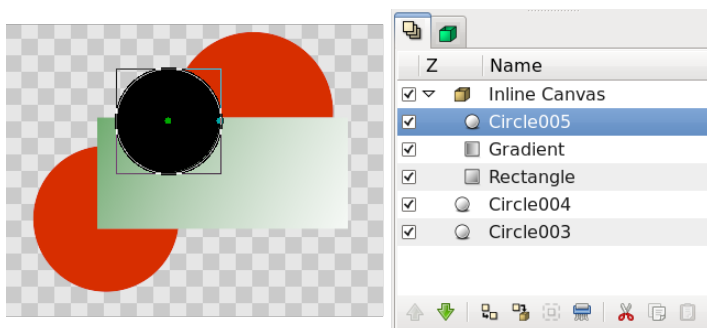
Make sure you have Inline Canvas layer selected and create two red circles. They will appear on top of Inline Canvas. Select Inline Canvas layer and use "Raise Layer" button in the Layers Panel to place it on top of the circles.



Now our inline canvas layer (with rectangle and gradient) is in front of those two circles.

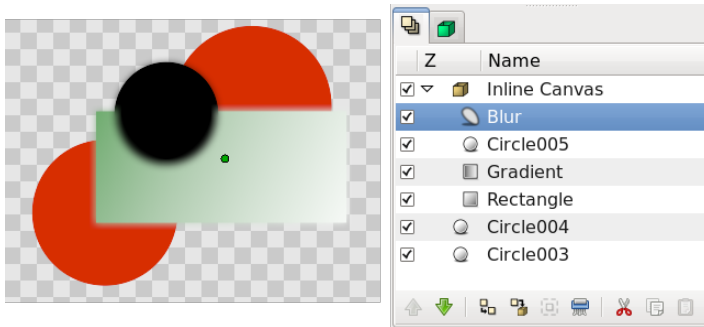


Expand the inline canvas to show its contents, and select the top layer inside of it (should be the gradient layer). This is where we want to insert the new layer. Create another circle filled with a black color. The black circle layer will be created over the gradient layer inside the inline canvas.



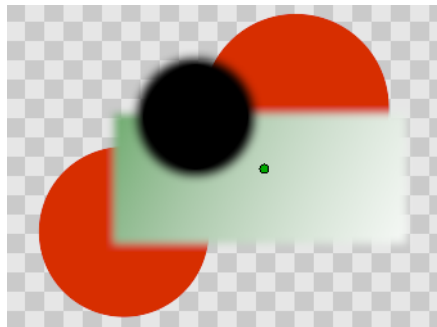
Now, right click on the black circle layer in the Layers Panel and a popup menu will appear. The first item in that popup is "New Layer". Inside of the "New Layer" menu, you'll see several categories of layers you could create, but what we want is a blur, so go to the Blurs category and select the "Blur" layer (so that would be "New Layer" → "Blurs" → "Blur").

Well, it blurred... but something is not quite right — the outside edge of contents of the inline canvas is still sharp. It is doing this because the blend method of the blur defaulted to "Composite" (you can change the default blend method for new layers from the New Layer Defaults section of the Toolbox). What we want is a blend method of "Straight". Just select the blur layer, and change the Blend Method to "Straight" in the Params Panel.



Note

We will probably change the way that default blend methods are handled in the future — as the way it is currently handled seems to only create hassles like this.



Ok, now we have all of the contents of the inline canvas blurred, but everything under it is sharp!

2.3.5 Digging further...

If you care to look into Synfig's main menu under "Layer" → "New Layer" you will note quite a lot of different possibilities for making layers. Several of them sound rather unusual, like "Transform" → "Rotate" for example. You can use this to add new attributes to your objects. And just like other, basic attributes in the previous animation tutorial, you can change them to be different on certain keyframes. Synfig will take care of interpolating the steps in between.

For example, you could create a some shape and add a Rotate Layer over it. Combine this with the lesson learned in the last tutorial and you can create a rotating effect. This technique is used for creation of Cut-out Animation.

2.4 Creating Shapes

2.4.1 Introduction

Basic primitives such as circles or rectangles are all great, but they are pretty much geometrically inflexible. What about creating more complex shapes? To do this, we use BLine Tool.

2.4.2 BLine Tool

In Synfig, the construct for describing shapes is called a Bline. This is roughly analogous to a "path" in other programs, except that it is strictly a hermite spline.

Before we start with the BLine tutorial, let's look at some additional notes on how Synfig works. When you click on the Bline Tool, you will see that the vertices from your currently selected object (if there was one) will disappear, but the layer(s) will still remain selected in the Layers Panel. This is normal. Anything you create with the BLine Tool will be inserted above the currently selected layer. Keep in mind that if you want to insert a shape somewhere, you should select where you want to insert it before you go into the Bline Tool — changing the selection afterward will automatically swap you back to the Transform Tool.

Now, go ahead and click on the "Reset Colors" button in the lower left corner of the FG/BG color widget in the toolbox. This will reset us back to the default black and white. Also, set the default line width to something nice and thick — 10pt should do the trick.

After you switched to BLine tool, take a look at the Tool Options Panel. Make sure that only "Create Region BLine", "Create Outline BLine" and "Link Origins" are checked.

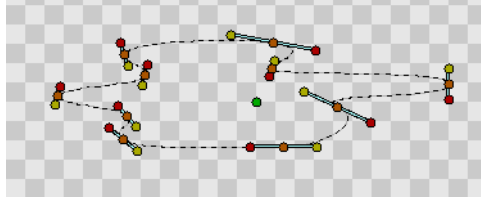
Clicking with your mouse in the canvas will place vertices. While you are placing a vertex, you can drag out its tangent by dragging the mouse. Do this over and over, and you construct a Bline.

Keep in mind, however, that during this construction, there is nothing stopping you from just moving it if you don't like where you placed a vertex or a tangent. Honest! If you want to remove a vertex, right click on it and select "Delete Vertex". Want to split the tangents? Right click on the tangent and hit "Split Tangents". Want to loop the bline? Right click on the first vertex and select "Loop BLine".

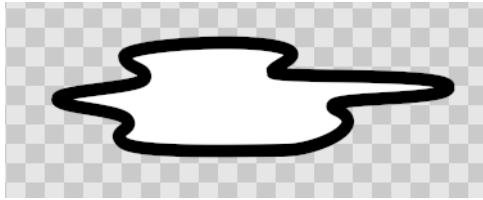
So we assume you got your first BLine laid out like you want it. That's great. But you may have noticed that the layers have not been created yet. That's because we are



Figure 2.4: Reset Colors button in the Toolbox



still in construction mode. There are two ways to create the layers: just either switch to another tool, or press the "Create" button at the bottom of the Tool Options Panel (it's the icon that looks like a gear). For now, just go ahead and click on the Transform Tool because we are done with the BLine Tool.



2.4.3 Editing BLines

Ok, we now have a nice pretty white region with a thick black outline. Since we checked "Create Region BLine" and "Create Outline BLine" in previous steps, you'll notice that there are two layers that we have created — the Outline and the Region in the Layers Panel. Despite the fact that they are two separate layers, their vertices parameter has already been linked — so you can select either one and move its ducks around and the other one will also change.

If you want to manipulate the vertices *after* you have created the layers, it is very easy to do so. Just click on one of the layers and have at it. If you want to remove a vertex, right click on it and hit "Remove Item (smart)". Want to insert a point somewhere? Right click on the segment where you want to insert something and hit "Insert item (smart)".

Note

The only major difference between this normal editing mode and the construction mode is in how you split the tangents — in construction mode you right click on the tangent itself. In normal duck editing mode, you must right click on the vertex that the tangents are attached to. This could be considered a usability bug, and it will be resolved at some point.

This may appear to be leading to a mess of layers. And yes, if you aren't using

the software properly, that is exactly what you will get. But there is a way to make this more sane. As mentioned in the previous tutorial, you can encapsulate layers into hierarchy.

One quick thing to mention before I finish up. You can change the width of an outline at each vertex. You do this by selecting the outline layer (NOTE: you must select the Outline Layer, the Region Layer has no width data) and tweaking with the width ducks. By default, these are masked. To show them, press **Alt 5** or click "Toggle width ducks" button at the top of the canvas window (the fifth one from the left). Repeat to hide them again. You can also see other things to mask via the Canvas Menu Caret: "View" → "Show/Hide Ducks".

2.4.4 Using tablet to draw shapes

If you have graphic tablet you can use Draw Tool to create BLines.

Synfig Studio supports pressure sensitivity, but you need to configure it first. Go to "File" → "Input Devices..." from toolbox menu. In the Input dialog find your tablet's stylus device and set its mode to "Screen". Click "Save" and then "Close".

Now grab your stylus, create new file and click on the Draw Tool button in the toolbox. Set default line width value to be big enough — say, 15pt — otherwise you will not notice any pressure sensitivity effect. Choose brown as default fill color.

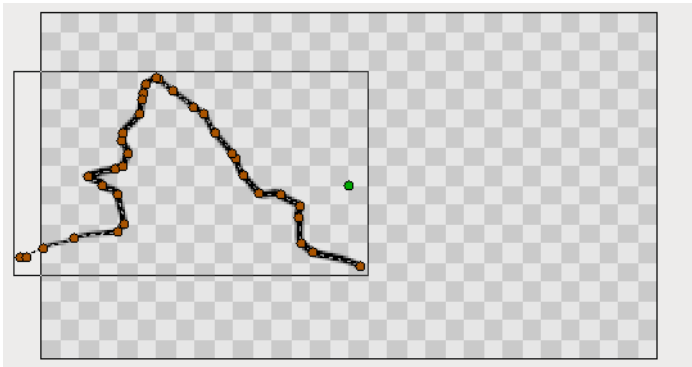
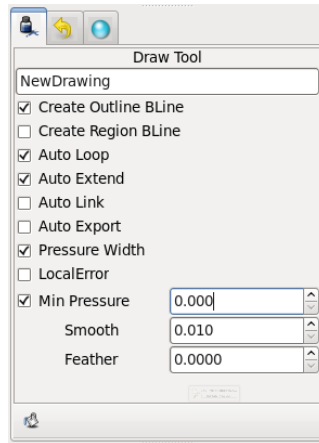
Note

Steps above should be done with stylus of your tablet, not the mouse. Synfig Studio remembers settings for each input device independently. That's why if you set those options with your mouse device they will not have any effect when you switch to stylus.

In the Tool Options Panel, make sure that you have same options as shown on screenshot below.

Now let's draw some thing like curvy mountain background. Start drawing a line from the left border to the middle of the canvas. Try to vary pressure while you drawing. Stop near the center of the canvas. This is your first line. Notice new outline layer created in the Layers Panel.

Point your stylus at the last duck of your new BLine and continue drawing to the right border of the canvas. When you finish, look at the Layers Panel again. There's still only one outline layer. Synfig Studio is smart enough to figure out that you don't need a new outline layer and properly extends the last one. You can extend the BLine from both ends, but if you start drawing from any other place of the canvas a new outline layer will be created. Though, your first line will remain selected and nothing stops you to extend it later.



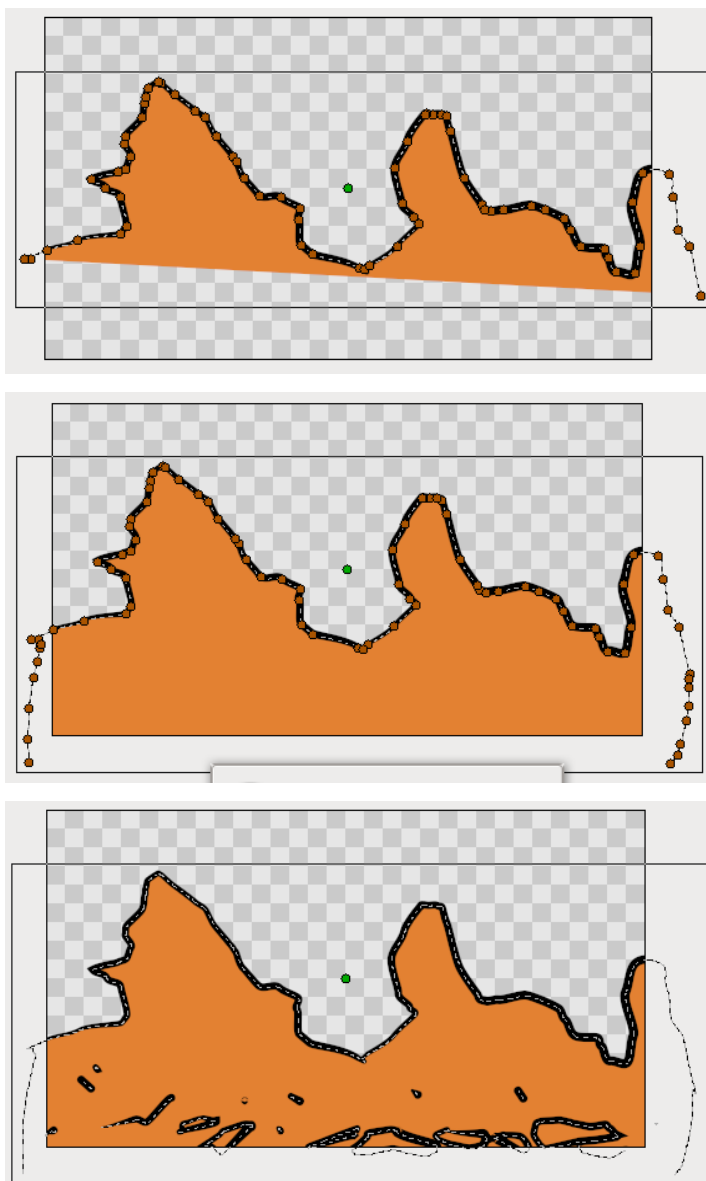
Back to our artwork. At the Tool Options Panel hit the button with bucket icon to fill the outline we just created. A region layer will appear at the top of the layer we are working with. Select outline layer and press "Raise Layer" button in the layers panel to put outline layer on top of the region.

Extend a line from both sides down to the corners of the canvas to make fill appear at the bottom. Great.

Go ahead and add a few more lines on top of the filled area to give it a mountain-like look. If brown ducks are on your way, you can hide them by clicking the "Toggle vertex ducks" button at the top of canvas window (the second one from the left).

Draw tool is great for drawing complex shapes, but you end up with a bunch of ducks, which are hard to manipulate with the Transform Tool in the way we described above. There are two solutions here.

First, you can increase "Smooth" value in the Tool Options Dialog while using Draw Tool. That will reduce the count of vertices produced at drawing time, but will



make your shape less detailed.

Second, you can use Smooth Move Tool to deform existing shape. Go for it and click Smooth Move Tool button in the toolbox. The trick about this tool is that it affects *selected ducks only*. Press and hold your left mouse button at the empty place

Warning!

Don't use **Alt 2** shortcut to turn off visibility of vertex ducks while you using Draw Tool. There's a bug that will cause Synfig Studio to hang.

of the canvas. Drag to create selection box. Release mouse button when you are done. Or just hit **Ctrl A** to select all ducks. Now you can deform selected segments of BLines. You can change size of influence area by tweaking "Radius" at the Tool Options Panel.

What about outline width? There is a Width Tool for that purpose. It is designed for increasing or decreasing the width of a line much like you would with a pencil on paper. Click Width Tool button on the toolbox, move your stylus over the line you want to change, press and move cursor back and forth along the line, like you scratching something. The width of outline will be increased at the places where you moved the cursor. If you want to decrease the width, just hold "Ctrl" while scratching. Easy!

If you don't want Width Ducks to be displayed, during usage of the Width Tool, just turn them off by pressing "Toggle width ducks" button at the top of canvas window.

Warning!

Don't use **Alt 5** shortcut to turn off visibility of width ducks while you using Width Tool. There's a bug that will cause Synfig Studio to hang.

2.4.5 Other ways to create BLines

Is that all? Not yet. You can use Circle, Rectangle, Star and Polygon tools to create BLines too. Just check the "Create Outline BLine" and "Create Region BLine" options at Tool Options Panel when using those tools.

Creating geometric primitive as BLine gives you a better control over it's shape and look. For example, if you want a deformed star, then you can use Star Tool to create it as outline and region BLines and then use Transform Tool to deform it.

Now you are ready for the last tutorial in this section. Hang on!

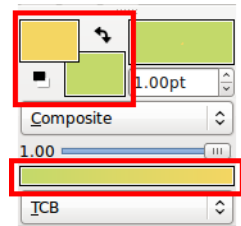
2.5 Animating Shapes

2.5.1 Basic settings

In this tutorial we will learn how to create a simple animation of a growing flower using blines.

Start Synfig Studio — a new animation will be created. If you already have Synfig Studio started, select "File" → "New" in the toolbox.

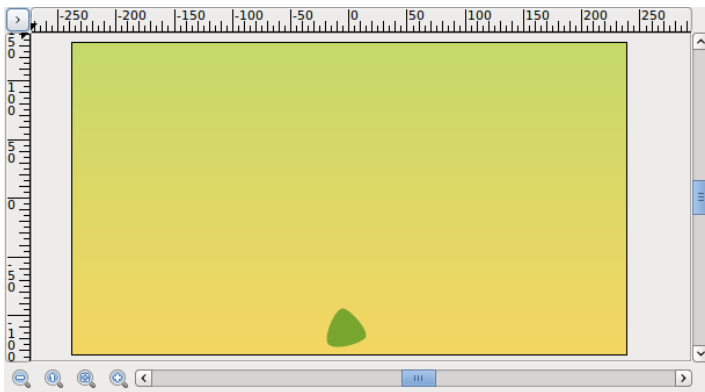
First, we need to create a gradient for a background. Click on the outline and fill colors in the toolbox to select a colors our gradient will have. You can also directly edit the gradient by clicking the gradient line in the toolbox.



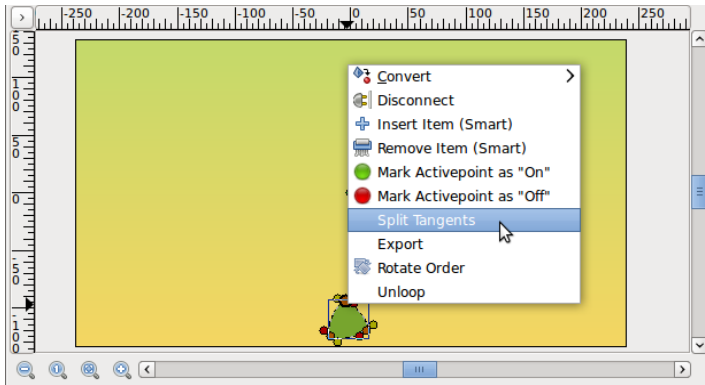
Select the Gradient Tool and drag your cursor vertically across the canvas to fill it with the gradient.

Next, select the Bline Tool and in the Tool Options Panel, make sure that only "Create Region BLine" is checked. In the toolbox, set the fill color to green. Draw a kind of triangle with the Bline tool. To close the shape after drawing the 3 vertices, right click on the first vertex and choose "Loop Bline".

Now that the shape is closed, you can "create" the bline shape by selecting another tool or pressing a button with gear-like icon at the bottom of the Tool Options Panel.



This will be the base of the stem. You can tweak the tangent handles (red dots) a bit to make a rounder triangle. With the Transform Tool, right-click on each vertex and select "Split Tangents", so the tangent handles of each vertex can be moved separately. We're done with the basic settings.

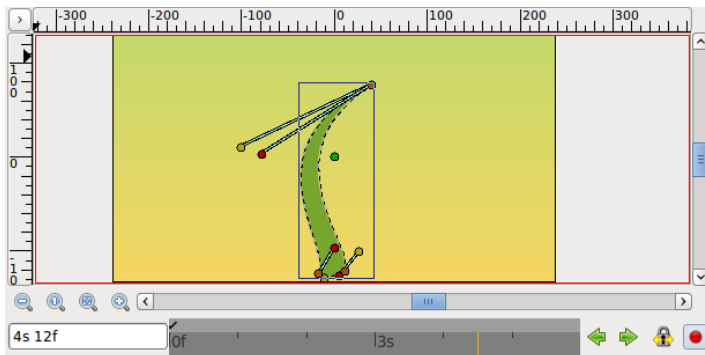


2.5.2 Animate the stem

In the Canvas Menu, select "Edit" → "Properties". Go to the Time tab, set the "End time" to "6s" and click OK button.

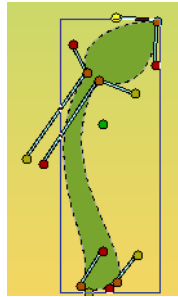
Click at the beginning of the timetrack ("0f"), then, on the Keyframes Panel (the one with a key icon) click button with a "+" icon (add a new keyframe). Keyframes allow us to *settle down* the scene; i.e. on a keyframe, every element of the scene will have all its properties remembered. Click again on the timetrack, at "4.5s". Press the green circle at the bottom right of the canvas (or whatever icon you have there, depending on your icon theme) to switch to the Animate Editing Mode (the circle is now red).

With the Transform Tool, select the green sprout, and move the upper vertex up to make a stem. You can play with the vertex handles to bend the shape a bit if you want.

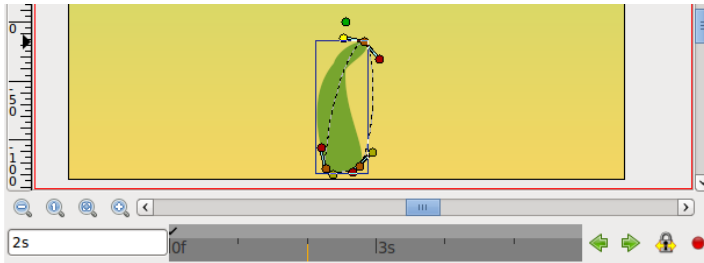


While you are still at "4.5s", right-click on the stem border, close to the top, and choose "Insert Item (smart)". Do the same on the other side of the stem. Right click on those new points and choose "Split Tangents" again. Then try

to make a shape that looks like the one on the image, to create the flower bud.

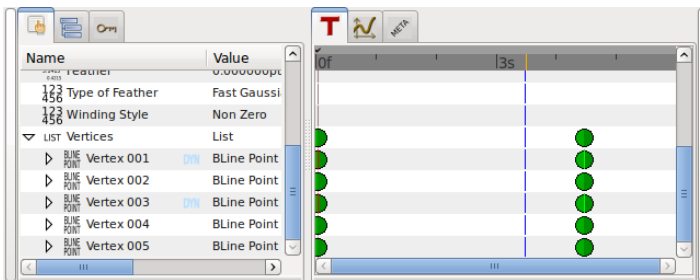


Now if you click on "2s" (for example), you'll see that the shape of the bud is slightly visible, even if the sprout is rather small, and even if the bud ducks are invisible.



Let's say we want the bud to appear only at 3.5s, and be full size at 4.5s.

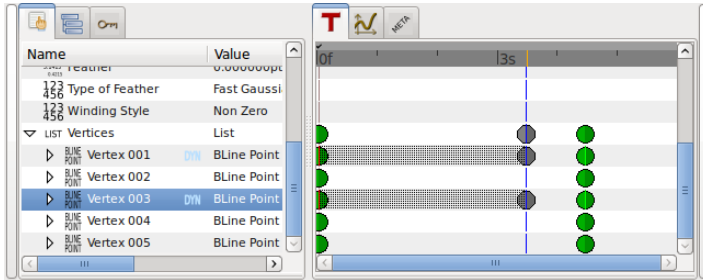
Click on "3.5s" on the timetrack. Now take a look at the "Params" and "Timetrack" panels at the bottom. You'll see that each parameter in the Params Panel matches a row in the Timetrack Panel. The last parameter is the vertices list. Click on the small arrow on the left to unfold the list. You should see something like this:



Each big green dot (or waypoint) stands for a recorded value (here the vertices positions were recorded at 0f with the keyframe, and at 4s when we moved some vertices

or vertices handles). The two vertices we added to make the bud are marked at "DYN" (dynamic). Right-click on them in the params list, and select "Mark Activepoint as Off".

The panel should now look like this, the grayed part being the part where the bud vertices have no effect on the stem.



For example if you click on "2s" or even "3s" now, the bud shape is not visible. It starts to appear only a little after 3.5s.

However, the shape of the stem may not look very nice during its growth between 0 and 4s. Make sure you're still in Animate Edit Mode, and tweak the shape at various moments in time, to get something you like.

The animation of the stem is now finished, but it still lacks the petals. You can watch a preview of your animation: Go to "File" → "Preview", validate, wait for the preview to be generated, and watch.

Note

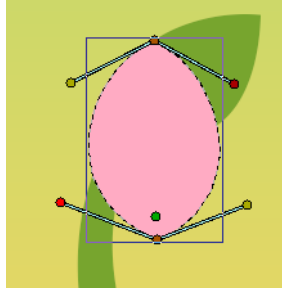
Previews are often pixelated and blurry, but the final render will be clean-cut. Higher quality previews are obtainable by using higher values for 'Zoom' and 'Frames per second' in the preview dialog window.

2.5.3 Adding the petals

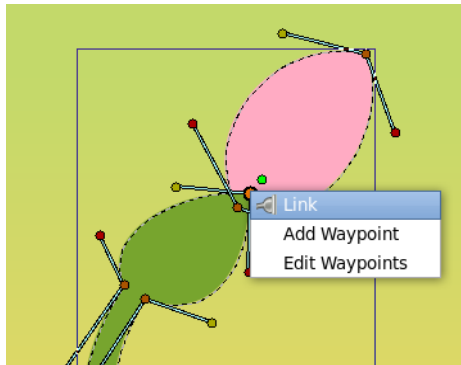
Now leave the "Animate Editing Mode" by clicking on the red circle at the right bottom of the canvas.

Change the fill color to pink, and create a petal with the BLine Tool. You'll notice that the green duck that allows easy movement of a shape is at the center of the canvas. Select all the vertices of the petal with **Ctrl** **A** and move them close to the green duck (with the Transform Tool), as shown.

Then drag the green duck very close to the top of the bud. Hit **Ctrl** **A** again to select all vertices of the petal and tweak it a bit with Rotate Tool. Also, in the Layers Panel select the petal layer and put it **under** the stem layer. Click on the petal to select it, then ctrl-click on the stem. Both objects should be selected.



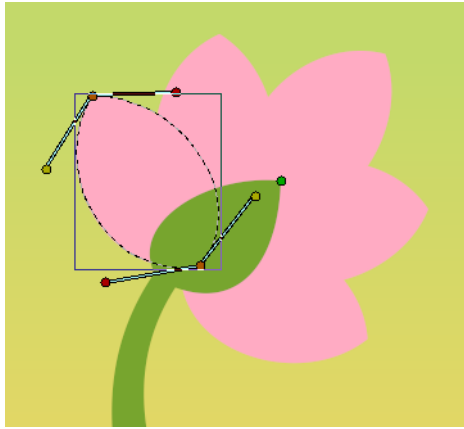
Now click on the vertex at the top of the stem and ctrl-click on the green duck of the petal (both should appear in a lighter color, as they are selected). Then right-click on the stem top vertex, and select "Link". The petal will move a bit as the green duck is snapped on the stem vertex.



Now that there's a link between the petal and the top of the stem, when the top of the stem moves, the petal will follow the move. (And if the green duck of the petal move, the top of the stem will move, but we don't want to do that here.)

On the Layers Panel, select the newly created Petal layer and duplicate it (with the third button, on the bottom of the panel). On the canvas, press **Ctrl A** to select all the vertices of the duplicated petal, and move them a little, so the petals are no longer overlaid. (Don't move the green duck, just the orange ones). Repeat the process several time, to get something looking like this image.

Note that the duplicated petals are also linked to the stem. If you go back to the first keyframe, you'll see that the petals are visible. We don't want that. We want the petals to appear and bloom almost at the end of the growth.

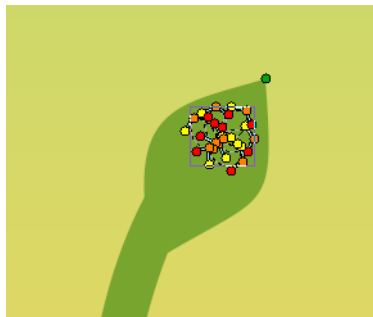


2.5.4 Hiding the petals

Let's say we want the petals to appear a little after 4 seconds in the animation, and be full size at 5 seconds, instead of being visible and full size all the time.

Switch to "Animate Editing Mode" again by clicking on the green circle at the bottom right of the canvas. But if we will go to "4s" and modify them, then they also change at "5s". Because the shape/position of the petals is not fixated at this moment of time by any waypoints or keyframes. That means that we need a keyframe at "5s". On the timetrack, click to place the cursor at 5 seconds. On the Keyframes Panel, click on "+" to add a new keyframe.

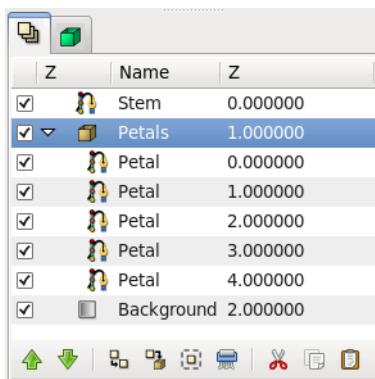
Now click on "4s", and on the Layers Panel, select all the petals layers (with ctrl-click), then press **Ctrl A** to select all the petals vertices. Scale them down with the Scale Tool, and move them, so they are hidden by the stem, as shown.



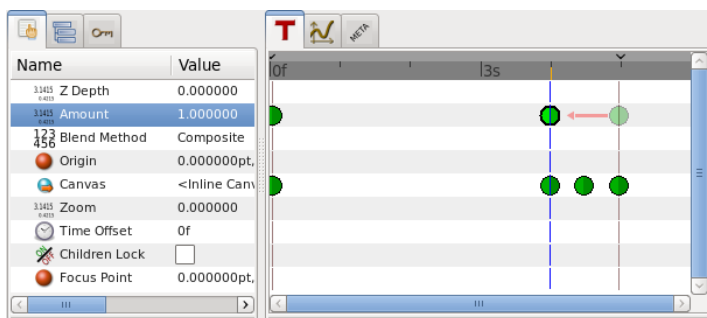
From 4s to 5s, the petals will now appear and bloom. But notice that we have a keyframe at 0s which also remembers petals shape. That makes the problem — the petals are still visible from the first keyframe to the 4s keyframe. We could either make petals tiny and hidden tweaking their size on every frame from 0s to 4s, or we

could make them invisible on this interval.

Let's choose the second solution. To make things easier, we are going to encapsulate the petal layers into a Inline Canvas. With all the petal layers selected, right-click on them on the Layers Panel and select "Encapsulate". You can rename the layers to make things more understandable.

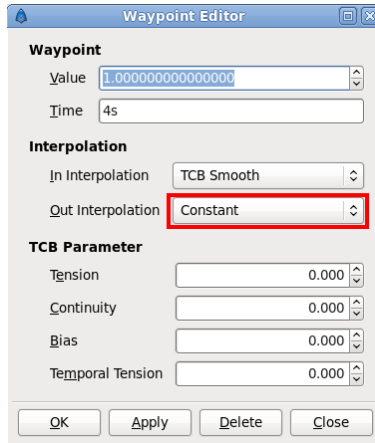


Select the "Petals" inline canvas and jump to the first keyframe. In the Param tabs, set the "Amount" value to " $\{\{1\}\}$ ". The petals are now invisible on that keyframe. Note that two waypoints were added in front of the "Amount" parameter, one at 0s and the other at 5s. Drag the 5s waypoint to 4s, so that the opacity of the petals will be 1 at 4s.



There is still one problem left: from 0s to 4s, the opacity of the petals slowly increases, making the petals visible when they shouldn't. To solve this, we will change the Amount interpolation method. Right click on the Amount waypoint at 0f, and select "Edit". A new dialog will appear, in which you can choose the In and Out interpolation. Set the Out Interpolation to "Constant".

This means that *after* that waypoint, the Amount value will remain constant, until another waypoint is encountered. So from 0f to 4s the Amount value will be equal to 0, and at 4s it will suddenly changed to 1, and make the petals visible, as expected.



Tip

You can also change waypoint Out interpolation by right-clicking on it and selecting "Out" → "Constant".

Alternatively, we could have achieved the same effect by setting the In Interpolation of the waypoint at 4s to "Constant".

Notice how (half of) the waypoint changes from a green circle (meaning smooth animation of the amount parameter) to a red step (meaning that the amount parameter is suddenly stepped).

Now you're done. The stem grows for 4.5 seconds and then stays still the last 1.5 second. The petals are hidden until 4 seconds, and then grow quickly between 4 and 5 seconds, and stay still the last 1 second too.

Click on "File" → "Render" to render your animation. Select any format you want, and ensure that "Use current frame" option is unchecked (otherwise, one frame only will be rendered).