



# Adobe® Illustrator® CS 2

## SVG Pie Chart Tutorial

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### Introduction

Creating SVG pie charts with Adobe® Illustrator® CS 2 is a collaborative process between both an interactive designer and a developer. First, the designer uses Adobe Illustrator CS 2 to create a number of graphic elements stored in an SVG file. These become the visual components for the SVG pie chart. Then, the developer modifies the SVG code to make the SVG graphic dynamic to its data.

This document is intended for the designer. It shows by example how to create the components for a three-dimensional pie chart. This document also explains many of the steps required by a developer to produce SVG code. As a result, the reader of this document will become familiar with the basic process of creating an SVG pie chart suitable for dynamic content integration.

By working with Adobe Illustrator CS 2, the designer produces high-quality SVG code compatible with Adobe Eclipse development tools while retaining the familiar and refined palette of tools for image creation.

## Before you begin

To begin creating the visual components for a three-dimensional pie chart, the designer should develop a list of the most basic elements that are required, as shown in Figure 1. For the example used throughout this document, the pie chart file consists of the following components:

- A. Artboard (to define the size of the final SVG graphic)
- B. Pie chart label
- C. Slice labels (to define and describe the values of the slices in comparison to each other)
- D. Pie chart (made up of the following elements to create a three-dimensional appearance):
  1. Circular mask
  2. Slices
  3. Background disc to create the illusion of a three-dimensional circle
- E. Shadow (again to create a more detailed three-dimensional appearance)
- F. Sample elements (eventually to be removed by the developer from the final graphic) to allow the designer to define color swatches (and any other style information) to be used by the developer for the appearance of chart slices beyond the single sample slice defined in this graphic
- G. Style definitions for the SVG graphic's appearance

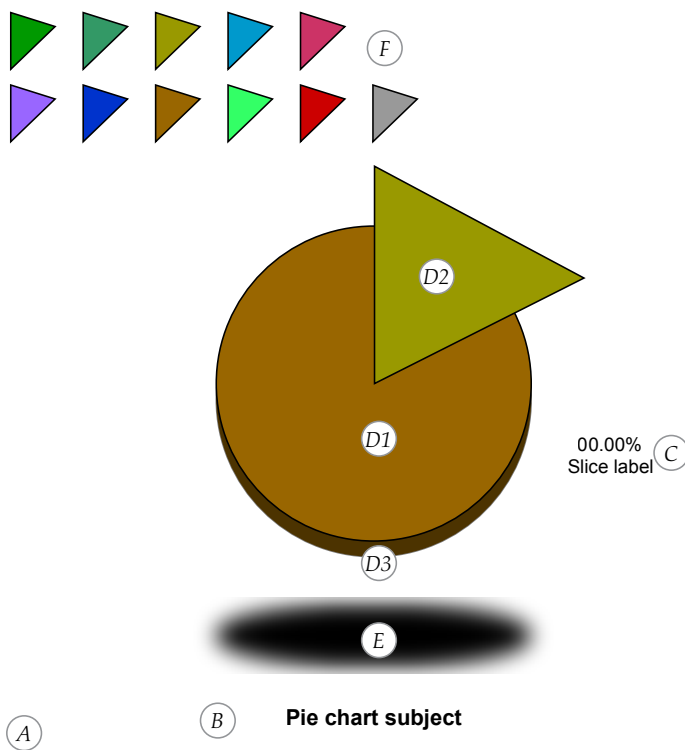


Figure 1: Example Adobe Illustrator CS 2 pie chart file

By having these components clearly detailed (and initially reviewed with the developer), the designer can be certain that the delivered Illustrator SVG file gives the developer all the required pieces. With these elements, the designer can systematically create the artwork pieces required for the final pie chart.

## Setting up Illustrator

Setting up Illustrator consists of:

1. Creating a document
2. Setting Illustrator preferences
3. Updating the working environment

### Creating a document

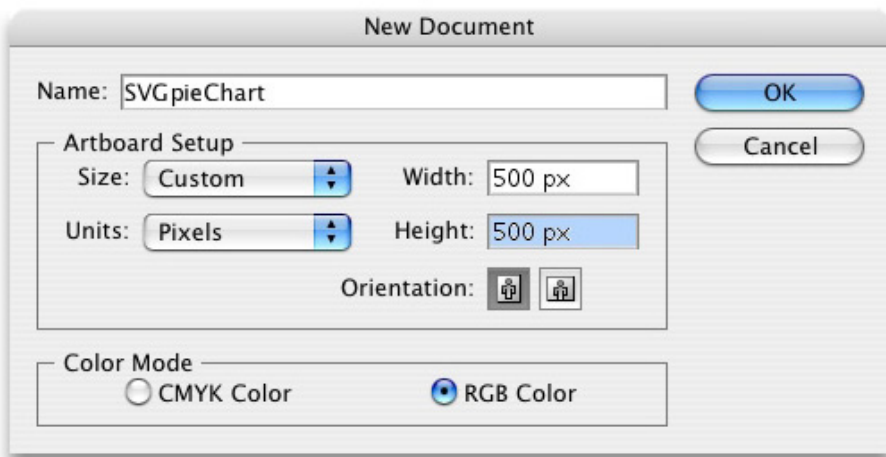
To create the Adobe Illustrator CS 2 document for the pie chart graphic template.

1. Open the Adobe Illustrator CS 2 application.
2. Choose File >> New... (or press Ctrl-N (Windows®) or Command N (Mac OS®)) to create a new document.

In the resulting New Document dialog box:

3. Select Pixels from the Units drop-down menu in the New Document window.
4. Select RGB Color from the Color Mode section.
5. Specify the width and height of your SVG document. For this example, we specify values of 500 pixels for each.
6. Enter the name of your document in the dialog box's Name text field.

The dialog should now appear as follows:



7. Press the OK button.

### Setting Illustrator preferences

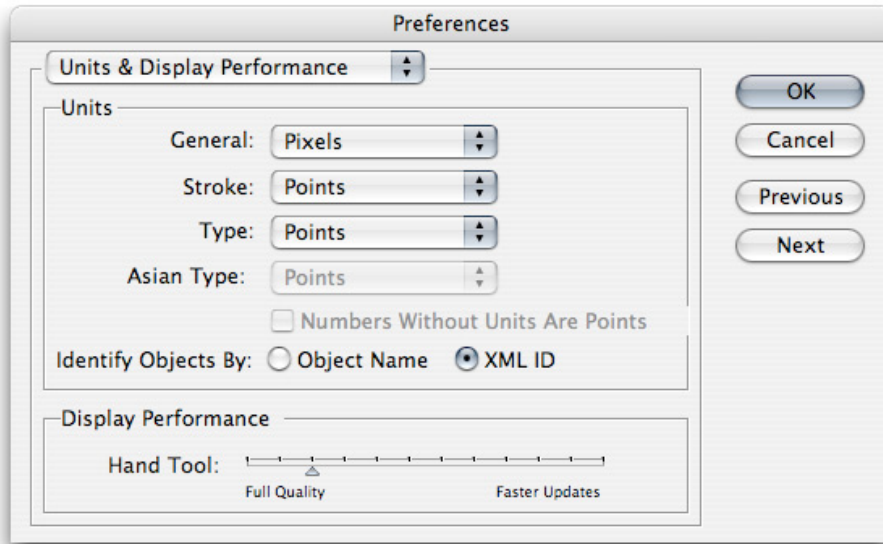
Because SVG files are a type of XML files, SVG document code must strictly comply with XML rules. The easiest way to ensure that the resulting SVG file meets this requirement is to setup Illustrator layer naming preferences to use XML-compliant object naming. Alternatively, you can manually name each layer and each sublayer according to XML language requirements, making sure that no element has the same ID attribute as any other element.

In either case, the goal is to avoid issues when a developer is later examining or altering XML or SVG code and trying to understand to what visual object the code relates to.

To change the Illustrator layer naming preference to use XML conventions:

1. Choose Illustrator >> Preferences >> Units & Display Performance...
2. Select XML ID from the Identify Objects by section.

The dialog should now appear as follows:

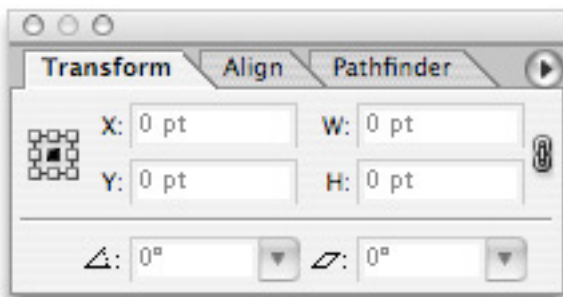


3. Press the OK button.

### Updating the working environment

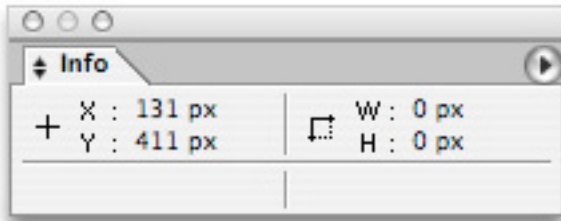
Now that Illustrator's preferences are updated, you should update your document's working environment to ease your artwork creation in the upcoming steps.

1. If they are not already visible, choose View >> Show Rulers (or press Ctrl-R (Windows) or Command R (Mac OS)) to display rulers along the top and left edges of the document window.
2. If it is not already visible, choose Window >> Transform to open Illustrator's Transform palette. This allows you pixel-precise control over placement and dimensions of each object you create.



Select the lower left square in the Transform palette's grid diagram to specify that transformations applied from the palette on a selected object are calculated from its bottom leftmost corner.


- If it is not also already visible, choose Window >> Info to open Illustrator's Info palette. This provides you with precise coordinates of the cursor position and object dimensions as you create new objects and artwork.




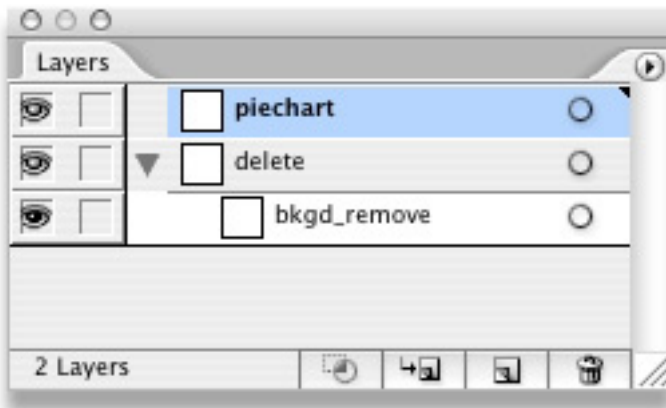
- Next, be sure that the Layers, Stroke, Color, and Align palettes are open as well.
- Using the Rectangle tool, click in the top left corner of the document's Artboard and drag the cursor to the bottom right corner of the Artboard to create a 500-pixel by 500-pixel square.

This square ensures that the resulting SVG file places the artwork contents in the same location as they appear in the document's Artboard. Once the final SVG document is completed and ready to publish, the developer deletes this object from the SVG code to eliminate clutter.

- Use the Color palette to set the Stroke and Fill values of the new rectangle to None. This ensures that this object does not interfere with the appearance of other objects.
- After you are done, reset the default Stroke and Fill values back to 1pt and black, so that subsequent shapes and lines are visible.
- Rename the rectangle's sublayer to "bkgd\_remove" and its surrounding layer to "delete". This will remind the last person who edits the SVG code to remove this layer of code.
- Finally, press the little document icon in the Layers palette to create a new layer. Rename this layer "piechart" to prevent future artwork from being included in the "delete" layer.

 You can open or close any of Illustrator's palettes by choosing its respective name under the Window menu, as in the previous steps 2 and 3.

 Use layer or sublayer naming to increase the efficiency of your SVG workflow. A designer can easily see the name of the sublayer of (or group containing) a selected object using Illustrator's Layers palette. However, a developer usually cannot see to which object a piece of code relates because they usually work with a text editor. Use "human readable" names for the layers and sublayers so a developer can modify and understand the document they are viewing in a text editing environment.



## Creating the pie

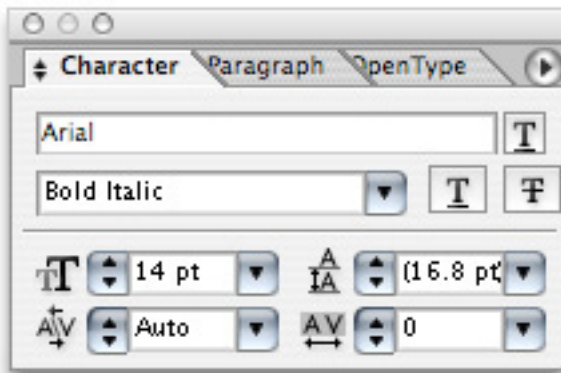
You can now begin creating the imagery that will eventually become the pie chart graphic, as follows:

1. Create the main pie, including the chart's descriptive label.
2. Add a pie slice.
3. Add the slice label.
4. Add 3D effects.

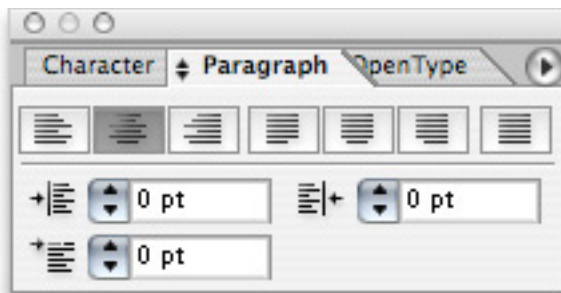
### Creating the main pie

First, create the pie chart's descriptive label that titles the graphic. Creating this label involves establishing the appearance and alignment of the text, inserting the text object, and then positioning it precisely on the page.

1. In the Character palette, choose a typeface (such as Arial Bold Italic) and typesize (such as 14pt) that can be used for the text label.



2. In the Paragraph palette, choose Align Center to ensure that the text you are about to create stays justified according to its center point.

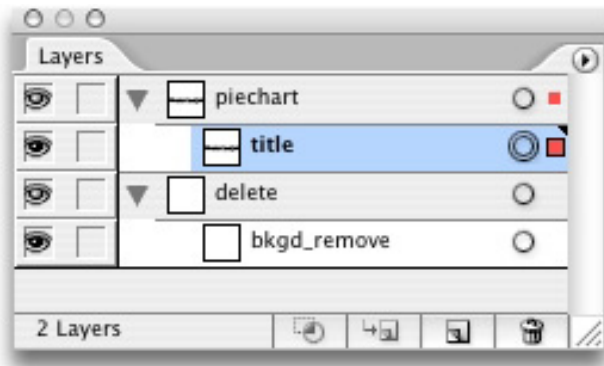



3. Select the Text tool and click in the lower middle section of the Artboard to enter text that forms the horizontal label. Enter "Pie chart subject" to define the label. Remember that the developer will change this text in the SVG code once the actual data populates the graphic.



Many of the text labels used in this document are generic, such as "Pie chart subject", because they will likely be populated from information in your database in your final dynamic graphic. Be sure to communicate this to the developer to ensure they know to link these text fields with an associated text record in the database.

- With the newly created text still selected, specify an X position (250 pixels) and Y position (35 pixels) in the Transform palette's respective fields to place the label in its appropriate position.
- Rename the newly created text sublayer to "title".



 Use round numbers (for example, specifying 250 pixels instead of 249.787234 pixels) to further increase SVG workflow efficiency. Using round number helps in two ways.

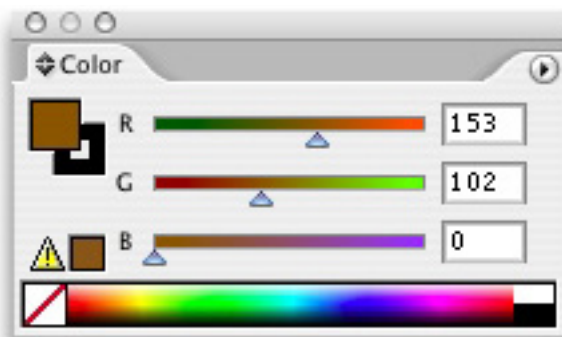
First, using round numbers substantially reduces the size of the resulting SVG document by minimizing the data required to describe coordinates and by reducing the amount of data a developer must search to find code to be modified.

Second, round numbers are inherently easier to transform when calculating modifications.

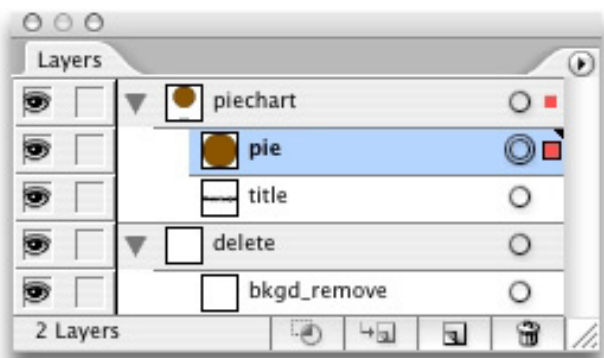
It is not always possible to produce artwork that easily matches all coordinates and attributes to round values. When possible, however, you can save yourself and the developer significant work by using round values.

With the chart's descriptive label in place, you can now create the main circle that becomes the pie itself.

- Using the Ellipse tool, draw the main pie outline by clicking and dragging your cursor in your document while holding down the Shift key (to constrain your artwork to a perfect circle).
- With the newly created circle still selected, specify a height and width (200 pixels each), X position (250 pixels), and Y position (250 pixels) in the Transform palette's respective fields to place the circle in the exact center of the document.
- Using the Color palette, choose a new Fill color for the circle (such as 153r 102g 0b) and a Stroke color (such as black, 0r 0g 0b). For an even stronger line weight, modify the Stroke width in the Stroke palette.



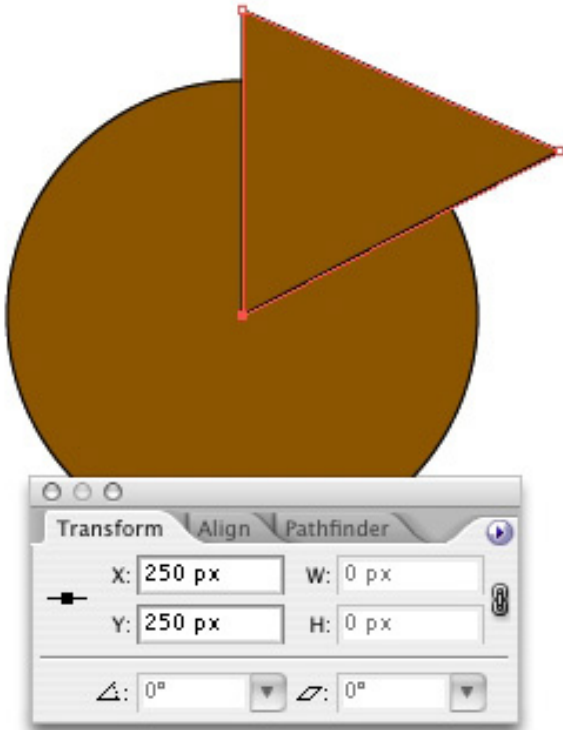
- In the Layers palette, rename the circle's sublayer to "pie".



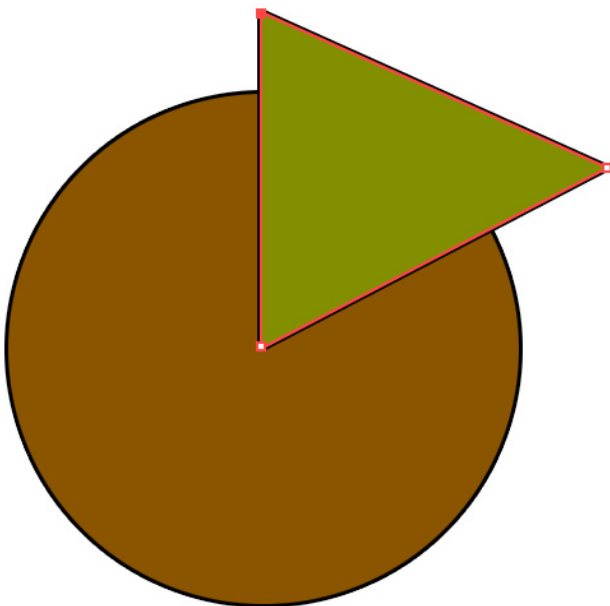
## Adding a pie slice

You only need to create one slice and slice label because the developer will adjust the final SVG code to allow dynamic content to determine how many slices to draw. To make the slice, draw a triangle.

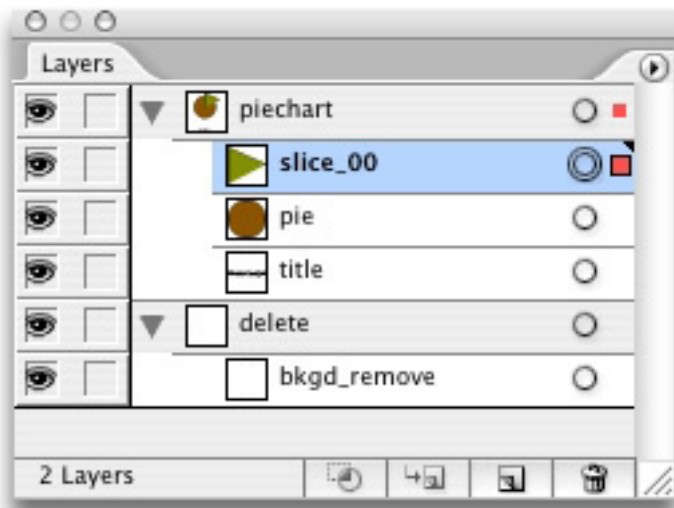
1. Using the Pen tool, click three times in your Artboard area to make a triangular shape. Be sure to click on the first point in the path after drawing the third point to close the triangle, thus making it a “closed” element.
2. Use the Direct Selection tool to select each point one at a time. Change the coordinates of each point to match the following three coordinates by entering the values into the Transform palette, thus creating a triangle with a point emanating from the center of the circle: (250,250), (385,320) and (250,380).




3. Using the Color palette, choose a Fill color for the new slice (such as 153r 153g 0b) and a Stroke color (such as black, 0r 0g 0b).



- To complete the slice, rename its objects' sublayer in the Layers palette to "slice\_00".

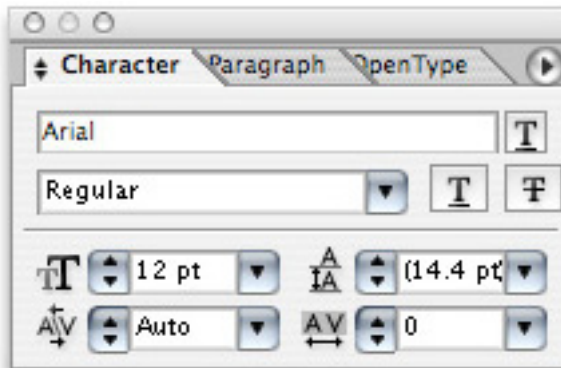


 Adding a "\_00" suffix to the sublayer labels makes it easy for the developer's code to quickly rename these sublayers by incrementing the number when more slices are created.

### Adding the slice label

Each slice in your final pie chart should have a descriptive label and a precise value label to help the audience understand the information being presented. To do this, you must create two more text fields to associate with the slice made previously.

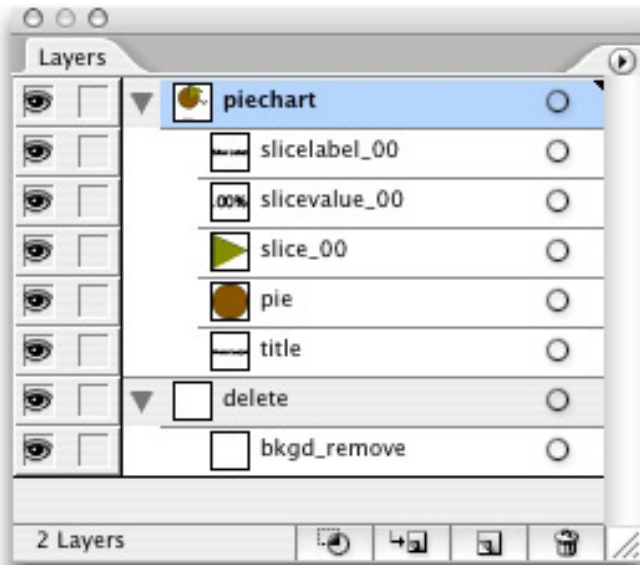
- Using the Character palette, choose a typeface (such as Arial) and typesize (such as 12pt) that can be used for the corresponding text label.



- Using the Text tool from the Tools palette, click to the right of the pie shape and enter "00.00%". This is the slice's precise value label that lets users know the exact value of the visual wedge.
- With the Text tool still selected, click below the label created previously and enter "Slice label". This is the slice's descriptive label that lets users know to which data the wedge correlates.
- With the descriptive label text still selected, use the Transform palette to move it to a new location. Specify an X coordinate of 400 pixels and a Y coordinate of 195 pixels.
- Select the precise value label and again use the Transform palette to move it to a new location. Specify an X coordinate of 400 pixels and a Y coordinate of 210 pixels.

6. Complete the pie slice by changing the names of the sublayers containing the text as follows:

- Descriptive label: "slicelabel\_00"
- Precise value label: "slicevalue\_00"

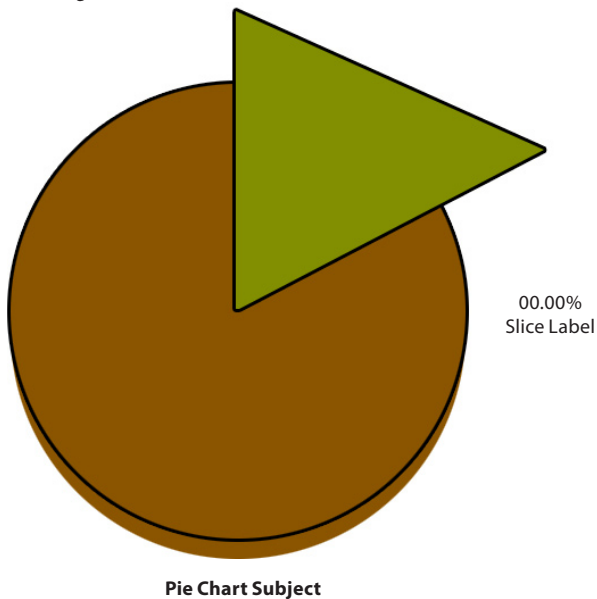


### Adding pie 3D effects

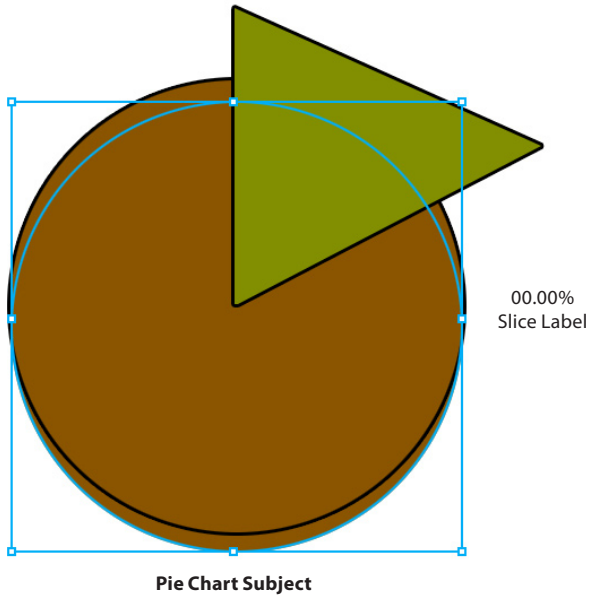
To complete the appearance of a three-dimensional pie, create the background shape of the pie and make a shadow below the pie.

To make the background component you must duplicate the existing pie shape, move it downwards, and then clone it again to stylize its appearance.

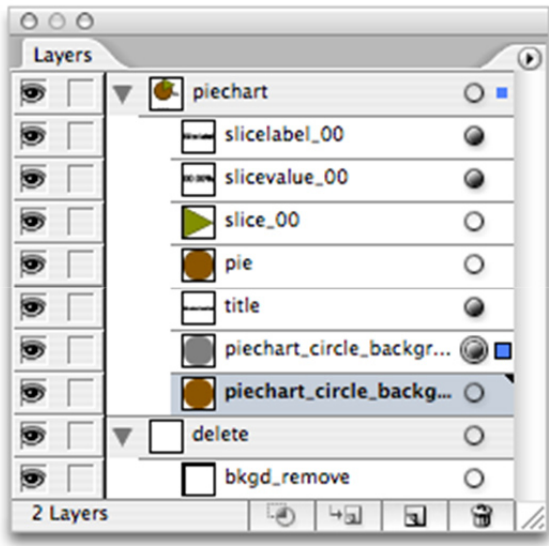
1. Select the main pie shape circle.
2. Choose Edit >> Copy to add the shape to the Clipboard.
3. Choose Edit >> Paste in Back to place an exact replica of the circle behind itself.
4. In the Transform palette, set the new circle's center point to a Y position of 240 pixels, effectively moving the circle down 10 pixels. This gives the artwork the appearance of existing in three dimensions.



5. With the new circle still selected, choose Edit >> Copy again.
6. Choose Edit >> Paste in Front to place an exact copy of the new circle directly in front of itself (but still behind the original circle).
7. Using the Color palette, make the new circle completely black by choosing 0r 0g 0b for both the Fill and Stroke colors.
8. Using the Transparency palette, change the Opacity value to 50%. This makes the background circles appear 50% darker than the original circle and more shadow-like.

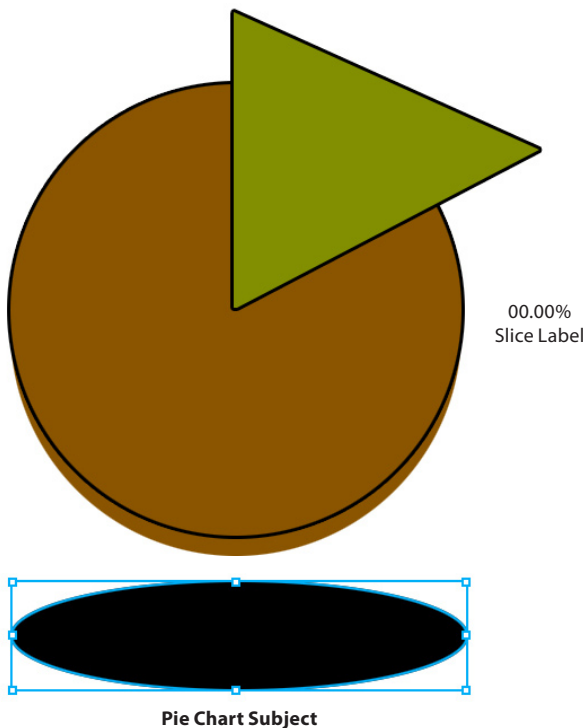


9. Complete the pie's background by changing the names of the sublayers containing the background pieces as follows:
  - 50% translucent circle: "piechart\_circle\_background\_overlay"
  - Background circle: "piechart\_circle\_background"



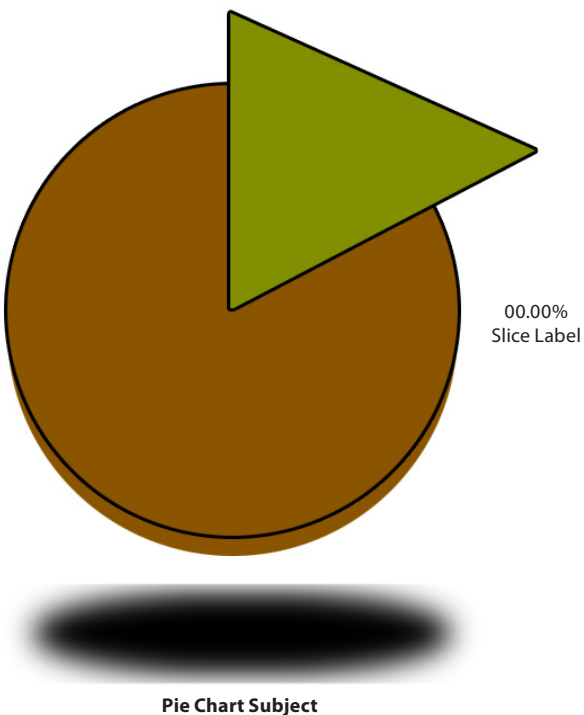
Create the chart's shadow by using Illustrator's ability to add and preview SVG filter effects. SVG allows designers to apply effects as found in Adobe Photoshop® (such as Gaussian blurs or embossing) to their vector graphics while retaining the vector information. As a result, the graphic can be scaled without affecting the filter effects.

10. Hold down the Alt (Windows) or Option (Mac OS) key while clicking on the original pie shape circle and dragging it below itself. This cloned circle will become the pie's shadow.
11. In the Transform palette, set the new circle's height to 40 pixels, and its center point location to an X position of 250 pixels and a Y position of 90 pixels. This places the circle directly below the original.
12. Using the Color palette, make the new ellipse completely black by choosing 0r 0g 0b for both the Fill and Stroke colors.

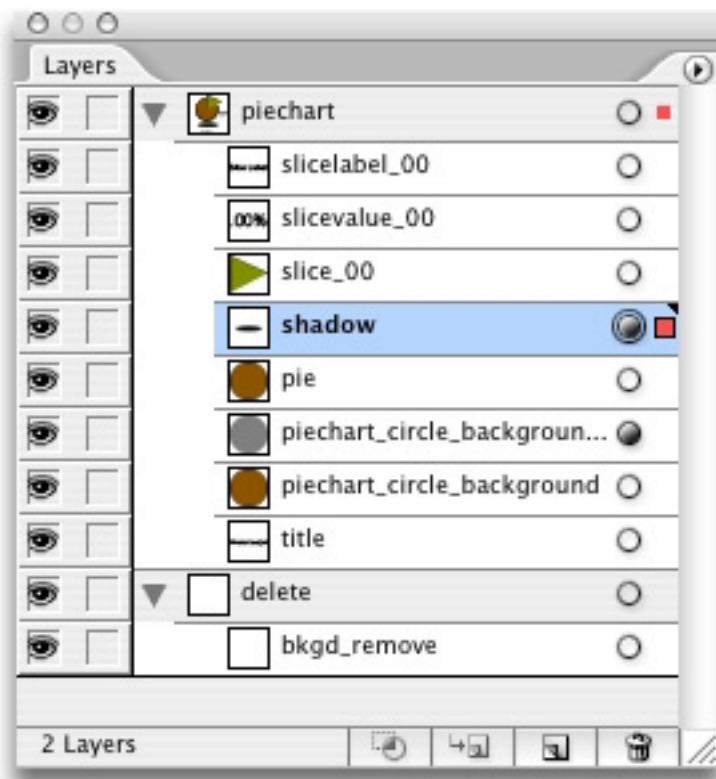


13. Choose Effects >> SVG Filters >> AI\_GaussianBlur\_7 to apply an SVG filter to the ellipse. This filter blurs the edges of your ellipse to create a softer, more shadow-like appearance.

*Note: Illustrator's previewing of the filter's appearance is not exact. Illustrator shows the shadow as being harshly cropped on its top and bottom edges. The SVG graphic will appear differently.*



14. Complete the pie's shadow by changing the name of its sublayer to "shadow"



### Adding a color and style palette

The artwork is now complete enough for you to hand off to a developer. However, you can take one more step to ensure the appearance of any slices that are added later. To do so, duplicate the existing slice, and create smaller examples of it with varying Fill colors. This provides the developer with a palette for future slices. You can then organize these examples in the same "delete" layer as the background box to let the developer know this artwork does not belong in the final file.

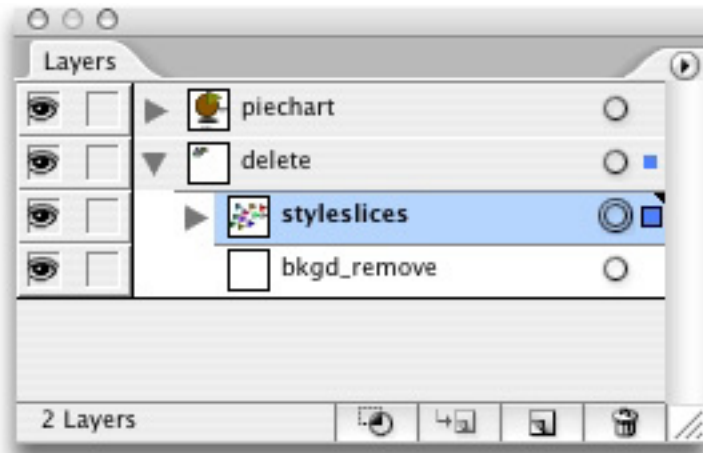
1. Select the chart's slice using the Tool palette's Selection tool.
2. Hold down the Alt (Windows) or Option (Mac OS) key while clicking on this shape and dragging it upwards and to the left. The exact location where you release does not matter because the cloned slice will be deleted later. However, be sure to keep the artwork in the document's Artboard. Otherwise, Illustrator will export the SVG using a document height and width other than what you specified.
3. Double-click on the Scale tool in the Tools palette to open the Scale dialog box. Enter a value of 20% in the Scale field in the Universal section and press the OK button. This reduces the size of the slice to allow you to create several instances of it in the document's Artboard area.
4. With the mini-slice selected, hold down the Alt (Windows) or Option (Mac OS) key while clicking on it and dragging it next to the existing mini-slice. Repeat this step several times until you have as many slices as you want to provide the developer with color palettes.

5. Use the Color palette to choose new fill colors for each of the mini-slices. To assist you, you can use the following sets:

- 0r 153g 0b
- 51r 153g 102b
- 153r 153g 0b
- 0r 153g 204b
- 204r 51g 102b
- 153r 102g 255b
- 0r 51g 204b
- 153r 102g 0b
- 51r 255g 102b
- 204r 0g 0b
- 153r 153g 153b

6. Using the Selection tool, select each of the mini-slices and choose Object >> Group to group the slices together.

7. Rename this new group's layer to "styleslices" and move the layer into the "delete" layer in the Layers palette.



When Illustrator exports its SVG code, it can be set to produce a CSS stylesheet that defines the visual presentation aspects of each object in an area separate from the object itself. Because Illustrator does not name styles according to the object they describe, it is important to make it as easy as possible for the developer to see which objects relate to each other, and thus which style references relate to each other. The proposed system can reduce the amount of work for a developer to match styles to their corresponding objects.

Putting temporary objects in a layer named "delete" has two benefits. First, you help the developer quickly find the referenced artwork when they modify the stylesheet. Second, you help them identify the artwork itself that needs to be removed from the final code.

## Saving your work

Illustrator makes it easy to produce SVG code that a developer can quickly modify to create a dynamic graphic, as follows:

1. Choose File >> Save As... to open the Save As dialog box.
2. Select SVG (.svg) from the Format drop-down menu at the bottom of this box.
3. Enter a filename (such as "SVG-piechart.svg") in the Save As: text field, and press the OK button.

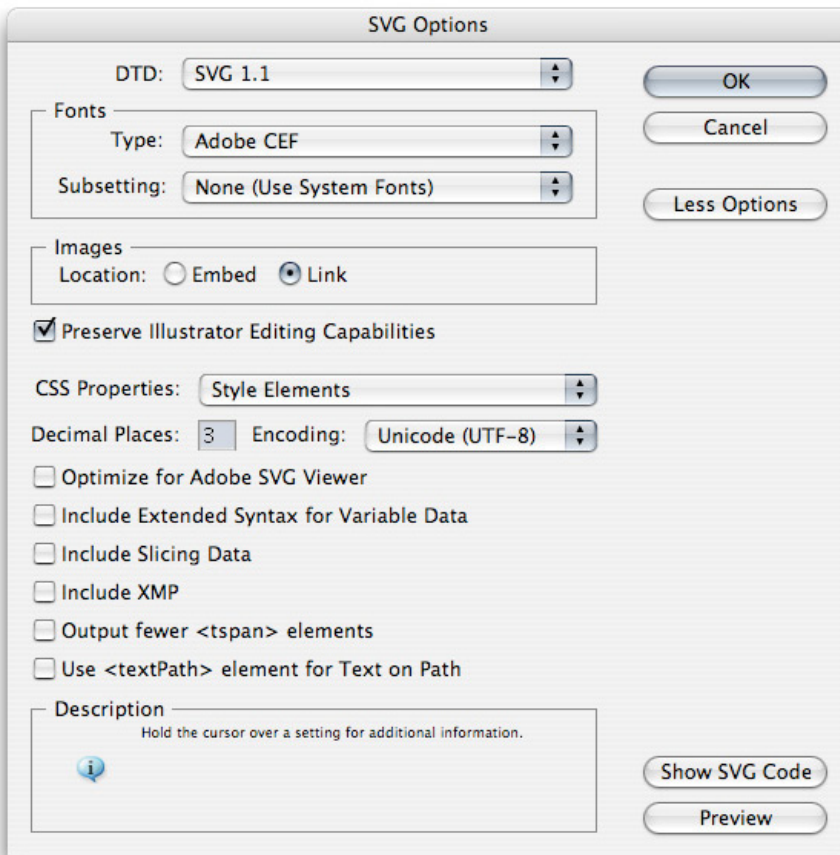
A new SVG Options dialog box appears. You must make important modifications to the settings in this dialog box, as shown the following steps.

4. Keep SVG 1.1 from the DTD drop-down list. The Document Type Definition (DTD) specifies which version of the SVG markup language to use. SVG 1.1 is the latest comprehensive version.
5. Do not change the settings in the Fonts section (Type: Adobe CEF and Subsetting: None (Use System Fonts)). They are preset for graphics that use the end-user's operating system typefaces, such as the SVG pie chart.
6. Do not change the Images setting. You do not have raster images (such as a photograph) in this graphic so the current setting is sufficient.

SVG allows you to embed specific typefaces within the graphic to keep typographic precision as seen in Illustrator. However, the resulting file can become considerably larger. Your need to include fonts depends largely on the type of SVG graphic you are creating. For example, a simple pie chart can be rendered attractively and legibly using a system typeface. However, a graphic that uses your company's specific chosen typefaces would need to include them.


7. Keep the Preserve Illustrator Editing Capabilities checkbox selected if you must later re-open the SVG graphic in Illustrator. This option introduces binary code in the SVG file that allows Illustrator to retain preferences and settings about your working environment.
8. Press the More Options button beneath the OK and Cancel buttons to make one further modification.
9. In the CSS Properties drop-down menu, select Style Elements. This setting saves the visual presentation information (such as fill and stroke colors, stroke weight, text justification and typeface selections) in a separate stylesheet section of the SVG file. This selection is optimal for dynamic-data graphic creation because it allows quick modifications in the code to affect all elements that reference a style in the stylesheet.
10. To simplify the resulting SVG code, leave the remaining selection boxes unchecked, the Decimal Places value set at 3, and the Encoding selection at Unicode (UTF-8). (These options allow you to produce code for other Adobe products.)


The dialog should now appear as follows:



11. Press the OK button to complete the creation of the SVG code.

You can now deliver the resulting SVG graphic to the developer so they can integrate it with dynamic code.

 Consult with the developer about this option. If it is unlikely that you will be re-opening the file in Illustrator, they may ask that you uncheck this option, thus reducing the code they must process.

 A Cascading Style Sheet (CSS) specifies the visual presentation attributes of objects in XML and HTML. Stylesheet information can be applied to SVG objects in several ways and Illustrator allows you to choose between them. This document uses a global stylesheet method. You can also specify Illustrator to place the visual presentation information within each object. This method allows the developer to see how an object is presented without having to trace the object's style association back to the stylesheet. However, this method presents two major disadvantages. First, it makes global changes to the imagery much more difficult. Second, files are generally larger with this method.



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