JavaFX

Oracle JavaFX Creating Visual Effects in JavaFX Release 2.1

E20486-03

October 2012

ORACLE

JavaFX Creating Visual Effects in JavaFX, Release 2.1

E20486-03

Primary Author: Dmitry Kostovarov

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Part I

About This Document

Use visual effects in JavaFX to enhance the look of your Java application.

All effects are located in the `javafx.scene.effect` package and are subclasses of the `Effect` class. For more information about particular classes, methods, or additional features, see the API documentation.

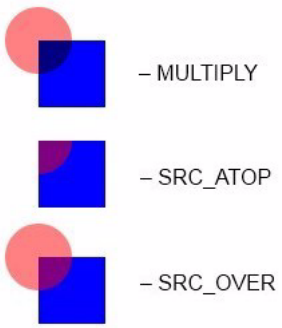
This document describes how to use some of the visual effects available in JavaFX and contains the following topics:

1

Blending Objects

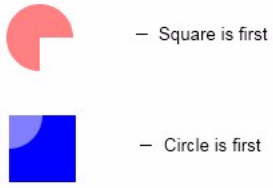
Blend is an effect that combines two objects using one of the predefined blend modes. A blend mode defines the manner in which the objects are mixed together. For example, in Figure 1–1, you can see examples of some blend modes applied to an intersecting circle and a square.

Figure 1–1 Different Blend Modes



Note that the produced effect also depends on the order of the elements in the code. For example, Figure 1–2 shows the difference that appears when the blend mode is applied to objects specified in the code in a different order.

Figure 1–2 Same Blend Mode Applied to Objects in Different Order



Example 1–1 shows a code snippet for the blend effect in the sample application.

Example 1–1 Blend Effect

```
static Node blendMode() {
    Rectangle r = new Rectangle();
    r.setX(590);
    r.setY(50);
```

```
r.setWidth(50);
r.setHeight(50);
r.setFill(Color.BLUE);

Circle c = new Circle();
c.setFill(Color.rgb(255, 0, 0, 0.5f));
c.setCenterX(590);
c.setCenterY(50);
c.setRadius(25);

Group g = new Group();
g.setBlendMode(BlendMode.MULTIPLY);
g.getChildren().add(r);
g.getChildren().add(c);
return g;
```

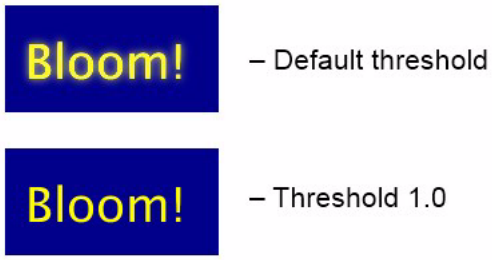
2

Using the Bloom Effect

The bloom effect makes brighter portions an image appear to glow, based on a configurable threshold. The threshold varies from 0.0 to 1.0. By default, the threshold is set to 0.3.

Figure 2–1 shows the bloom effect at the default threshold and at a threshold of 1.0.

Figure 2–1 Bloom Effect



Example 2–1 shows a code snippet from the sample application that is using the bloom effect.

Example 2–1 Bloom Example

```
static Node bloom() {
    Group g = new Group();

    Rectangle r = new Rectangle();
    r.setX(10);
    r.setY(10);
    r.setWidth(160);
    r.setHeight(80);
    r.setFill(Color.DARKBLUE);

    Text t = new Text();
    t.setText("Bloom!");
    t.setFill(Color.YELLOW);
    t.setFont(Font.font("null", FontWeight.BOLD, 36));
    t.setX(25);
    t.setY(65);

    g.setCache(true);
    //g.setEffect(new Bloom());
    Bloom bloom = new Bloom();
    bloom.setThreshold(1.0);
    g.setEffect(bloom);
    g.getChildren().add(r);
```

```
    g.getChildren().add(t);
    g.setTranslateX(350);
    return g;
}
```

3

Applying Blur Effects

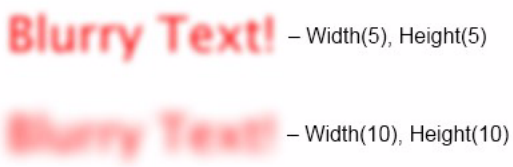
Blurring are common effects that can be used to provide more focus to selected objects. With JavaFX you can apply a boxblur, a motion blur, or a gaussian blur.

3.1 BoxBlur

The BoxBlur is a blur effect that uses a simple box filter kernel, with separately configurable sizes in both dimensions that control the amount of blur applied to an object, and an `Iterations` parameter that controls the quality of the resulting blur.

Figure 3–1 shows two samples of blurred text.

Figure 3–1 BoxBlur Effect



Example 3–1 is a code snippet that uses the BoxBlur effect.

Example 3–1 BoxBlur Example

```
static Node boxBlur() {
    Text t = new Text();
    t.setText("Blurry Text!");
    t.setFill(Color.RED);
    t.setFont(Font.font("null", FontWeight.BOLD, 36));
    t.setX(10);
    t.setY(40);

    BoxBlur bb = new BoxBlur();
    bb.setWidth(5);
    bb.setHeight(5);
    bb.setIterations(3);

    t.setEffect(bb);
    t.setTranslateX(300);
    t.setTranslateY(100);

    return t;
}
```

3.2 Motion Blur

A motion blur effect uses a Gaussian blur, with a configurable radius and angle to create the effect of a moving object.

Figure 3–2 shows the effect of the motion blur on a text.

Figure 3–2 Motion Blur Effect

This illustration shows "Motion Blur" text blurred to create a moving object effect.

****

Example 3–2 shows a code snippet that creates a motion blur effect with radius set to 15 and angle set to 45 in the sample application.

Example 3–2 Motion Blur Example

```
static Node motionBlur() {
    Text t = new Text();
    t.setX(20.0f);
    t.setY(80.0f);
    t.setText("Motion Blur");
    t.setFill(Color.RED);
    t.setFont(Font.font("null", FontWeight.BOLD, 60));

    MotionBlur mb = new MotionBlur();
    mb.setRadius(15.0f);
    mb.setAngle(45.0f);

    t.setEffect(mb);

    t.setTranslateX(300);
    t.setTranslateY(150);

    return t;
}
```

3.3 Gaussian Blur

The Gaussian blur is an effect that uses a Gaussian algorithm with a configurable radius to blur objects.

Figure 3–3 shows the effect of the Gaussian blur on a text.

Figure 3–3 Gaussian Blur

Example 3–3 shows a code snippet that blurs the text using Gaussian blur effect.

Example 3–3 Gaussian Blur

```
static Node gaussianBlur() {
    Text t2 = new Text();
    t2.setX(10.0f);
    t2.setY(140.0f);
    t2.setCache(true);
    t2.setText("Gaussian Blur");
    t2.setFill(Color.RED);
    t2.setFont(Font.font("null", FontWeight.BOLD, 36));
    t2.setEffect(new GaussianBlur());
    return t2;
}
```

4

Creating a Drop Shadow

A drop shadow is an effect that renders a shadow of the content to which it is applied. You can specify the color, the radius, the offset, and some other parameters of the shadow.

Figure 4–1 shows the shadow effect on different objects.

Figure 4–1 Drop Shadow Example

The illustration shows two examples of the drop shadow effect. The first example is a text "JavaFX drop shadow effect" with a gray shadow, which is offset by 3 pixels in both horizontal and vertical directions. The second example is a red circle with gray shadow, which is offset by 4 pixels in both horizontal and vertical directions.

****

Example 4–1 shows how to create a drop shadow on text and a circle.

Example 4–1 Text and Circle With Shadows

```
import javafx.collections.ObservableList;
import javafx.application.Application;
import javafx.scene.*;
import javafx.stage.*;
import javafx.scene.shape.*;
import javafx.scene.effect.*;
import javafx.scene.paint.*;
import javafx.scene.text.*;

public class HelloEffects extends Application {

    Stage stage;
    Scene scene;

    @Override public void start(Stage stage) {
        stage.show();

        scene = new Scene(new Group(), 840, 680);
        ObservableList<Node> content = ((Group)scene.getRoot()).getChildren();
```

```
        content.add(dropShadow());
        stage.setScene(scene);
    }
static Node dropShadow() {
        Group g = new Group();

        DropShadow ds = new DropShadow();
        ds.setOffsetY(3.0);
        ds.setOffsetX(3.0);
        ds.setColor(Color.GRAY);

        Text t = new Text();
        t.setEffect(ds);
        t.setCache(true);
        t.setX(20.0f);
        t.setY(70.0f);
        t.setFill(Color.RED);
        t.setText("JavaFX drop shadow effect");
        t.setFont(Font.font("null", FontWeight.BOLD, 32));

        DropShadow ds1 = new DropShadow();
        ds1.setOffsetY(4.0f);
        ds1.setOffsetX(4.0f);
        ds1.setColor(Color.CORAL);

        Circle c = new Circle();
        c.setEffect(ds1);
        c.setCenterX(50.0f);
        c.setCenterY(325.0f);
        c.setRadius(30.0f);
        c.setFill(Color.RED);
        c.setCache(true);

        g.getChildren().add(t);
        g.getChildren().add(c);
        return g;
    }
    public static void main(String[] args) {
        Application.launch(args);
    }
}
```

Tip:

- Making the drop shadow too wide gives the element the look of heaviness. The color of the shadow should be realistic, usually a few shades lighter than the background color.
- If you have multiple objects with drop shadows, orient the drop shadow the same for all of the objects. A drop shadow gives the appearance of a light coming from one direction and casting a shadow on objects.

5

Creating an Inner Shadow

An inner shadow is an effect that renders a shadow inside the edges of the given content with the specified color, radius, and offset.

Figure 5–1 shows plain text and the same text with the inner shadow effect applied.

Figure 5–1 Inner Shadow

Example 5–1 shows how to create an inner shadow on text.

Example 5–1 Inner Shadow

```
static Node innerShadow() {
        InnerShadow is = new InnerShadow();
        is.setOffsetX(2.0f);
        is.setOffsetY(2.0f);

        Text t = new Text();
        t.setEffect(is);
        t.setX(20);
        t.setY(100);
        t.setText("Inner Shadow");
        t.setFill(Color.RED);
        t.setFont(Font.font("null", FontWeight.BOLD, 80));

        t.setTranslateX(300);
        t.setTranslateY(300);

        return t;
    }
```

6

Adding a Reflection

Reflection is an effect that renders a reflected version of the object below the actual object.

> **Note:** The reflection of a node with a reflection effect will not respond to mouse events or the containment methods on the node.

Figure 6–1 shows a reflection applied to text. Use the `setFraction` method to specify the amount of visible reflection.

Figure 6–1 Reflection Effect

Example 6–1 shows how to create the reflection effect on text.

Example 6–1 Text With Reflection

```
import javafx.scene.text.*;
import javafx.scene.paint.*;
import javafx.scene.effect.*;
public class HelloEffects extends Application {

    Stage stage;
    Scene scene;

    @Override public void start(Stage stage) {
        stage.show();

        scene = new Scene(new Group(), 840, 680);
        ObservableList<Node> content = ((Group)scene.getRoot()).getChildren();
        content.add(reflection());
        stage.setScene(scene);
    }
    static Node reflection() {
        Text t = new Text();
        t.setX(10.0f);
        t.setY(50.0f);
        t.setCache(true);
        t.setText("Reflection in JavaFX...");
        t.setFill(Color.RED);
        t.setFont(Font.font("null", FontWeight.BOLD, 30));
```

```
        Reflection r = new Reflection();
        r.setFraction(0.9);

        t.setEffect(r);

        t.setTranslateY(400);
        return t;
    }
    public static void main(String[] args) {
        Application.launch(args);
    }
}
```

7

Adding a Lighting Effect

The lighting effect simulates a light source shining on the given content, which can be used to give flat objects a more realistic three-dimensional appearance.

Figure 7–1 shows the lighting effect on text.

Figure 7–1 Lighting Effect

Example 7–1 shows how to create a lighting effect on text.

Example 7–1 Text with Applied Lighting Effect

```
import javafx.application.Application;
import javafx.collections.ObservableList;
import javafx.geometry.VPos;
import javafx.scene.effect.Light.Distant;
import javafx.scene.*;
import javafx.stage.*;
import javafx.scene.shape.*;
import javafx.scene.effect.*;
import javafx.scene.paint.*;
import javafx.scene.text.*;

public class HelloEffects extends Application {
    Stage stage;
    Scene scene;

    @Override public void start(Stage stage) {
        stage.show();

        scene = new Scene(new Group());
        ObservableList<Node> content = ((Group)scene.getRoot()).getChildren();

        content.add(lighting());
        stage.setScene(scene);
    }
    static Node lighting() {
        Distant light = new Distant();
```

```
        light.setAzimuth(-135.0f);

        Lighting l = new Lighting();
        l.setLight(light);
        l.setSurfaceScale(5.0f);

        Text t = new Text();
        t.setText("JavaFX"+"\n"+"Lighting!");
        t.setFill(Color.RED);
        t.setFont(Font.font("null", FontWeight.BOLD, 70));
        t.setX(10.0f);
        t.setY(10.0f);
        t.setTextOrigin(VPos.TOP);

        t.setEffect(l);

        t.setTranslateX(0);
        t.setTranslateY(320);

        return t;
    }
    public static void main(String[] args) {
        Application.launch(args);
    }
}
```

8

Adding a Perspective

The perspective effect creates a three-dimensional effect of otherwise two-dimensional object.

Figure 8–1 shows the perspective effect.

Figure 8–1 Perspective Effect

A perspective transformation can map any square to another square, while preserving the straightness of the lines. Unlike affine transformations, the parallelism of lines in the source is not necessarily preserved in the output.

> **Note:** This effect does not adjust the coordinates of input events or any methods that measure containment on a node. Mouse clicking and the containment methods are undefined if a perspective effect is applied to a node.

Example 8–1 is a code snippet from the sample application that shows how to create a perspective effect.

Example 8–1 Perspective Effect

```
static Node perspective() {
    Group g = new Group();
    PerspectiveTransform pt = new PerspectiveTransform();
    pt.setUlx(10.0f);
    pt.setUly(10.0f);
    pt.setUrx(210.0f);
    pt.setUry(40.0f);
    pt.setLrx(210.0f);
    pt.setLry(60.0f);
    pt.setLlx(10.0f);
    pt.setLly(90.0f);

    g.setEffect(pt);
    g.setCache(true);

    Rectangle r = new Rectangle();
    r.setX(10.0f);
    r.setY(10.0f);
```

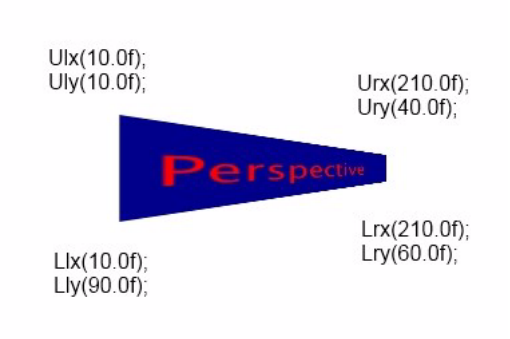
```
        r.setWidth(280.0f);
        r.setHeight(80.0f);
        r.setFill(Color.DARKBLUE);

        Text t = new Text();
        t.setX(20.0f);
        t.setY(65.0f);
        t.setText("Perspective");
        t.setFill(Color.RED);
        t.setFont(Font.font("null", FontWeight.BOLD, 36));

        g.getChildren().add(r);
        g.getChildren().add(t);
        return g;
    }
```

Figure 8–2 shows which coordinates affect the resulting image.

Figure 8–2 Coordinates for Perspective Effect



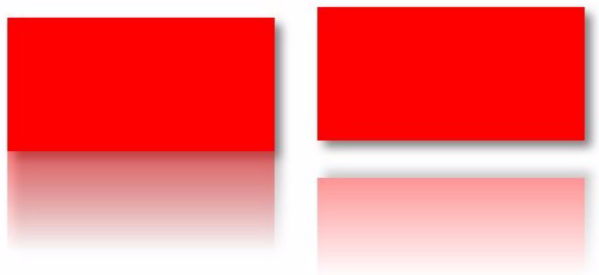
9

Creating a Chain of Effects

Some of the effects have an input property that you can use to create a chain of effects. The chain of effects can be a tree-like structure, because some effects have two inputs and some do not have any.

In Figure 9–1 the reflection effect is used as an input for the drop shadow effect, which means that first the rectangle is reflected by the reflection effect and then the drop shadow effect is applied to the result.

Figure 9–1 Shadow and Reflection



Example 9–1 Rectangle with a Shadow and Reflection Sequentially Applied

```
import javafx.application.Application;
import javafx.collections.ObservableList;
import javafx.scene.*;
import javafx.stage.*;
import javafx.scene.shape.*;
import javafx.scene.effect.*;
import javafx.scene.paint.*;
import javafx.scene.text.*;

public class HelloEffects extends Application {

    Stage stage;
    Scene scene;

    @Override public void start(Stage stage) {
        stage.show();

        scene = new Scene(new Group());
        ObservableList<Node> content = ((Group)scene.getRoot()).getChildren();

        content.add(chainEffects());
        stage.setScene(scene);
```

```
    }
    static Node chainEffects() {

        Rectangle rect = new Rectangle();
        rect.setFill(Color.RED);
        rect.setWidth(200);
        rect.setHeight(100);
        rect.setX(20.0f);
        rect.setY(20.0f);

        DropShadow ds = new DropShadow();
        ds.setOffsetY(5.0);
        ds.setOffsetX(5.0);
        ds.setColor(Color.GRAY);


        Reflection reflection = new Reflection();

        ds.setInput(reflection);
        rect.setEffect(ds);

        return rect;
    }
    public static void main(String[] args) {
        Application.launch(args);
    }
}
```

Note: If you change the last two lines in the `static Node chainEffects()` to `reflection.setInput(ds);` and `rect.setEffect(reflection);`, first the drop shadow will be applied to the rectangle, and then the result will be reflected by the reflection effect.

For more information about particular classes, methods, or additional features, see the API documentation.