13.8 JavaFX 9: Java SE 9 JavaFX Updates

This section overviews several JavaFX 9 changes and enhancements.

Java SE 9 Modularization

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Java SE 9's biggest new software-engineering feature is the module system. This applies to JavaFX 9 as well. The key JavaFX 9 modules are:

- `javafx.base`—Contains the packages required by all JavaFX 9 apps. All the other JavaFX 9 modules depend on this one.

- `javafx.controls`—Contains the packages for controls, layouts and charts, including the various controls we demonstrated in this chapter and Chapter 12.

- `javafx.fxml`—Contains the packages for working with FXML, including the FXML features we demonstrated in this chapter and Chapter 12.

- `javafx.graphics`—Contains the packages for working with graphics, animation, CSS (for styling nodes), text and more (Chapter 22, JavaFX Graphics and Multimedia).

- `javafx.media`—Contains the packages for incorporating audio and video (Chapter 22, JavaFX Graphics and Multimedia).

- `javafx.swing`—Contains the packages for integrating into JavaFX 9 apps Swing GUI components (Chapter 26, Swing GUI Components: Part 1, and Chapter 35, Swing GUI Components: Part 2).

- `javafx.web`—Contains the package for integrating web content.

In your apps, if you use modularization and JDK 9, only the modules required by your app will be loaded at runtime. Otherwise, your app will continue to work as it did previously, provided that you did not use so-called internal APIs—that is, undocumented Java APIs that are not meant for public use. In the modularized JDK 9, such APIs are automatically *private* and inaccessible to your apps—any code that depends on pre-Java-SE-9 internal APIs will not compile. We discuss modularization in more detail in our online Java SE 9 treatment. See the Preface for details.

New Public Skinning APIs

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In Chapter 22, JavaFX Graphics and Multimedia, we demonstrate how to format JavaFX objects using a technology called *Cascading Style Sheets (CSS)* that was originally developed for styling the elements in web pages. As you'll see, CSS allows you to specify *presentation* (e.g., fonts, spacing, sizes, colors, positioning) separately from the GUI's *structure* and *content* (layout containers, shapes, text, GUI components, etc.). If a JavaFX GUI's presentation is determined entirely by a style sheet (which specifies the rules for styling the GUI), you can simply swap in a new style sheet

—sometimes called a **skin**—to change the GUI's appearance. This is commonly called **skinning**.

Each JavaFX control also has a skin class that determines its default appearance. In JavaFX 8, skin classes are defined as internal APIs, but many developers create custom skins by extending these skin classes. In JavaFX 9, the skin classes are now public APIs in the package `javafx.scene.control.skin`. You can extend the appropriate skin class to customize the look-and-feel for a given type of control. You then create an object of your custom skin class and set it for a control via its `setSkin` method.

GTK+ 3 Support on Linux

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GTK+ (GIMP Toolkit—`http://gtk.org`) is a GUI toolkit that JavaFX uses behind the scenes to render GUIs and graphics on Linux. In Java SE 9, JavaFX now supports GTK+ 3—the latest version of GTK+.

High-DPI Screen Support

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In a Java SE 8 update, JavaFX added support for High DPI

(dots-per-inch) screens on Windows and macOS. Java SE 9 adds Linux High-DPI support, as well as capabilities to programmatically manipulate the scale at which JavaFX apps are rendered on Windows, macOS and Linux.

Updated GStreamer

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JavaFX implements its audio and video multimedia capabilities using the open-source GStreamer framework (`https://gstreamer.freedesktop.org`). JavaFX 9 incorporates a more recent version of GStreamer with various bug fixes and performance enhancements.

Updated WebKit

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JavaFX's `WebView` control enables you to embed web content in your JavaFX apps. `WebView` is based on the open source WebKit framework (`http://www.webkit.org`)— a web browser engine that supports loading and rendering web pages. JavaFX 9 incorporates an updated version of WebKit.