JavaFX

JavaFX is a software platform for creating and delivering desktop applications, as well as rich internet applications (RIAs) that can run across a wide variety of devices. JavaFX is intended to replace Swing as the standard GUI library for Java SE, but both will be included for the foreseeable future.[3] JavaFX has support for desktop computers and web browsers on Microsoft Windows, Linux, and Mac OS X.

Before version 2.0 of JavaFX, developers used a statically typed, declarative language called JavaFX Script to build JavaFX applications. Because JavaFX Script was compiled to Java bytecode, programmers could also use Java code instead. JavaFX applications could run on any desktop that could run Java SE, on any browser that could run Java EE, or on any mobile phone that could run Java ME.

JavaFX 2.0 and later is implemented as a native Java library, and applications using JavaFX are written in native Java code. JavaFX Script has been scrapped by Oracle, but development is being continued in the Visage project.[4] JavaFX 2.x does not support the Solaris operating system or mobile phones; however, as Oracle plans to integrate JavaFX to Java SE embedded 8, Java FX for ARM processors is in developer preview phase.[5]

On desktops, JavaFX supports Windows XP, Windows Vista, Windows 7, Windows 8, Mac OS X and Linux operating systems.[6] Beginning with JavaFX 1.2, Oracle has released beta versions for OpenSolaris.[7] On mobile, JavaFX Mobile 1.x is capable of running on multiple mobile operating systems, including Symbian OS, Windows Mobile, and proprietary real-time operating systems.

1 Technical highlights

Common profile JavaFX 1.1 was based on the concept of a "common profile" that is intended to span across all devices supported by JavaFX. This approach makes it possible for developers to use a common programming model while building an application targeted for both desktop and mobile devices and to share much of the code, graphics assets and content between desktop and mobile versions.

To address the need for tuning applications on a specific class of devices, the JavaFX 1.1 platform includes APIs that are desktop or mobile-specific. For example JavaFX Desktop profile includes Swing and advanced visual effects.

Drag-to-Install From the point of view of the end user "Drag-to-Install" allows them to drag a JavaFX widget (or application residing in a website and is visible within the browser window) and drop it onto their desktop. The application will not lose its state or context even after the browser is closed. An application can also be re-launched by clicking on a shortcut that gets created automatically on the user's desktop.

This behavior is enabled out-of-the-box by the Java applet mechanism since Java 6 update 10 and is leveraged by JavaFX from the underlying Java layer.

Sun touts "Drag-to-Install" as opening up of a new distribution model and allowing developers to "break away from the browser".

Integrating graphics created with third-party tools JavaFX 1.x included a set of plug-ins for Adobe Photoshop and Illustrator that enable advanced graphics to be integrated directly into JavaFX applications. The plug-ins generate JavaFX Script code that preserves layers and structure of the graphics. Developers can then easily add animation or effects to the static graphics imported.

There was also an SVG graphics converter tool (a.k.a. Media Factory) that allows for importing graphics and previewing assets after the conversion to JavaFX format.

2 Design highlights

Sun Microsystems licensed a custom typeface called Amble for use on JavaFX powered devices. The font family was designed by mobile user interface design specialists Punchcut and is available as part of the JavaFX SDK 1.3 Release.

3 JavaFX platform components

JavaFX 2.x platform includes the following components:

1. The JavaFX SDK: runtime tools. Graphics, media web services, and rich text libraries. Java FX 1.x also included JavaFX compiler, which is now obsolete as JavaFX user code is written in Java.

2. NetBeans IDE for JavaFX: NetBeans with drag-and-drop palette to add objects with transformations, effects and animations plus a set of samples and best practices. For JavaFX 2 support you need at least NetBeans 7.1.1 . For Eclipse users there is a community-supported plugin hosted on Project Kenai.

3. Java FX scene builder: This was introduced for Java FX 2.1 and later. A user interface (UI) is created by dragging and dropping controls from a palette. This information is saved as an FXML file, a special XML format.

4. Tools and plugins for creative tools (a.k.a. Production Suite): Plugins for Adobe Photoshop and Adobe Illustrator that can export graphics assets to JavaFX Script code, tools to convert SVG graphics into JavaFX Script code and preview assets converted to JavaFX from other tools (currently not supported in JavaFX 2.x versions)

4 JavaFX Mobile

JavaFX Mobile was the implementation of the JavaFX platform for rich Internet applications aimed at mobile devices. JavaFX Mobile 1.x applications can be developed in the same language, JavaFX Script, as JavaFX 1.x applications for browser or desktop, and using the same tools: JavaFX SDK and the JavaFX Production Suite. This concept makes it possible to share code-base and graphics assets for desktop and mobile applications. Through integration with Java ME, the JavaFX applications have access to capabilities of the underlying handset, such as the filesystem, camera, GPS, bluetooth or accelerometer.

An independent application platform built on Java, JavaFX Mobile is capable of running on multiple mobile operating systems, including Android, Windows Mobile, and proprietary real-time operating systems.

JavaFX Mobile was publicly available as part of the JavaFX 1.1 release announced by Sun Microsystems on February 12, 2009.

Sun planned to enable out-of-the-box support of JavaFX on the devices by working with handset manufacturers and mobile operators to preload the JavaFX Mobile runtime on the handsets. JavaFX Mobile running on an Android was demonstrated at JavaOne 2008 and selected partnerships (incl. LG Electronics, Sony Ericsson) were announced at the JavaFX Mobile launch in February, 2009.

5 History

JavaFX Script, the scripting component of JavaFX, began life as a project by Chris Oliver called F3.[8]

Sun Microsystems first announced JavaFX at the JavaOne Worldwide Java Developer conference on May 2007.

In May 2008 Sun Microsystems announced plans to deliver JavaFX for the browser and desktop by the third quarter of 2008, and JavaFX for mobile devices in the second quarter of 2009. Sun also announced a multi-year agreement with On2 Technologies to bring comprehensive video capabilities to the JavaFX product family using the company's TrueMotion Video codec. Since end of July 2008, developers could download a preview of the JavaFX SDK for Windows and Macintosh, as well as the JavaFX plugin for NetBeans 6.1.

Major releases since JavaFX 1.1 have a release name based on a street or neighborhood in San Francisco. Update releases typically do not have a release name.[9]

5.1 JavaFX 1.0

On December 4, 2008 Sun released JavaFX 1.0.2

5.2 JavaFX 1.1

JavaFX for mobile development was finally made available as part of the JavaFX 1.1 release (named Franca[9]) announced officially on February 12, 2009.

5.3 JavaFX 1.2

JavaFX 1.2 (named Marina[9]) was released at JavaOne on June 2, 2009. This release introduced:[10]

- Beta support for Linux and Solaris,
- Built-in controls and layouts,
- Skinnable CSS controls,
- Built-in chart widgets,
- JavaFX I/O management, masking differences between desktop and mobile devices,
- Speed improvements.
- Windows Mobile Runtime with Sun Java Wireless Client.

5.4 JavaFX 1.3

JavaFX 1.3 (named Soma[9]) was released on April 22, 2010. This release introduced:[11]

- Performance improvements
- Support of additional platforms
- Improved support for user interface controls

5.5 JavaFX 1.3.1

This version was released on August 21, 2010. This release introduced:

- Quick startup time of JavaFX application.
- Custom progress bar for application startup.

5.6 JavaFX 2.0

This version (named Presidio[9]) was released on October 10, 2011. This release introduced:

- A new set of Java APIs opening JavaFX capabilities to all Java developers, without the need for them to learn a new scripting language. Java FX Script support was dropped permanently.
- Support for high performance lazy binding, binding expressions, bound sequence expressions, and partial bind re-evaluation.
- Dropping support for JavaFX Mobile.
- Oracle announcing its intent to open source JavaFX.
- JavaFX runtime turning to be platform specific, utilizing system capabilities, as video codec available on the system ; instead of implementing only one crossplatform runtime as with JavaFX 1.x .

Various improvements have been made within the JavaFX libraries for multithreading. The Task APIs have been updated to support much more concise threading capabilities (i.e. the JavaTaskBase class is no longer necessary since all the APIs are in Java, and the requirement to have a callback interface and Java implementation class are no longer necessary). In addition, the scene graph has been designed to allow scenes to be constructed on background threads and then attached to "live" scenes in a threadsafe manner.

On May 26, 2011, Oracle released the JavaFX 2.0 Beta. The beta release was only made available for 32 and 64 bit versions of Microsoft Windows XP, Windows Vista and Windows 7. An Early Access version for Mac OS X was also available for members of the JavaFX Partner Program at the time, while Linux support was planned for a future release of JavaFX. JavaFX 2.0 was released with only Windows support. Mac OS X support was added with JavaFX 2.1. Linux Support was added with JavaFX 2.2 .

JavaFX 2.0 makes use of a new declarative XML language called FXML.[12][13]

5.7 JavaFX 2.1

On April 27, 2012, Oracle released version 2.1 of JavaFX,[14] which includes the following main features:[15]

- First official version for Mac OS X (desktop only)
- H.264/MPEG-4 AVC and Advanced Audio Coding support
- CoolType text
- UI enhancements including combo box controls, charts (stacked chart), and menu bars
- Webview component now allows JavaScript to make calls to Java methods

5.8 JavaFX 2.2

On August 14, 2012, Oracle released version 2.2 of JavaFX,[16] which includes the following main features:[17]

- Linux support (including plugin and webstart)
- Canvas
- New controls: Color Picker, Pagination
- HTTP Live Streaming support
- Touch events and gestures
- Image manipulation API
- Native Packaging

JavaFX 2.2 adds new packaging option called Native Packaging, allowing packaging of an application as a "native bundle". This gives users a way to install and run an application without any external dependencies on a system JRE or FX SDK.

As of Oracle Java SE 7 update 6 and Java FX 2.2, JavaFX is bundled to be installed with Oracle Java SE platform.[18]

5.9 JavaFX 8

JavaFX is now part of the JRE/JDK for Java 8 and has the same numbering, i.e., JavaFX 8.[19]

JavaFX 8 adds several new features, including:[20]

- Support for 3D graphics[21][22]
- Sensor Support
- Printing and rich text support

5.10 JavaFX 9

JavaFX 9 features are included in Java SE started in March 2015 release.

- Generic dialog templates via inclusion of ControlsFX to replace JOptionPane as of JavaFX 8u40. [23]

5.11 Future work

Oracle also announced in November 2012 the open sourcing of **Decora**, a DSL Shader language for JavaFX allowing to generate Shaders for OpenGL and Direct3D.[24]

6 Platforms

As of March 2014 JavaFX is deployed on Windows, Mac OS X, and Desktop Linux.[25] Oracle has an internal port of JavaFX on iOS and Android Linux.[26][27] Support for ARM is available starting with JavaFX 8[1] On February 11, 2013, Richard Bair, chief architect of the Client Java Platform at Oracle, announced that Oracle would open source the iOS and Android implementations of its JavaFX platform in the next two months.[28][29] Starting with version 8u33 of JDK for ARM, JavaFX support has been removed.[30] Support will continue for x86-based architectures.[31]

7 License

There are various licenses for the modules that compose the JavaFX runtime:

- Parts of the core JavaFX runtime are still proprietary software and its code has not yet been released to the public,[32]
- The JavaFX compiler[33] and an older version of the 2D Scene graph[34] are released under a GPL v2 license,
- The NetBeans plugin for JavaFX is dual licensed under GPL v2 and CDDL.[32]

During development, Sun explained they will roll out their strategy for the JavaFX licensing model for JavaFX first release.[35] After the release, Jeet Kaul, Sun's Vice president for Client Software, explained that they will soon publish a specification for JavaFX and its associated file formats, and will continue to open source the JavaFX runtime, and decouple this core from the proprietary parts licensed by external parties.[36]

At JavaOne 2011, Oracle Corporation announced that JavaFX 2.0 would become open source.[37] Since December 2011, Oracle began to open source the JavaFX code under the GPL+linking exception.[2][38]

In December 2012, new portions of the JavaFX source code have been Open-Sourced by Oracle:[39]

- the animations and timelines classes
- the event delivery mechanism and other various core classes
- the render tree interface, and the implementation of this interface
- the geometry and shapes implementation
- the java part of the rendering engine used in the rendering pipeline
- the logging support

8 See also

- JavaFX Script
- Curl (programming language), a declarative programming language for web applications
- JavaScript

9 Related platforms and tools

- Granite data services: an event-driven, cross-framework, application client container that aims at simplifying JavaFX data-intensive application development.

10 References

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12 External links

- Official website
- OpenJFX website
- Ellison at JavaOne: Myths About JavaFX, Android, and J2ME
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