



Apache Pivot

Presentation to JUG Torino, 2010-05-28

By Sandro Martini



What is

- Apache Pivot is an open-source platform for building rich internet applications (RIA) in Java or any JVM-compatible language
- Pivot applications are written using a combination of Java and XML and can be run either as an applet or as a standalone (optionally offline) desktop application
- Released under the Apache 2.0 License



History

- Pivot began as an R&D effort in the Web UI group at VMware in 2007, and was released as an open-source project in June, 2008 under the Apache 2.0 license
- Pivot joined the Apache Incubator in January, 2009 and graduated as a top-level Apache project in December, 2009 with the 1.4 release
- The 1.5 release (June 2010) is a further step in maturity, stability, and richness of features



apachepivot

Why – Part 1

- It's an Apache Top Level Project
- Apache License, so no vendor lock-in
- Deliver to users Data-Centric Applications more interactive than Browser-only web sites
- Run in the JVM of the Client (JRE 6 or upper required): inside a Browser or outside as a Standalone Application
- Secure: access to local res. only with signed jars
- Reuse of Java knowledge and tools: Pivot Applets/Applications can be written in Java or any JVM language (Groovy, Scala, JavaScript, or other)
- Native support to I18N (UTF-8 resources etc)



apache**pivot**

Why – Part 2

- Other major RIA Platforms (Adobe Flex, Microsoft Silverlight, JavaFX) aren't fully open-source, and aren't based on the Java language
- Many Data-bound Components provided (see Demo), and data binding via annotations
- Same codebase for applets and applications
- Based on MVC, with GUI definition using XML files called WTKX (or otherwise in Java Code)
- GUI partitioning splitting WTKX files and resources
- Asynchronous operations handled by Pivot (for example Web Query for retrieving data), in standard formats like JSON, and by default in a REST way



Why – Part 3

- Support for visual effects and transitions (for example animations)
- Skinnability of Components, writing additional skins
- Customization of the default skin (Terra) by changing colors, and other parameters
- Scalable (zoom in/out) Interfaces
- Layout using different types of Containers
- Many Serializers to handle different serialization formats
- Interaction with Page DOM for Applets
- No GUI Editor (at the moment)



Why – Part 4

- Self-contained (no external dependencies)
- Extensions:
Charting available using the Pivot-JFree provider (Apache License), for using JfreeChart
- Support for Maven-based projects, for better integration in complex Java Enterprise Projects (binary and source artifacts published in main repository)



apachepivot

Demo

- Take the Binary distribution and look at its contents
- Take the Source distribution, Build it and look at generated artifacts
- Build prerequisites: JDK 6 Update 14 or upper, ANT 1.7.1 or upper, JUnit 4.x, LiveConnect API (from JRE), JNLP API (from JRE)
- Publish generated WARs in a local Tomcat instance, and execute some of them
- Open Eclipse, look at some Demos / Tutorials Source Code, and run them from the IDE



apache**pivot**

Use cases

- Highly Interactive Applications
- Data Entry Applications that require Fast Navigation and Fast Data Editing, for example using many Keyboard Shortcuts
- Offline Applications
- Administration Console / DashBoards
- Additional UI for complex/computation intensive tasks of webapps, reusing the same server-logic of webapp Web pages
- Server-side generated UI (for example WTKX files) and Clients handling it, like a Browser
- And many others ...



Apache Pivot

Apache Pivot 1.5

Demos



apache**pivot**

Pivot Demos - Highlights

- **Kitchen Sink**, showcase of most Pivot Components
 - **Stock Tracker, iTunes Search, Suggestion Popups (new)** samples for interaction with Web-based data in real-time
 - **Component Explorer**, to inspect in real-time all Pivot Components and Styles, and make experiments on them
 - **XML Viewer, JSON Viewer**, utility tools to view structured data
 - **Table Row Editor, Large Data Sets**, some data-centric samples
 - **Decorators**, show some effect (Transparencies, shadows, reflections, image effects)
 - **File Drag & Drop**, show support for Drag & Drop, and handle files
 - **DOM Interaction**, show Pivot to Browser (Javascript) and viceversa
 - Others ...
-
- Differences in execution mode (Applet / Web Start), from a user point of view



Apache Pivot

Apache Pivot 1.5

Tutorials



Pivot Tutorials - Highlights



- **HelloWorld, HelloWTKX**, the Pivot version of HelloWorld: standard, and loading the GUI from a WTKX file
- **Component & Container, Overview**
- **Pivot Components**, with many samples (for data-centric examples for example see: Forms, Suggestion Popups, Table Views, Web Queries, Data Binding, Localization, Scripting)
- **A Practical Example**, the "Stock Tracker" explained in detail
- **Further Reading: WTKX Primer**, a must to understand the core of the Pivot way to define and construct user interfaces



Some Tricks – Part 1

- Pivot Collection classes (as a Model) for notifying events to registered listeners at data change
- Translation to/from Pivot Collections for Java Collections
- Constrained Elements (optional) in layout
- Reloadable WTKX files (optional)
- Event listeners could be written in any JVM language inside WTKX files (optional)
- Ability to change the default skin colors without rewriting code (but using a different json config file)
- Ability to interact with AWT Classes, and in some cases also with Swing Classes (new)



Some Tricks – Part 2

- Use the (new) Publish-Subscribe API to have a decoupled UI inside applications
- Use Pivot Web Queries to interact with remote services, in a REST way
- Use Pivot also as a server-side library (for generating graphics elements, and also for headless operations)
- Use the (enhanced) data binding to simplify and automate data synchronization between components
- Tested interaction with other JVM languages: Javascript, Groovy, Scala
- Extensibility with (external, third-party) Libraries/Products compatible with Pivot: EventBus, Griffon Pivot Builder, etc.



apache**pivot**

Bonus

- Additional content:
graphics, presentations, etc (outside trunk)
- Experimental area (outside trunk)
- Tools and tricks for improving the quality of
Pivot Code
- Future Projects:
Next Releases, Related Projects/Tools,
HTML 5 and RIA, etc.



apache**pivot**

References

- Web Site:
<http://pivot.apache.org/>
- Mailing Lists (public):
For users: user@pivot.apache.org
For developers: dev@pivot.apache.org
- Bug Tracking (JIRA):
<https://issues.apache.org/jira/browse/PIVOT>
- Repository (Subversion):
<http://svn.apache.org/repos/asf/pivot/>
with main development under the /trunk folder



apache**pivot**

Presentation Summary

- Apache Pivot
- What is
- History
- Why – Part 1,2,3,4
- Demo
- Use cases
- Pivot Demos + Highlights
- Pivot Tutorials + Highlights
- Some Tricks – Part 1,2
- Bonus
- References