Building Great RIA with Eclipse ATF - Ajax Tools Framework

Using the Web Tools Ajax Tooling Framework (ATF) to create and debug Ajax and JavaScript applications

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Introductions and plug

- Philippe Ombredanne, open source enthusiast
- I contribute to a few open source projects such as
  - Eclipse, Web tools, Ajax Tooling (ATF) (lead), Visual Editor, SOC (co-lead)
  - EasyEclipse (co-lead)
  - PHPEclipse (co-lead)
  - Mozilla,
  - JBoss Drools,
  - Joomla!
  - OpenMRS
  - Summer of Code and a few other
- I work at nexB, a software startup :
  - we create products for software development
- We help developers and teams:
  - write code with Eclipse-based studio,
  - write code in teams with collaborative tools,
  - re-use code (open source and own code)
  - http://nexb.com

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Things we will cover today

- ATF ?
- Tools to introspect live JavaScript intensive applications
- Future and plans
- What this presentation is NOT about
  - Using the JavaScript or Ajax or RIA framework XYZ

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ATF? short story

You built that great Ajax
and JavaScript based RIA application

..it happens

Peek in the browser!

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Why it matters? ..it happens

- Modern applications:
  - many devices
  - many tiers
  - many languages
  - many abstract frameworks
- When everything goes according to plan ... all is well
- When ..it happens, you need to peek inside
- Debugging, tracing and other runtime introspection techniques are well supported for applications and languages
- This is not the case for things that run in the browser
- ATF helps you to peek inside the browser when things go wrong

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Why it will matter more?

- RAP
  - Eclipse rich Ajax platform that provides a server-based Eclipse programming models and renders UI in the browser
- E4 (aka Eclipse Version 4) prototypes
  - Alternative GWT/Dojo based UI
  - Alternative Flex based UI

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ATF? In a nutshell

- The AJAX Tooling Framework (ATF) is a Web Tools incubating sub-project that brings Ajax and enhanced JavaScript support to Eclipse.

- ATF provides tooling for create, run, debug and introspect your Ajax and JavaScript-based application
  - Eclipse-based JavaScript live in-browser debugging
  - live JavaScript, DOM introspection, DOM watching
  - live request and XMLHTTPRequest monitoring
  - Ajax libraries support
    - ATF provides a framework and tooling to integrate support for libraries such as Dojo, Rico, Prototype and more: any libraries works with ATF
  - comprehensive JavaScript editing
  - integration with the Web Tools framework

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Components

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ATF in the context of the Web Tools Platform

- WE ARE THERE!

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ATF history

- Started in 2006 by IBM in an emerging technologies group
- The project joined the Eclipse Web tools as an incubating project
  - Initial contributors: Craig Becker, Gino Bustello, Javier Pedemonte, Phil Berkland, Robert Goodman and more (IBM)
- Today an all volunteer led project
  - Philippe Ombredanne, Giuliano Mega, Laurens Vandeput, Ha Li and a small community of lazy yet enthusiast volunteers
- Adopters are actively building products based on ATF, commercial and open source
  - JBoss, Suprasphere, Joomlatools.org, Aptana, Nokia, Fanfarre, MyEclipse, Backbase, Nexaweb, Motorola, CodeGear, ...
- Key Contributions that graduated
  - Firefox Mozilla browser widget on Mac, Linux, Windows
    - Graduated and contributed to SWT since Eclipse 3.3/Europa
  - Advanced JavaScript editor
    - Graduated and integrated in Web tools since WTP 3.0/Ganymede
    - Replaces the (legacy) SSE-based JS editor
  - Generic HTTP server adapter
    - Graduated and integrated in Web tools

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AJAX Tooling Framework Features

- Creating AJAX applications for specific libraries
  - Manage and create projects with external JS libraries
- Browser Tooling
  - DOM Source view, DOM Inspector, Browser Console, XmlHttpRequest Monitor, and CSS Tools
- JavaScript Debugger
  - Stack Frame, Variables and Script view
- Embedded Mozilla Browser using Xulrunner
  - Run/Debug an Ajax application in the Embedded Mozilla Browser
- Application Deployment
  - Deployment of an AJAX Application to a server.
- Personality Extensions
  - Ability to provision AJAX toolkits
- JavaScript Editor
  - Integrated advanced JavaScript editor with validation (no standard in WTP 3.0)

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ATF demo tour

- Live debug of existing applications
- Live HTTP request monitoring
- Live DOM watching and inspection

- Project and library provisioning
- Create a new project
- Create a new application inside the project
- Add pre-configured library to the application
- Edit
- Deploy and run
- Debug, inspect

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Ajax Application Creation

- Sample support for some AJAX runtimes out of the box
  - Dojo, Rico, Scriptaculous
  - Extension to support adding other AJAX runtimes.
- Application Creation Wizard
  - Template to create initial Ajax Application
- Eclipse Projects integration with Web tools modules and facets
  - Static Web Project, Dynamic Web Project
  - Able to add in AJAX to existing project.

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Firefox browser widget: the genesis

picture stolen from EMF (Ed Merks Files) without authorization

- In the beginning was SWT
- Steve Northover looked at SWT and saw that was good
- .... though SWT with a browser widget would be better

- SWT dudes created the browser widget using:
  - Safari on Mac
  - Firefox/Mozilla on Linux
  - Internet Explorer on Windows

- ATF dudes saw that and it was good
- .... though the programmability of the widget was poor
- .... and Firefox everywhere would be better

- ATF dudes created the programmable Mozilla browser widget using
  - Firefox on Mac
  - Firefox on Linux
  - Firefox on Windows

- SWT looked at the widget and saw that was good, and integrated it in SWT

- ATF dudes looked at all that and saw this was good
- .... though it could be better with programmable IE and WebKit widgets
- ..... and may deliver that in the future

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Embedded Mozilla Browser

- uses XULRunner (a special build of Firefox) and JavaXPCOM, a Java wrapper to the full Mozilla API

- Advanced Java programming capabilities: all the browser API is available
- Provides the engine for advanced AJAX and JavaScript Tooling
  - Debugger
  - JavaScript Engine
  - Browser Views

- Can be installed and “registered” as a public resource on a desktop, or bundled in an application as an Eclipse plug-in and used privately by ATF
  - (see extension point org.eclipse.atf.mozilla.ide.core.xulrunner)

- Essential plugins for the Xulrunner based MozillaBrowser widget : org.mozilla.xpcom, org.eclipse.atf.mozilla.ide.core, org.eclipse.atf.mozilla.swt.browser, and org.eclipse.atf.mozilla.swt.browser.<platfom specific code> (win32, mac, linux)

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JavaScript editor: the genesis

- In the beginning was the Web tools SSE (Structured Source Editing)
  - Common model for markup like languages such as XML, HTML, JSP, CSS
  - used also for JavaScript
- ATF dudes saw that was good (especially the ability to embed languages in languages)
- Though .... not great

- JavaScript is not just a markup language (typing issues, etc)

- ATF dudes took the Java Development Tool (JDT) and forked it

- ... to create the JSDT

- Web tools dudes looked at it and saw that was good
- ... and integrated that in the Web tools to replace the JS SSE-based editor

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ATF future

- Incubation until Q1 2009 ...
- ... then graduate and integrate WTP as a standard component

- Focus until graduation
  - new features,
  - stabilization,
  - tests,
  - delivering new milestones,
  - working towards the WTP integration and schedule synchronization
- New Features
  - Firefox is great but....
    - Add support for Internet Explorer (under way)
    - Add support for WebKit and derivative: important for Mac and phones
    - Add support for remote debugging
  - Debugging abstractions
  - WYSIWYG editing
    - can only be truly WYSIWYG inside the browser
  - RCP components (under way)

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Future: More browsers

- Embedding of a fully programmable IE browser using ACTF component
  - A GSOC project from Ha Li
  - Towards debugging live in IE, and offering introspection
- Embedding Web Kit on all platforms
  - Beyond Safari, web kit is important for mobile devices (Android, IPhone, Nokia, etc)
- Support for remote debugging
  - The browser may run elsewhere in a device
- Towards a common debugging cross-browser abstratction

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Future: WYSIWYG Ajax editing

- WYSIWYG editing is hard
- IMHO, it can only work when the drawing/editing canvas is the same one as the target
- Emulation works not too great
- Solution => edit in the browser
- Simple implementation => edit HTML
- Hard implementation => edit JavaScript intensive HTML
  - Though already done in JBoss JSF editor that re-uses ATF bits
- Short term
  - ATF will provide the simple implementation (contribution of Laurens Vandeput, former GSOC student)
  - That editor will be integrated with the JSF/HTML editor (pure SWT) sharing the common scaffoldings
- Long term
  - Invent extensibility to support multi-widget libraries aware WYSIWYG editing
  - Hard!
  - OpenAjax alliance may help

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Future: Debugging abstraction

- Who writes JavaScript today?
  - More and more complex abstractions
  - Java to JavaScript
  - JSF, Rails and related JS generating frameworks
  - XML DSLs to JavaScript
- Can debugging the JavaScript as executed in the browser really help?
  - Not always
- There is a need to
  - invent JavaScript debug symbols for those frameworks that generate JavaScript
  - invent a cross-browser debugging and introspection abstraction
- The benefit: mapping the execution of JavaScript live in the browser
  - back to the original sources
  - back to the original call stack
  - back to the original variables
  - on any (supported) browser
- For instance you could debug in the browser, AND you step through the original GWT Java code

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ATF and the rest of the world

- Web tools
  - Integration as a component
  - Integration with the JSF WYSIWYG editor
- ACTF (Accessibility toolkit)
  - Borrowing and evolving the COM based IE embedding for IE debugging and tooling support
- DLTK JavaScript editor
- Web oriented programming with Ruby, Python, PHP, ASP, etc
- Mozilla
  - ATF dudes contribute to Mozilla to keep the Xulrunner flame alive
- What about Firebug?
  - The XPCOM API's used by Firebug and ATF are the same
  - ATF offers the familiar Eclipse interface and debug framework
- Ajax toolkits and libraries
  - Short of some standardization, better support is hard
  - Waiting for some standardization hopefully from the OpenAjax Alliance

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More about the AJAX Tools Framework

- Open Source Project at Eclipse
  - www.eclipse.org/atf
- Listserv and Newsgroup
  - atf-dev@eclipse.org
  - news://eclipse.webtools.atf/
- Source Code in Eclipse CVS
  - http://dev.eclipse.org/viewcvs/index.cgi/org.eclipse.atf/?root=WebTools_Proje
  - :pserver:anonymous@dev.eclipse.org:/cvsroot/webtools org.eclipse.atf
- Milestones and Weekly builds
  - www.eclipse.org/atf/downloads/index.php
- Flash Demo Movies
  - www.eclipse.org/atf/flash/index.php

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