eclipse rich ajax platform (rap)

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outline

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  - project status and background
  - technology overview

eclipse rich ajax platform project

The rap project aims to enable developers to build rich, AJAX-enabled web applications by using the eclipse development model, plug-ins and a java-only api

eclipse plays a significant role in the rich client world

- provides advanced concepts and technologies that can be easily built upon
- „enforces“ solid archtecture patterns in application development

the goal of the project is to extend the reach of the eclipse platform to ajax

project status: moved from proposal status to „approved, waiting for project lead“

- still no code available in CVS
- eclipse legal process requires “legal clearing” before code can go into CVS

eclipse rich ajax platform project - continued

the rap project does not start from scratch, it will receive a code contribution from Innoopract:

- w4t, a widget toolkit that allows development of ajax web ui's in plain java
- technlology has proved to work, e.g. with the eclipse download configurator service http://yoxos.com/ondemand - handling 500 concurrent users easily
- the project proposal has received the

The award honours and recognises the most remarkable and outstanding contributions in the world of Java and Eclipse.

current trends in application development

- the most commonly applied technology for developing user interfaces in the past decade, templating for (simple) HTML, is getting replaced by two new major trends:
  - rich client applications (with concepts for keeping the client up to date)
  - rich internet application, with a strong focus on ajax technologies
- eclipse has succeeded in delivering a state of the art rich client framework, but the rich client camp is getting pressure from ajax enabled webapps
- the ajax world to date is very colorful, with many very promising technologies and projects. Most of the effort seems to be focused on providing client-side widget toolkits and a communication layer to the server.

ajax suffers from development complexity

- although ajax is a promising vision, the development complexity is very high
- better tools can help
  - e.g. eclipse atf http://eclipse.org/proposal/atf
  - better javascript editors are desperately needed (this can be an area for collaboration)
- frameworks and toolkits can deal with the low level stuff
  - XAP - eXtensible Ajax Platform (Meta-Framework)
  - Kabuki Ajax Toolkit
  - Dojo
  - OpenRico

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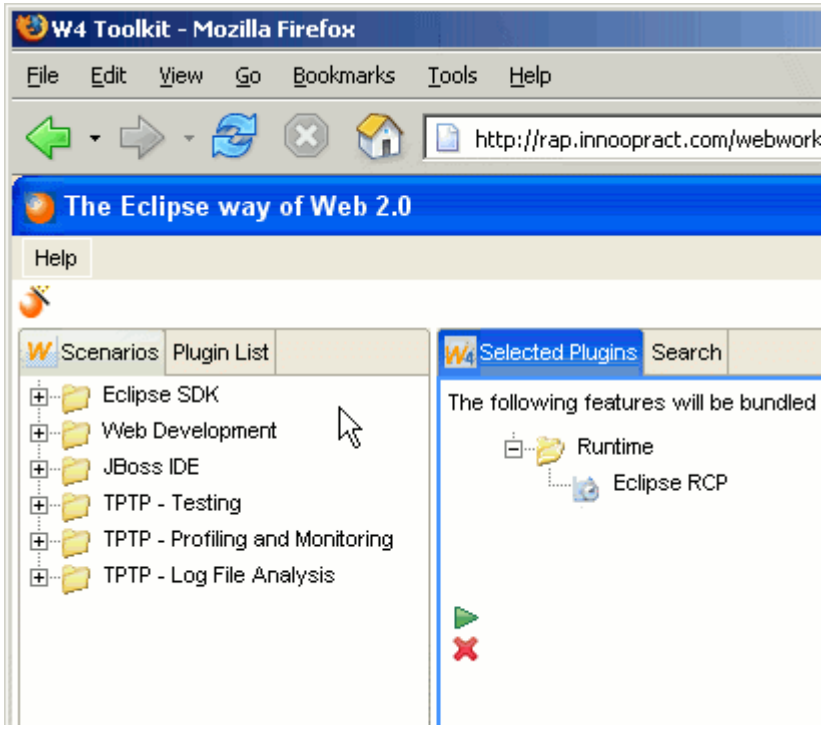
  - an eclipse platform strategy

rap leverages and extends the eclipse platform

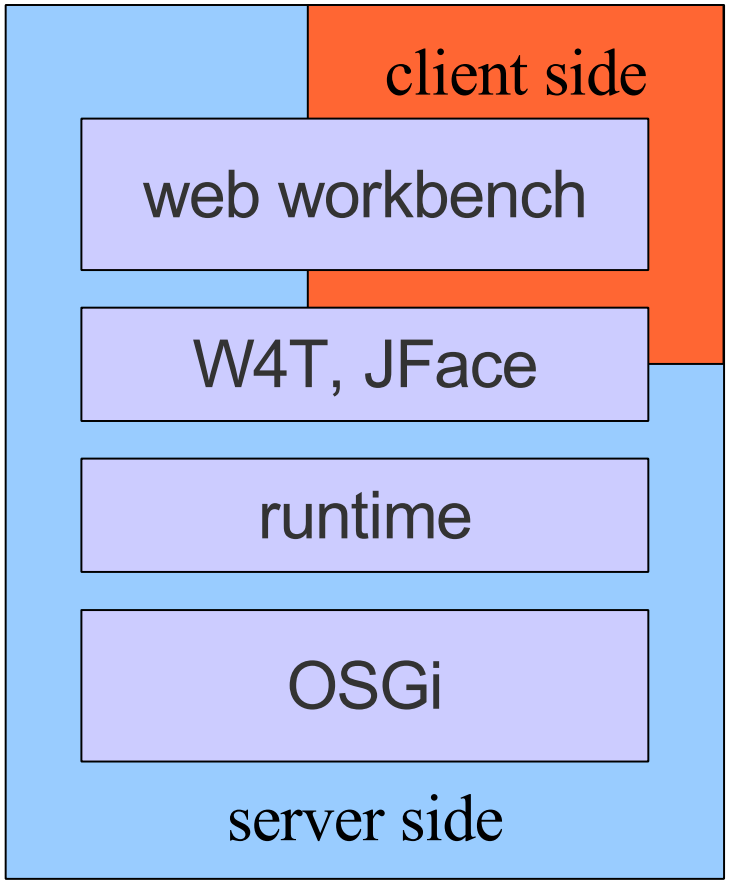
- rap enables developers to employ the eclipse concepts for developing ajax applications, leveraging the advanced eclipse programming model
- **plugin concept** – based on osgi, implemented by Eclipse Equinox
- **workbench concept** – a powerful UI metaphor that facilitates providing a consistent user experience
- a **widget toolkit** encapsulates all ajax technologies behind Java objects and rendering kits
- only developers who want to create their own widgets need to deal with javascript and ajax
- eclipse as a platform becomes an attractive alternative for ajax development – not only for ajax tooling



a brief example

- webworkbench – look & feel of the eclipse workbench in a browser
  - adding type ahead search
- implementation is not yet based on the eclipse workbench model
  - „hand-coded“ workbench, like creating the workbench look & feel directly in swt
  - showcasing feasibility, performance, look & feel

rap architecture overview



➔selection service, action sets, viewparts

➔widget toolkit, mvc, handling of distributed environment

➔extension points

➔modularity, dependency management (bundles / plugins) **based on standard jee technology**

eclipse OSGi on the server side

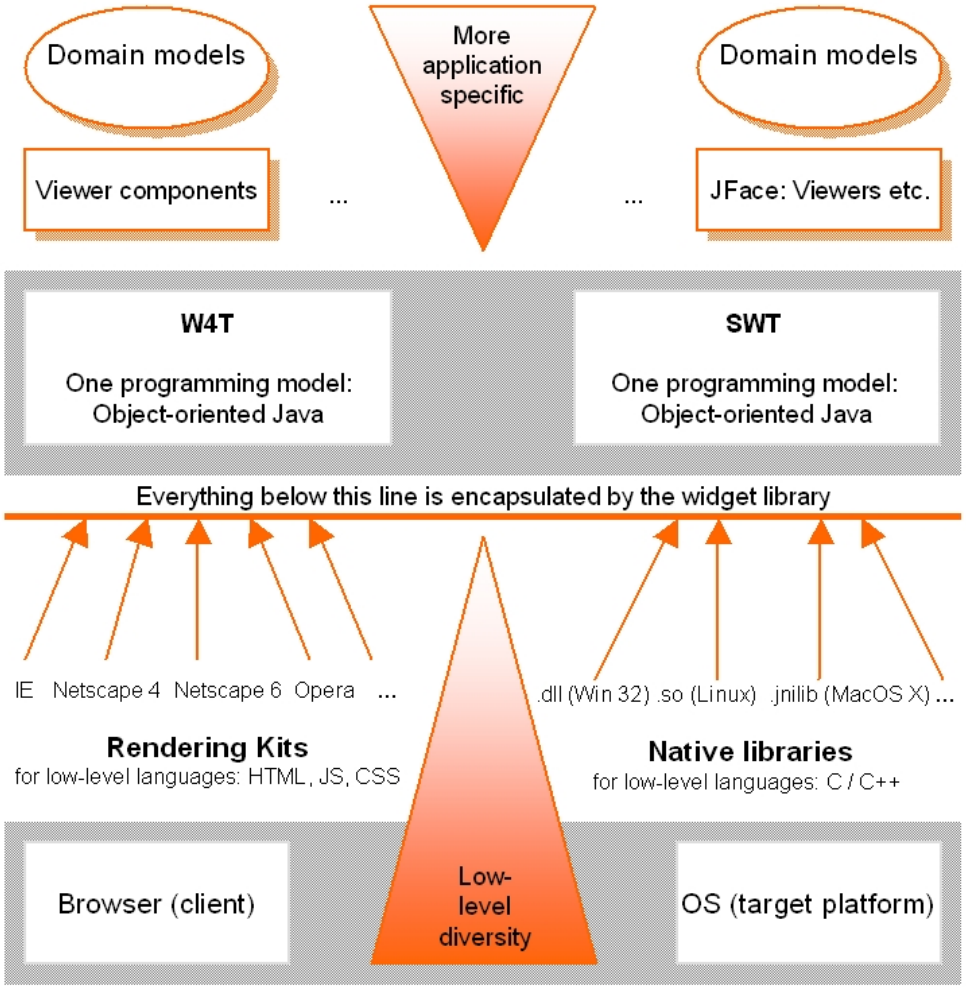
- equinox is providing an two „incubators“ for running eclipse inside a web app and interacting with a servlet
  - server side integration - main problems have been solved and are part of Eclipse 3.2 http://www.eclipse.org/equinox/incubator/server/eclipse_serverside_integration.php
  - embedding in a servlet container
    - war file to demo is available – starting an eclipse platform server side
  - rap will mainly reuse equinox technology and act as a client
- a new project proposal for eclipse rich server platform has been posted
  - “creation of truly pluggable, componentized, server-side applications“
  - http://eclipse.org/proposals/rsp

eclipse runtime - on the server side

- late bindings
- declarativ
- loose coupling
- contributing
- extending existing implementations

- ONCE per web application

w4t widget toolkit explained



a generic solution for partial ui updates

- send request (client-side)
  - collect form data and submit via XmlHttpRequest
- detect changed components (server-side)
  - hash code based algorithm to trace component state
- apply response (client-side)
  - received HTML fragments are applied to document
- transparent for application developer
- overhead does not affect overall application performance (e.g. WebWorkbench takes 0 – 16 milliseconds to fulfil request)

workbench

- strong coupling between workbench, swt and jface
- need to reimplement core apis to align with widget toolkit (swt api under exploration)

challenges ahead:

- workbench
  - session vs. application scope
  - memory considerations
  - multi user / logins
- layouts
  - absolute positioning, formLayout
- integration with existing web applications

the balance of server and client side

- framework provides client-side handling for workbenchparts (open, close, resize)
- widgets can provide client side event processing (e.g. expanding a tree)
- other event processing happens (mostly) server side
  - implementation in java
  - ui changes are calculated on the server side, client will get partial updates
- data binding happens on the server side (jface is the eclipse standard)
- eclipse plugin concept is enabled on the server side inside a web app
  - everything is a plugin (server side) - ui is assembled by contributions (server side) providing a well thought out development model
  - main callenges for running eclipse inside a web app and interacting with a servlet have been solved and are part of the eclipse 3.2 release http://www.eclipse.org/equinox/incubator/server/eclipse_serverside_integratio

collaboration with other ajax approaches is important

rap benefits from simple integration of widgets based on common ajax frameworks

- rap's widget toolkit is extensible
  - server side java api (might be moving to swt)
  - rendering kits provide implementation (html, css, js)
  - a canvas can be filled with client side life
  - server side needs info about client state

problems to avoid:

- possible incompatibilities between different libraries
- different versions of libraries

we need to find ways to avoid runtime problems effectively (e.g. ast, classpath, compiler)

how does rap compare to google gwt?

google gwt is a cool technology

- running on an emulated java engine in the browser (needs javascript to work)
- javascript is in charge of „drawing“ the user interface
- eventhandling in GWT is on the client side (+ RPC calls to the server to access data)
- GWT enables a "standalone SWT" comparable approach
- can scale to 100 thousands of concurrent users

rap is a cool technology, too

- runs standard html and javascript in the browser (can work with javascript disabled)
- the browsers rendering engine „draws“ the ui, refreshes happen through transfer of html snippets
- RAP relays most client-side events to the server for processing (solely ui related events can be processed on the client).
- running mainly on the server it can access the full java api and make use of OSGi inside a web container, enabling the full usage of the eclipse plugin model
- can scale to thousands of concurrent users

conclusion

- ajax is here to stay, but it has yet to overcome some obstacles
- ajax does not need to be in contradiction with rich clients – the technologies can complement each other
- shielding ajax complexities is one of the hottest topics today – a java api (swt) has proved to work in rich ui development, but there is also a strong movement about declarative ui development

references

- Eclipse RAP proposal http://eclipse.org/proposals/rap
- Eclipse Rich Client platform http://eclipse.org/rcp/
- Eclipse ATF proposal http://eclipse.org/proposals/atf
- Google Web Toolkit http://code.google.com/webtoolkit/