Frizione - Clutch

Version: 0.5

Release Date: 22/08/2008

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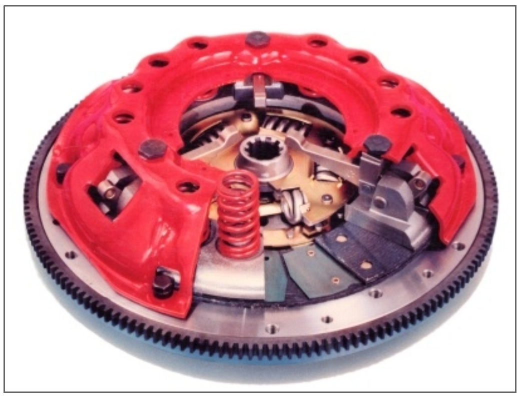
Frizione - Clutch

by John Leach



Frizione (that's Italian for Clutch, which is what I'll call the project from now on) is a classic open source tool – born of a desperate itch which I just simply had to scratch. I decided to give Gears a close scrutiny, since it is an interesting project which provides a browser agnostic plugin platform. I pretty soon realised that I'd be needing a robust JavaScript testing system since it is nearly impossible to debug code within a WorkerPool.

Apart from the usual problems of running JavaScript within a browser, I also wanted a small suite of tools, such as JSLint, JavaScript code file joining or concatenation (as used by the Prototype library), and JavaScript code compression, not to mention documentation generation. It seemed a reasonable idea to put them all together within a framework which runs inside the browser itself, much as the unit testing code would have to.

So that's how Frizione, er, Clutch got started. Although I'm using it for Gears development, it is actually a library agnostic set of tools for any type of browser based JavaScript development, which coincidentally has Gears support too.

The Frizione project is hosted on the Google Code web site. It is released under a MIT license, and kept in a shady Subversion repository, away from direct sunlight. There is also a low volume discussion group.

What's in the Box?

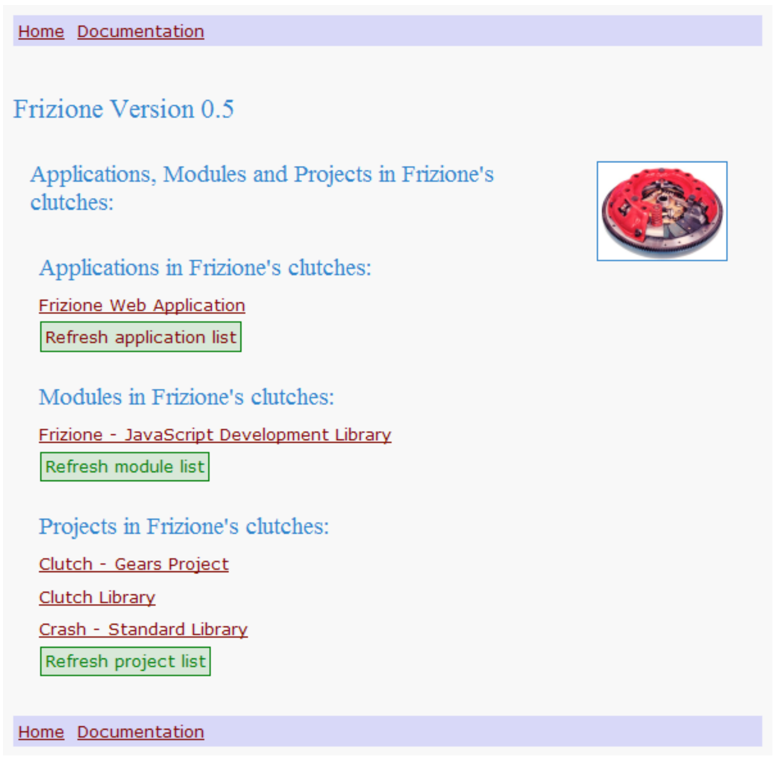
Clutch works happily in combination with your text editor or IDE. As you write new code (or modify existing code) you can use a JSLint page to check that you avoid certain insidious problems, such as accidental global variables. As you add functionality, you can create and run unit tests to ensure that the new code works, and that existing code continues to work correctly. As the code develops, you can use JsDoc Toolkit to produce HTML formatted documentation from the tagged comments, and finally, when the code is complete, you can join (concatenate) all the files together, and use YUICompressor to minify both the CSS and JavaScript code.

Clutch is a JavaScript web application, designed to run locally on your development computer.

Using Clutch

With the Clutch web application running, open your browser and type the pseudo domain root address http://clutch.syger.it/frizione/, (see the section "Requirements, Installation and Architecture" on page 17, for further information) you should then see the Clutch home page.

The Home Page



Home Documentation

Frizione Version 0.5

Applications, Modules and Projects in Frizione's clutches:

Applications in Frizione's clutches:

Frizione Web Application

Refresh application list

Modules in Frizione's clutches:

Frizione - JavaScript Development Library

Refresh module list

Projects in Frizione's clutches:

Clutch - Gears Project

Clutch Library

Crash - Standard Library

Refresh project list

Home Documentation

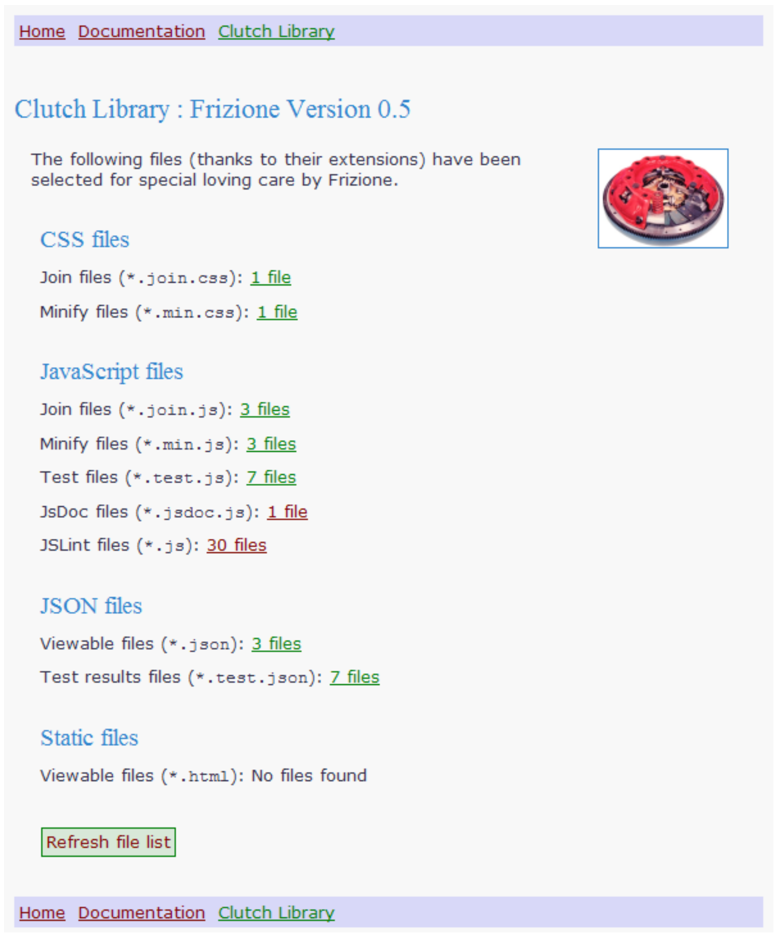
The home page provides access to the project pages. Clutch caches project information, so if you make changes, don't forget to click on one of the refresh buttons.

Applications and Modules refer to Helma specific directories which also contain a `frizione.json` file. Projects refer to directories under the `/frizione-projects` directory, which also contain a `frizione.json` file.

See the section "Creating Your Own Projects", on page 32, for further information.

The Project Page

Once you have chosen a particular project, the main project page is displayed:


Home Documentation Clutch Library

Clutch Library : Frizione Version 0.5

The following files (thanks to their extensions) have been selected for special loving care by Frizione.

CSS files

Join files (`*.join.css`): 1 file

Minify files (`*.min.css`): 1 file

JavaScript files

Join files (`*.join.js`): 3 files

Minify files (`*.min.js`): 3 files

Test files (`*.test.js`): 7 files

JsDoc files (`*.jsdoc.js`): 1 file

JSLint files (`*.js`): 30 files

JSON files

Viewable files (`*.json`): 3 files

Test results files (`*.test.json`): 7 files

Static files

Viewable files (`*.html`): No files found

Refresh file list

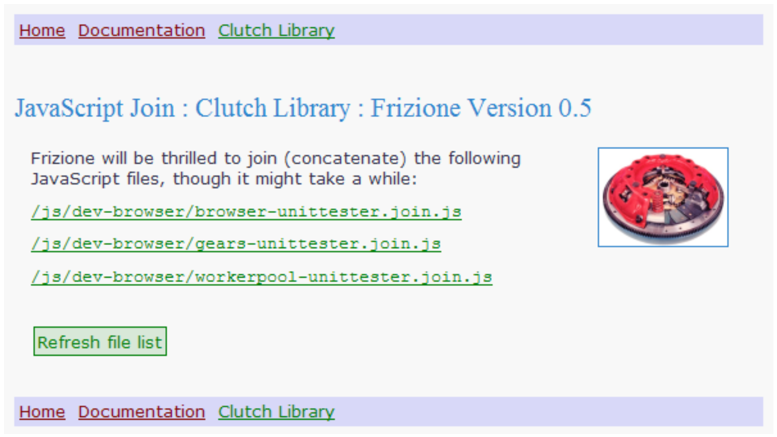
Home Documentation Clutch Library

Clutch also caches project file information, so if you make changes, don't forget to click on the refresh button.

Using the file extension naming convention, from this page you can access the Join, Minify, JsDoc, JSLint, Test and View services.

The Join Page

The main Join page provides links to each join file. Clutch recognises Join files by their extension of `.join.js` or `.join.css`.


Home Documentation Clutch Library

JavaScript Join : Clutch Library : Frizione Version 0.5

Frizione will be thrilled to join (concatenate) the following JavaScript files, though it might take a while:

/js/dev-browser/browser-unittester.join.js

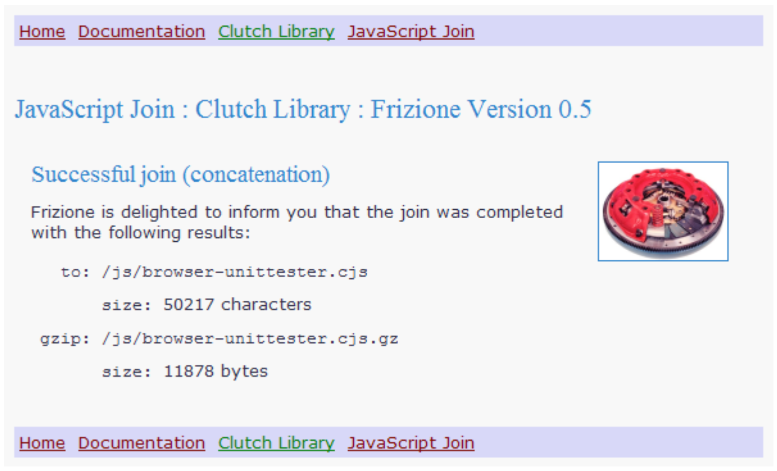
/js/dev-browser/gears-unittester.join.js

/js/dev-browser/workerpool-unittester.join.js

Refresh file list

Home Documentation Clutch Library

Not to be repetitive, but Clutch caches project file information, so if you make changes, don't forget to click on the refresh button. Clicking on any of the displayed links executes the Join, producing a Join results page:


Home Documentation Clutch Library JavaScript Join

JavaScript Join : Clutch Library : Frizione Version 0.5

Successful join (concatenation)

Frizione is delighted to inform you that the join was completed with the following results:

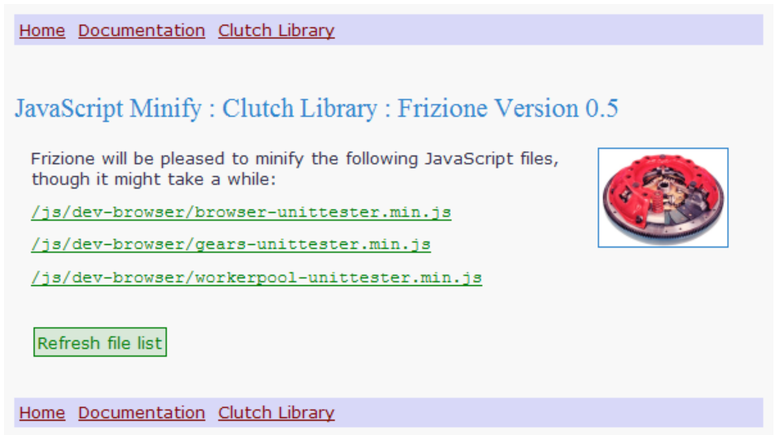
```
  to: /js/browser-unittester.cjs
      size: 50217 characters
gzip: /js/browser-unittester.cjs.gz
      size: 11878 bytes
```

Home Documentation Clutch Library JavaScript Join

See the sections “CSS Join Service (/cssjoin)”, and “JavaScript Join Service (/jsjoin)”, on page 20 and 21 respectively, for further information.

The Minify Page

The main Minify page provides links to each minify file. Clutch recognises Minify files by their extension of `.min.js` or `.min.css`.


Home Documentation Clutch Library

JavaScript Minify : Clutch Library : Frizione Version 0.5

Frizione will be pleased to minify the following JavaScript files, though it might take a while:

/js/dev-browser/browser-unittester.min.js

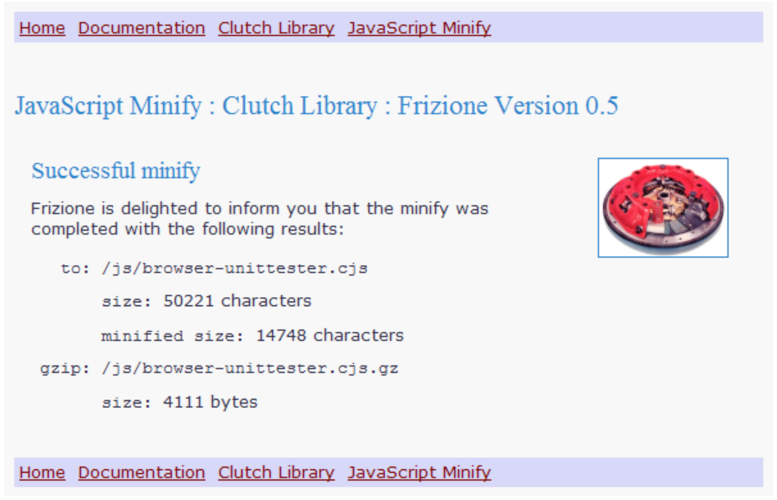
/js/dev-browser/gears-unittester.min.js

/js/dev-browser/workerpool-unittester.min.js

Refresh file list

Home Documentation Clutch Library

This might have been explained before, but Clutch caches project file information, so if you make changes, don't forget to click on the refresh button. Clicking on any of the displayed links executes the Minify, producing a Minify results page:


Home Documentation Clutch Library JavaScript Minify

JavaScript Minify : Clutch Library : Frizione Version 0.5

Successful minify

Frizione is delighted to inform you that the minify was completed with the following results:

```
  to: /js/browser-unittester.cjs
      size: 50221 characters
      minified size: 14748 characters
gzip: /js/browser-unittester.cjs.gz
      size: 4111 bytes
```

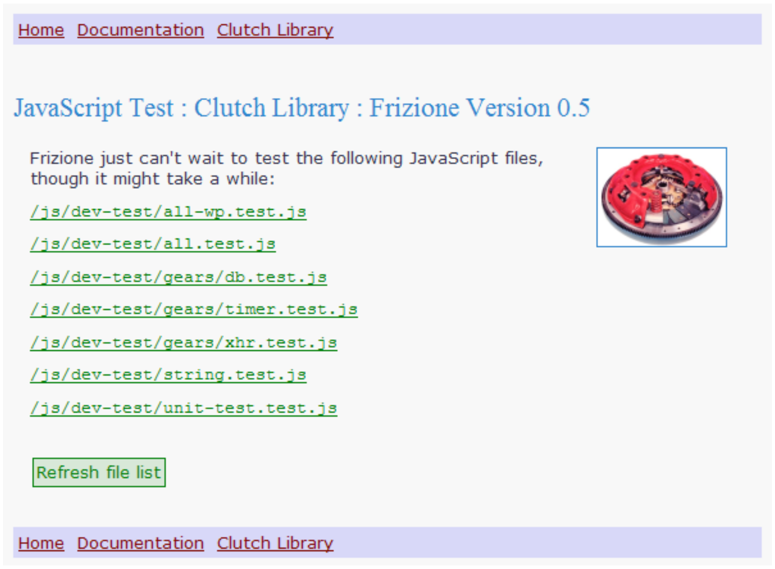
Home Documentation Clutch Library JavaScript Minify

See the sections “CSS Minify Service (/cssminify)” and “JavaScript Minify Service

(/jsminify)”, on page 22 and 23 respectively, for further information.

The Test Page

The main Test page provides links to each unit test file. Clutch recognises Test files by their extension of `.test.js`.


Home Documentation Clutch Library

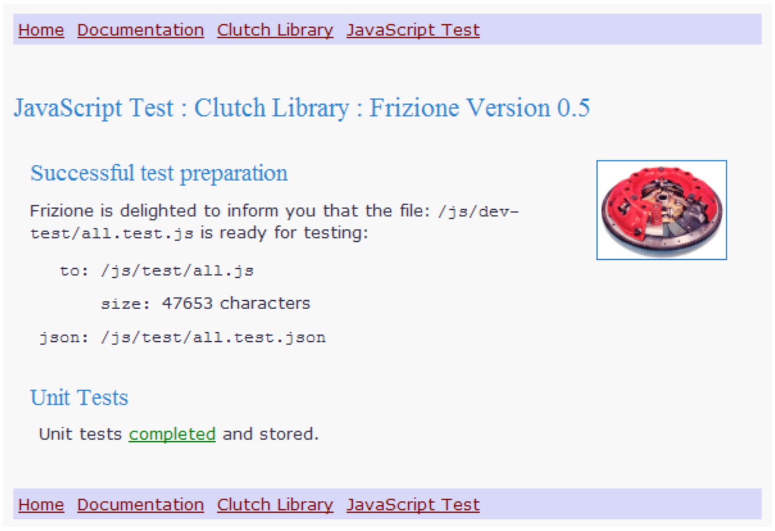
JavaScript Test : Clutch Library : Frizione Version 0.5

Frizione just can't wait to test the following JavaScript files, though it might take a while:

```
/js/dev-test/all-wp.test.js
/js/dev-test/all.test.js
/js/dev-test/gears/db.test.js
/js/dev-test/gears/timer.test.js
/js/dev-test/gears/xhr.test.js
/js/dev-test/string.test.js
/js/dev-test/unit-test.test.js
```

Refresh file list
Home Documentation Clutch Library

By now it's clear that Clutch caches project file information, so if you make changes, don't forget to click on the refresh button. Clicking on any of the displayed links executes the unit tests, producing a Unit Test results page:


Home Documentation Clutch Library JavaScript Test

JavaScript Test : Clutch Library : Frizione Version 0.5

Successful test preparation

Frizione is delighted to inform you that the file: /js/dev-test/all.test.js is ready for testing:

```
   to: /js/test/all.js
      size: 47653 characters
 json: /js/test/all.test.json
```

Unit Tests

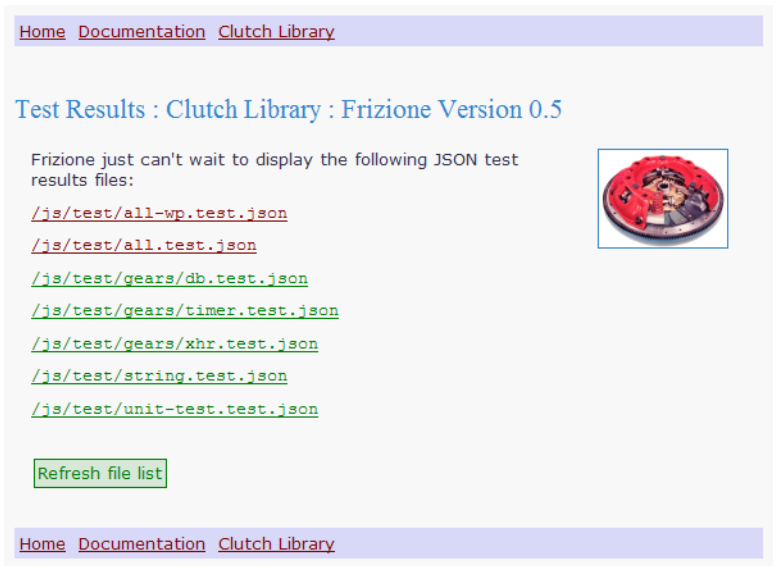
Unit tests completed and stored.

Home Documentation Clutch Library JavaScript Test

See the section “JavaScript Test Service (/jstest)” on page 26, for further information.

The Test Results Page

The main Test Results page provides links to each unit test results file. Clutch recognises Test Results files by their extension of `.test.json`.



Home Documentation Clutch Library

Test Results : Clutch Library : Frizione Version 0.5

Frizione just can't wait to display the following JSON test results files:

/js/test/all-wp.test.json

/js/test/all.test.json

/js/test/gears/db.test.json

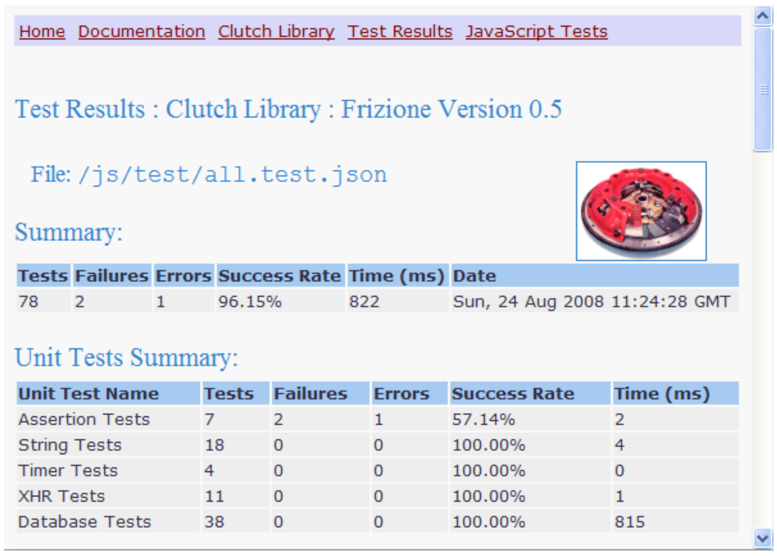
/js/test/gears/timer.test.json

/js/test/gears/xhr.test.json

/js/test/string.test.json

/js/test/unit-test.test.json

By now you're well aware that Clutch caches project file information, so if you make changes, don't forget to click on the refresh button. Clicking on any of the displayed links displays the unit test results. The unit test report starts with a general summary of the results:



Home Documentation Clutch Library Test Results JavaScript Tests

Test Results : Clutch Library : Frizione Version 0.5

File: /js/test/all.test.json

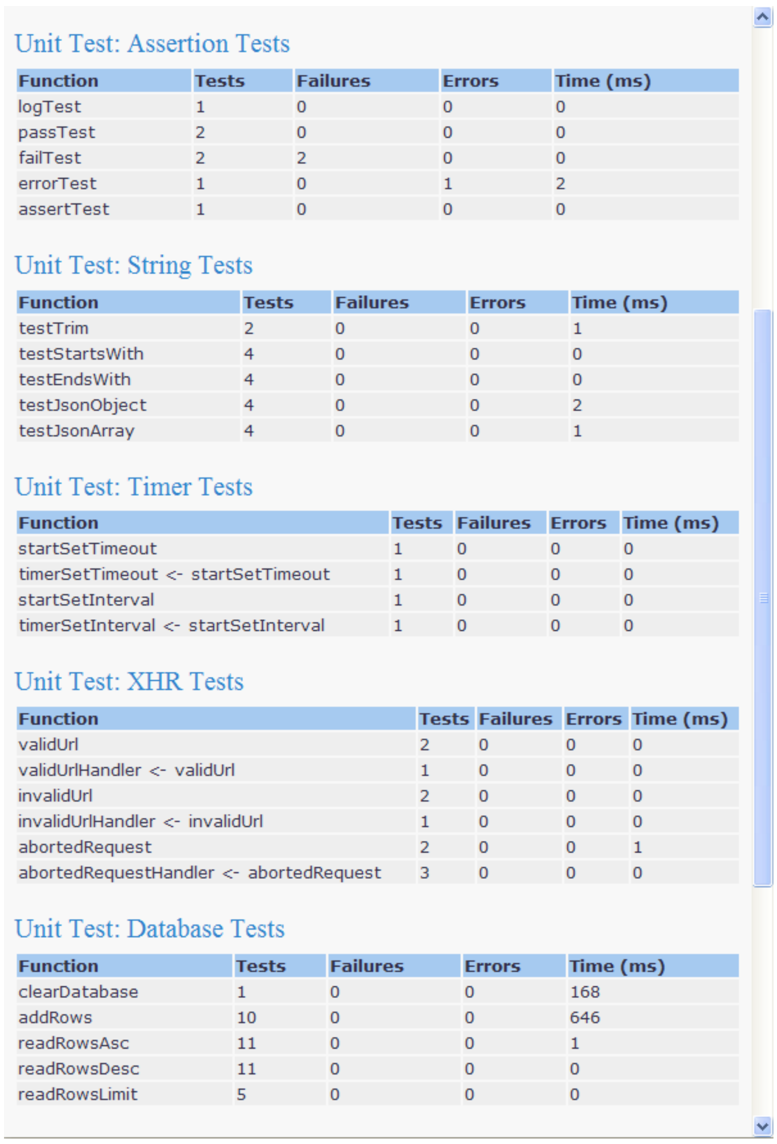
Summary:

Tests	Failures	Errors	Success Rate	Time (ms)	Date
78	2	1	96.15%	822	Sun, 24 Aug 2008 11:24:28 GMT

Unit Tests Summary:

Unit Test Name	Tests	Failures	Errors	Success Rate	Time (ms)
Assertion Tests	7	2	1	57.14%	2
String Tests	18	0	0	100.00%	4
Timer Tests	4	0	0	100.00%	0
XHR Tests	11	0	0	100.00%	1
Database Tests	38	0	0	100.00%	815

This is followed by a more detailed report for each unit test:



Unit Test: Assertion Tests

Function	Tests	Failures	Errors	Time (ms)
logTest	1	0	0	0
passTest	2	0	0	0
failTest	2	2	0	0
errorTest	1	0	1	2
assertTest	1	0	0	0

Unit Test: String Tests

Function	Tests	Failures	Errors	Time (ms)
testTrim	2	0	0	1
testStartsWith	4	0	0	0
testEndsWith	4	0	0	0
testJsonObject	4	0	0	2
testJsonArray	4	0	0	1

Unit Test: Timer Tests

Function	Tests	Failures	Errors	Time (ms)
startSetTimeout	1	0	0	0
timerSetTimeout <- startSetTimeout	1	0	0	0
startSetInterval	1	0	0	0
timerSetInterval <- startSetInterval	1	0	0	0

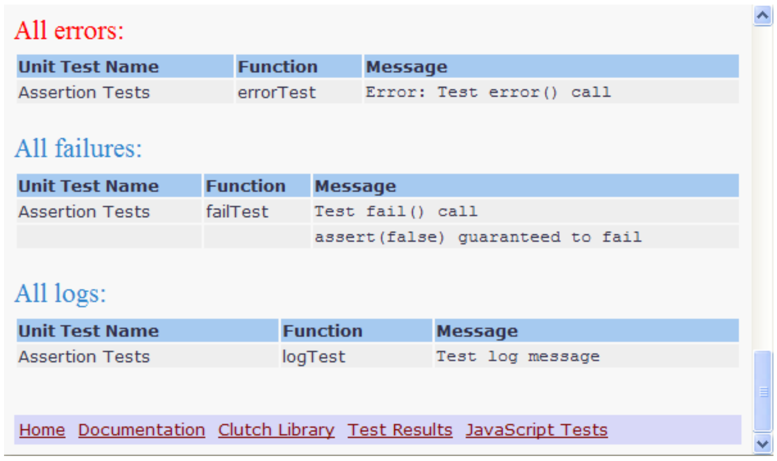
Unit Test: XHR Tests

Function	Tests	Failures	Errors	Time (ms)
validUrl	2	0	0	0
validUrlHandler <- validUrl	1	0	0	0
invalidUrl	2	0	0	0
invalidUrlHandler <- invalidUrl	1	0	0	0
abortedRequest	2	0	0	1
abortedRequestHandler <- abortedRequest	3	0	0	0

Unit Test: Database Tests

Function	Tests	Failures	Errors	Time (ms)
clearDatabase	1	0	0	168
addRows	10	0	0	646
readRowsAsc	11	0	0	1
readRowsDesc	11	0	0	0
readRowsLimit	5	0	0	0

Finally, errors, failures and log messages are displayed:



All errors:

Unit Test Name	Function	Message
Assertion Tests	errorTest	`Error: Test error() call`

All failures:

Unit Test Name	Function	Message
Assertion Tests	failTest	`Test fail() call`
		`assert(false) guaranteed to fail`

All logs:

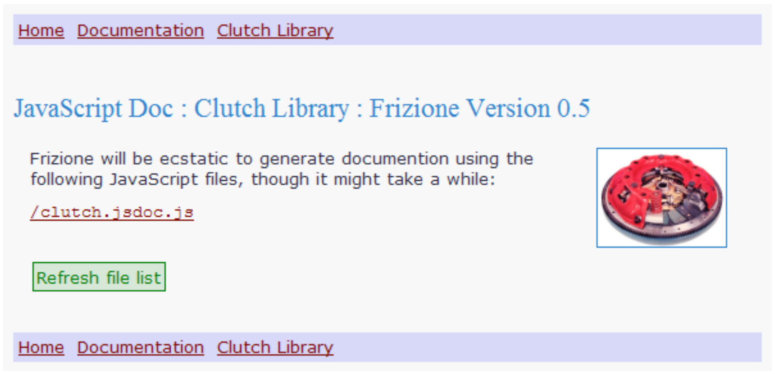
Unit Test Name	Function	Message
Assertion Tests	logTest	`Test log message`

Home Documentation Clutch Library Test Results JavaScript Tests

See the section "JSON Test Result View Service (/jsontest)" on page 27, for further information.

The JsDoc Page

The main JsDoc page provides links to each JsDoc file. Clutch recognises JsDoc files by their extension of `.jsdoc.js`.



Home Documentation Clutch Library

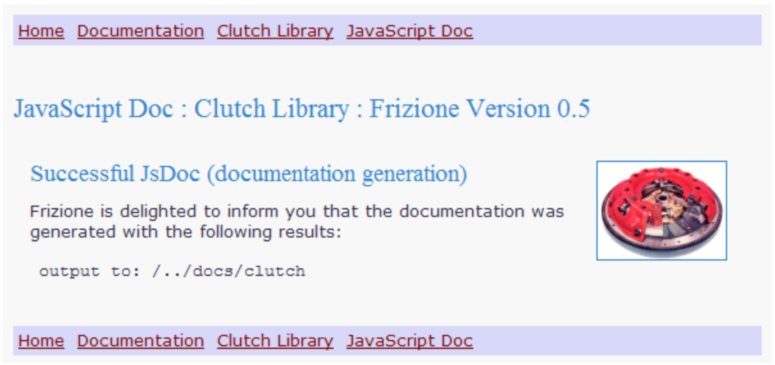
JavaScript Doc : Clutch Library : Frizione Version 0.5

Frizione will be ecstatic to generate documention using the following JavaScript files, though it might take a while:

/clutch.jsdoc.js

Refresh file list
Home Documentation Clutch Library

It's been said before, but Clutch caches project file information, so if you make changes, don't forget to click on the refresh button. Clicking on any of the displayed links causes the documentation to be generated. This may take considerable time (several seconds). After the documentation has been generated, a general summary of the results is displayed:



Home Documentation Clutch Library JavaScript Doc

JavaScript Doc : Clutch Library : Frizione Version 0.5

Successful JsDoc (documentation generation)

Frizione is delighted to inform you that the documentation was generated with the following results:

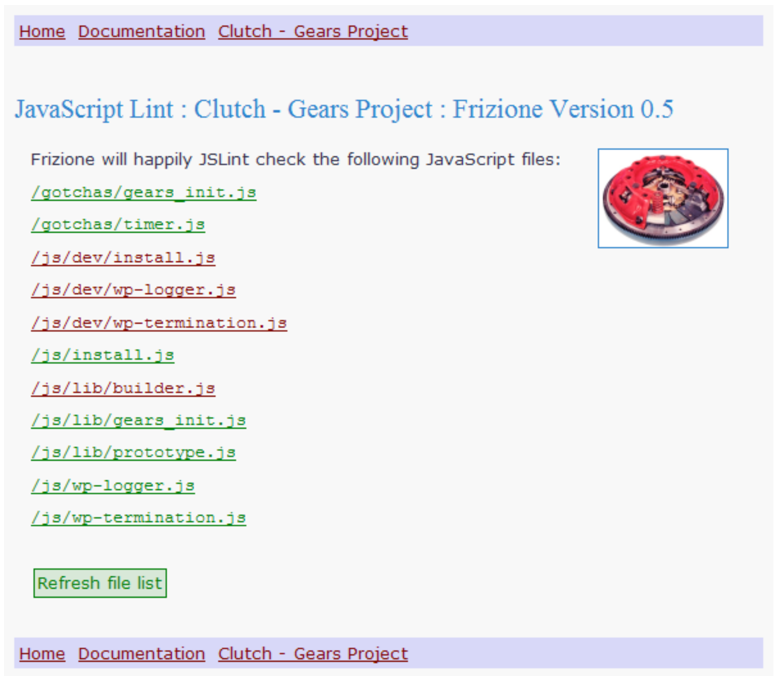
```
output to: /../docs/clutch
```

Home Documentation Clutch Library JavaScript Doc

See the section “JavaScript Documentation Service (/jsdoc)” on page 24, for further information.

The JSLint Page

The main JSLint page provides links to all JavaScript files which are not used for Join, JsDoc, Minify or Tests.


Home Documentation Clutch - Gears Project

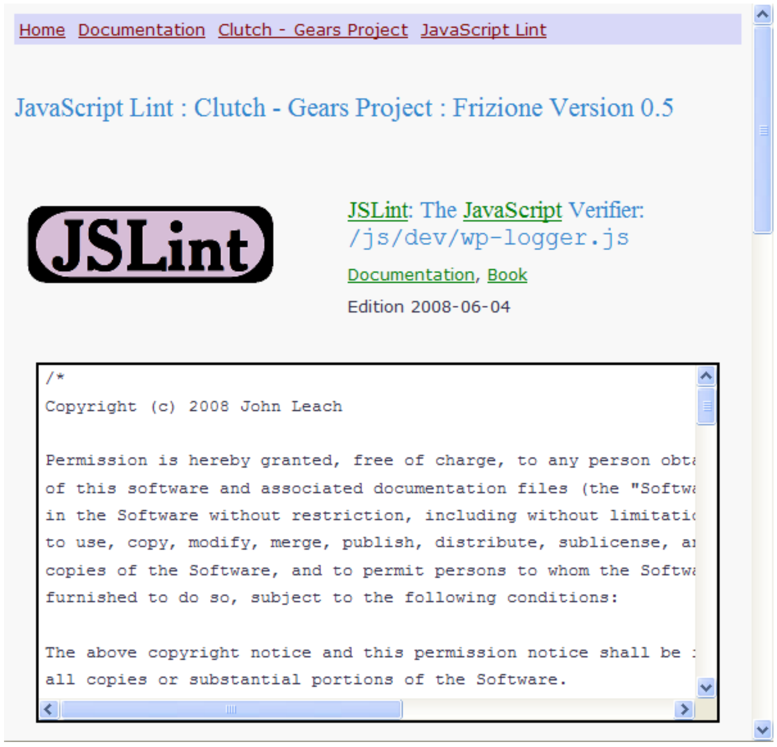
JavaScript Lint : Clutch - Gears Project : Frizione Version 0.5

Frizione will happily JSLint check the following JavaScript files:

/gotchas/gears_init.js
/gotchas/timer.js
/js/dev/install.js
/js/dev/wp-logger.js
/js/dev/wp-termination.js
/js/install.js
/js/lib/builder.js
/js/lib/gears_init.js
/js/lib/prototype.js
/js/wp-logger.js
/js/wp-termination.js

Home Documentation Clutch - Gears Project

Here too, Clutch caches project file information, so if you make changes, don't forget to click on the refresh button. Clicking on any of the displayed links executes JSLint on that file. First, the JavaScript file contents are displayed, and so can be used to check modifications 'on the fly'. You may need to refresh the page (usually F5):


Home Documentation Clutch - Gears Project JavaScript Lint

JavaScript Lint : Clutch - Gears Project : Frizione Version 0.5

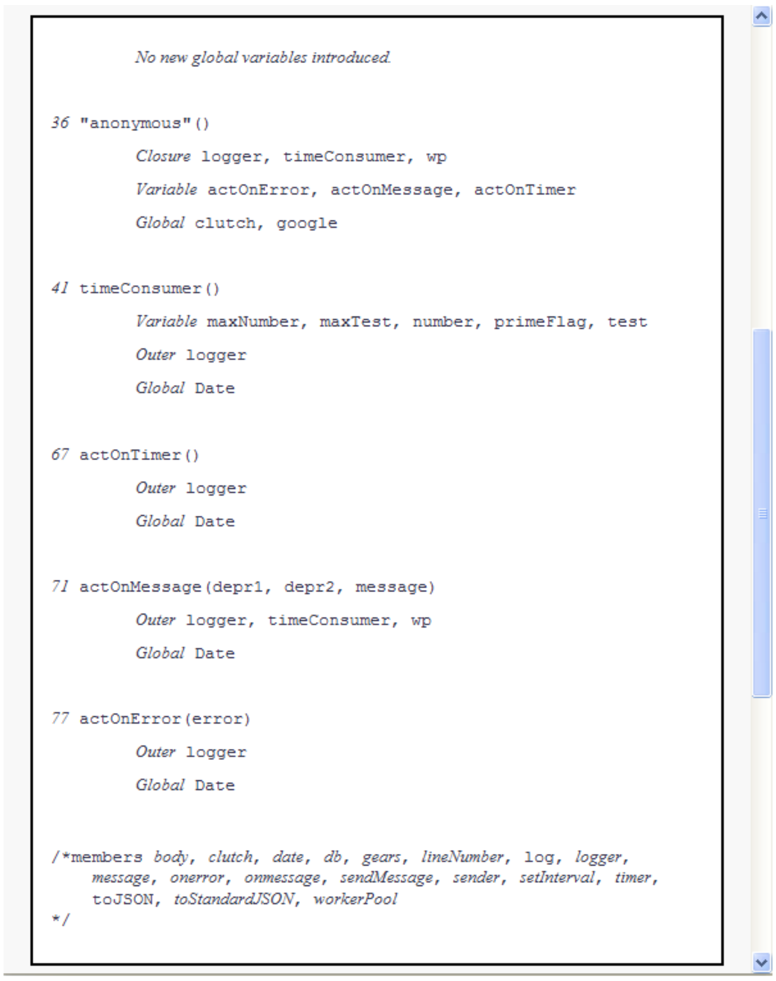
JSLint: The JavaScript Verifier: /js/dev/wp-logger.js

Documentation, Book

Edition 2008-06-04

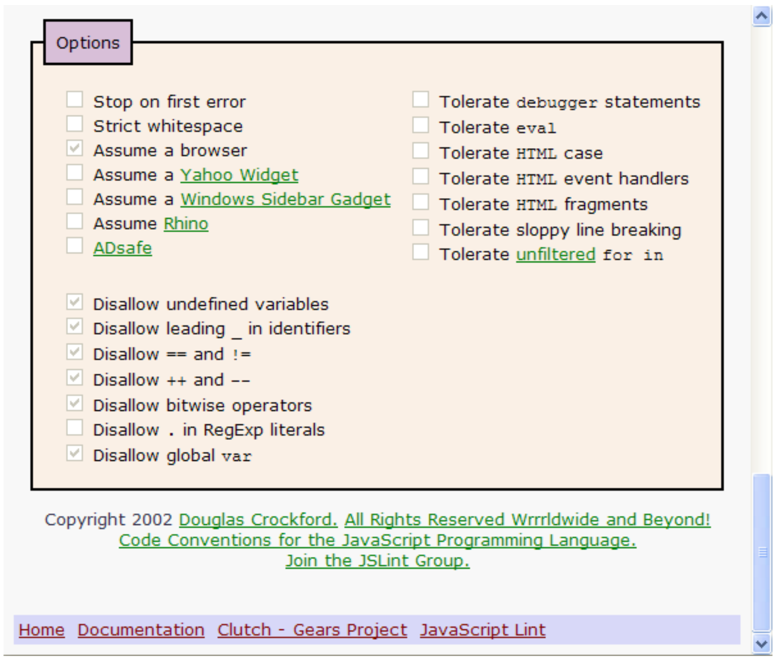
```
/*
Copyright (c) 2008 John Leach

Permission is hereby granted, free of charge, to any person obta
of this software and associated documentation files (the "Softwa
in the Software without restriction, including without limitatic
to use, copy, modify, merge, publish, distribute, sublicense, ar
copies of the Software, and to permit persons to whom the Softwa
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be i
all copies or substantial portions of the Software.
```

Then follows the JSLint report. Error messages are shown in a shocking pink, probably to encourage you to correct them:



```
        No new global variables introduced.

36 "anonymous"()
        Closure logger, timeConsumer, wp
        Variable actOnError, actOnMessage, actOnTimer
        Global clutch, google

41 timeConsumer()
        Variable maxNumber, maxTest, number, primeFlag, test
        Outer logger
        Global Date

67 actOnTimer()
        Outer logger
        Global Date

71 actOnMessage(depr1, depr2, message)
        Outer logger, timeConsumer, wp
        Global Date

77 actOnError(error)
        Outer logger
        Global Date

/*members body, clutch, date, db, gears, lineNumber, log, logger,
    message, onerror, onmessage, sendMessage, sender, setInterval, timer,
    toJSON, toStandardJSON, workerPool
*/
```

Finally the options used are displayed:



Options

- ☐ Stop on first error
- ☐ Strict whitespace
- ✓ Assume a browser
- ☐ Assume a Yahoo Widget
- ☐ Assume a Windows Sidebar Gadget
- ☐ Assume Rhino
- ☐ ADsafe
- ☐ Tolerate `debugger` statements
- ☐ Tolerate `eval`
- ☐ Tolerate `HTML` case
- ☐ Tolerate `HTML` event handlers
- ☐ Tolerate `HTML` fragments
- ☐ Tolerate sloppy line breaking
- ☐ Tolerate unfiltered `for in`

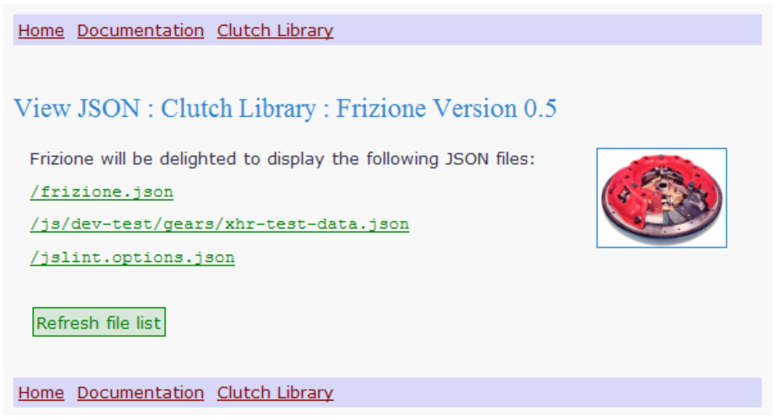
- ✓ Disallow undefined variables
- ✓ Disallow leading _ in identifiers
- ✓ Disallow `==` and `!=`
- ✓ Disallow `++` and `--`
- ✓ Disallow bitwise operators
- ☐ Disallow `.` in RegExp literals
- ✓ Disallow global `var`

Copyright 2002 Douglas Crockford. All Rights Reserved Wrrrldwide and Beyond!
Code Conventions for the JavaScript Programming Language.
Join the JSLint Group.

See the section "JSLint Service (/jslint)" on page 19, for further information.

The JSON View Page

The main JSON View page provides links to all JSON files which are not used for unit test results.



Home Documentation Clutch Library

View JSON : Clutch Library : Frizione Version 0.5

Frizione will be delighted to display the following JSON files:

/frizione.json

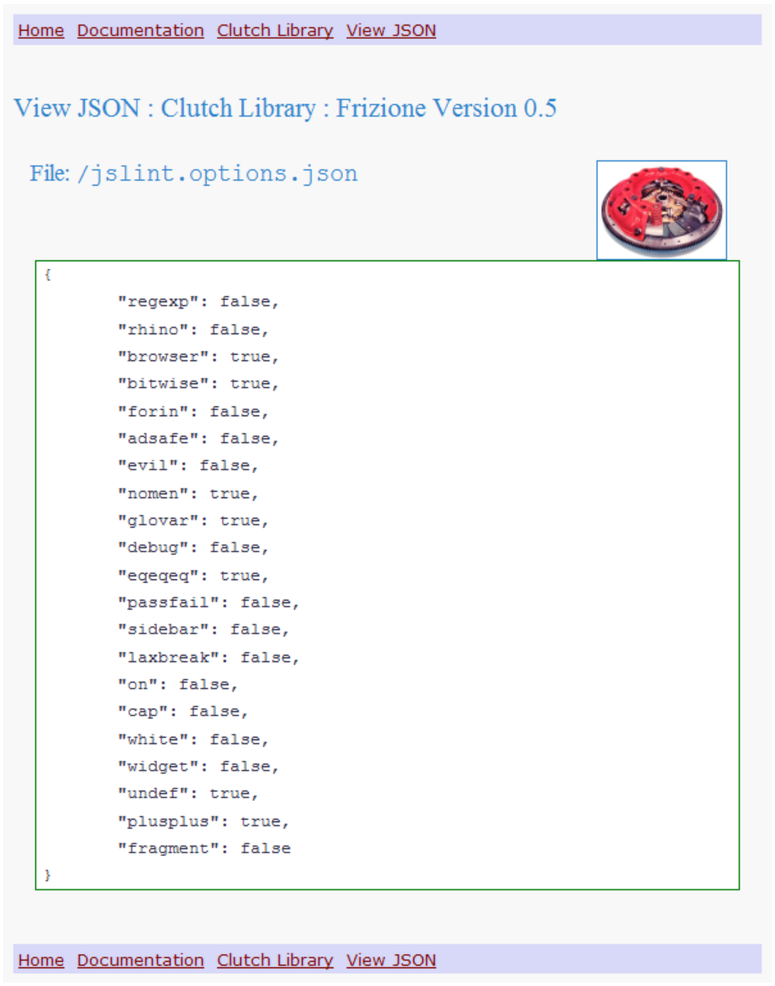
/js/dev-test/gears/xhr-test-data.json

/jslint.options.json

Refresh file list

Home Documentation Clutch Library

Once again, Clutch caches project file information, so if you make changes, don't forget to click on the refresh button. Clicking on any of the displayed links displays the contents of the JSON file:



Home Documentation Clutch Library View JSON

View JSON : Clutch Library : Frizione Version 0.5

File: /jslint.options.json

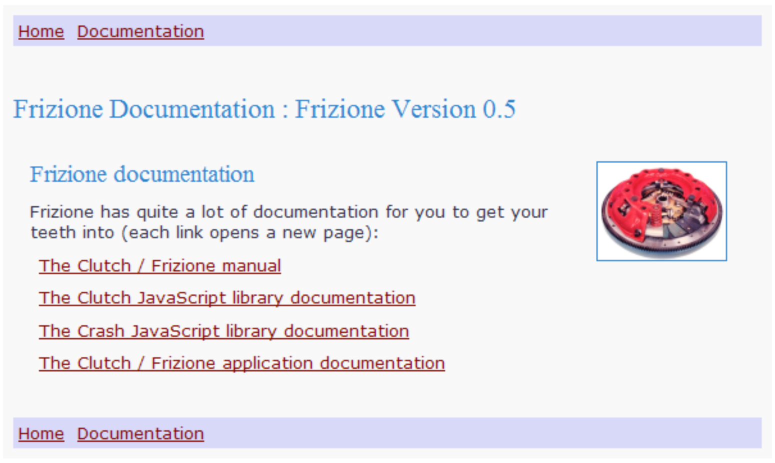
```
{
        "regexp": false,
        "rhino": false,
        "browser": true,
        "bitwise": true,
        "forin": false,
        "adsafe": false,
        "evil": false,
        "nomen": true,
        "glovar": true,
        "debug": false,
        "eqeqeq": true,
        "passfail": false,
        "sidebar": false,
        "laxbreak": false,
        "on": false,
        "cap": false,
        "white": false,
        "widget": false,
        "undef": true,
        "plusplus": true,
        "fragment": false
}
```

Home Documentation Clutch Library View JSON

See the sections "HTML file view (/htmlview)" and "JSON file view (/jsonview)", on page 20 and 20 respectively, for further information.

Documentation

Clutch comes with a complete set of documentation:


Home Documentation

Frizione Documentation : Frizione Version 0.5

Frizione documentation

Frizione has quite a lot of documentation for you to get your teeth into (each link opens a new page):

The Clutch / Frizione manual

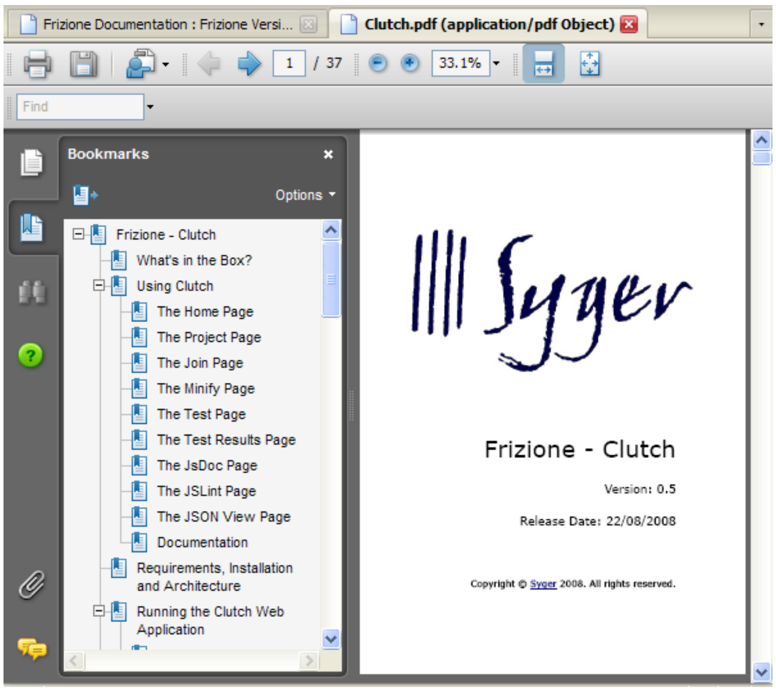
The Clutch JavaScript library documentation

The Crash JavaScript library documentation

The Clutch / Frizione application documentation

Home Documentation

This document is also available from within the Clutch web application: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The JSLint Page
The JSON View Page
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Requirements, Installation and Architecture
Running the Clutch Web Application

Frizione - Clutch

Version: 0.5

Release Date: 22/08/2008

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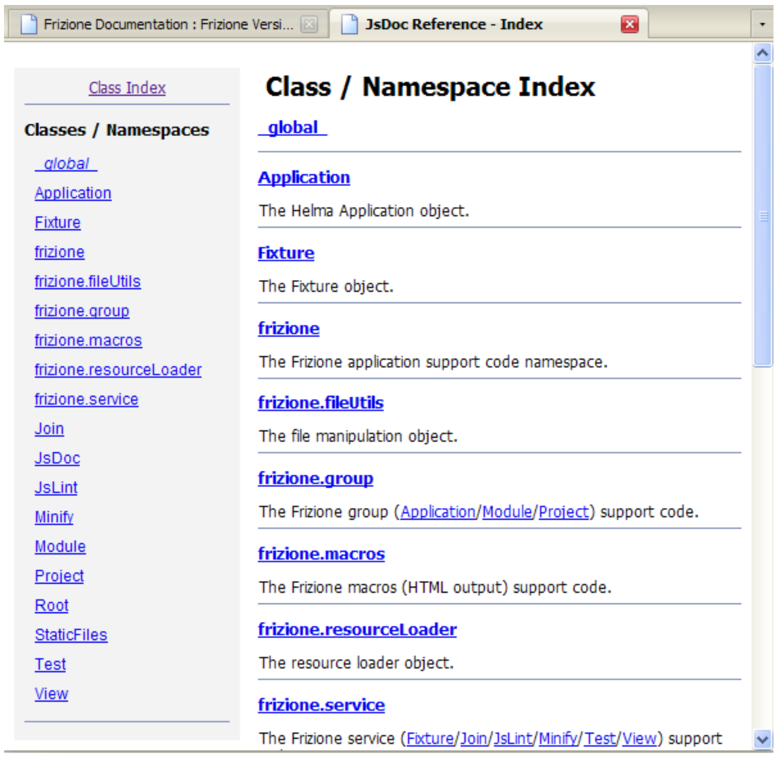
The Clutch web application documentation:



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StaticFiles
Test
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The Helma Application object.

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The Fixture object.

frizione

The Frizione application support code namespace.

frizione.fileUtils

The file manipulation object.

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The Frizione group (Application/Module/Project) support code.

frizione.macros

The Frizione macros (HTML output) support code.

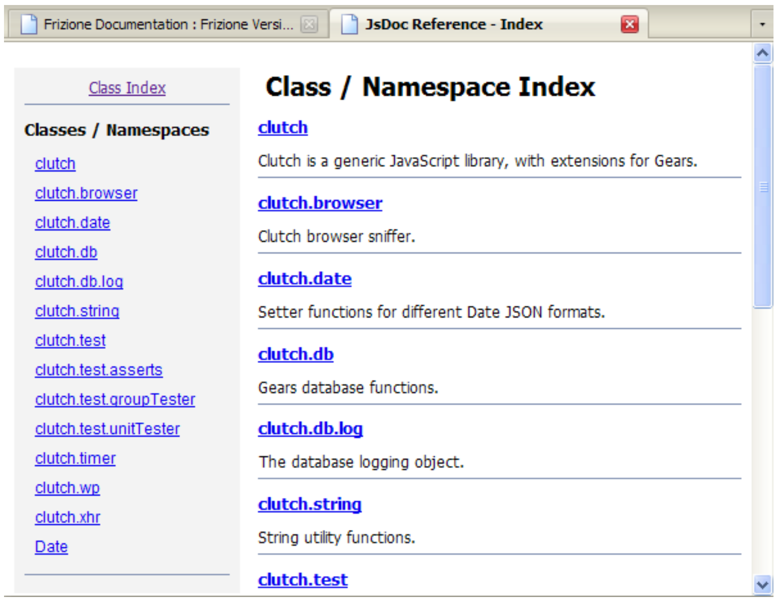
frizione.resourceLoader

The resource loader object.

frizione.service

The Frizione service (Fixture/Join/JsLint/Minify/Test/View) support

The Clutch library documentation:



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clutch

Clutch is a generic JavaScript library, with extensions for Gears.

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Clutch browser sniffer.

clutch.date

Setter functions for different Date JSON formats.

clutch.db

Gears database functions.

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clutch.string

String utility functions.

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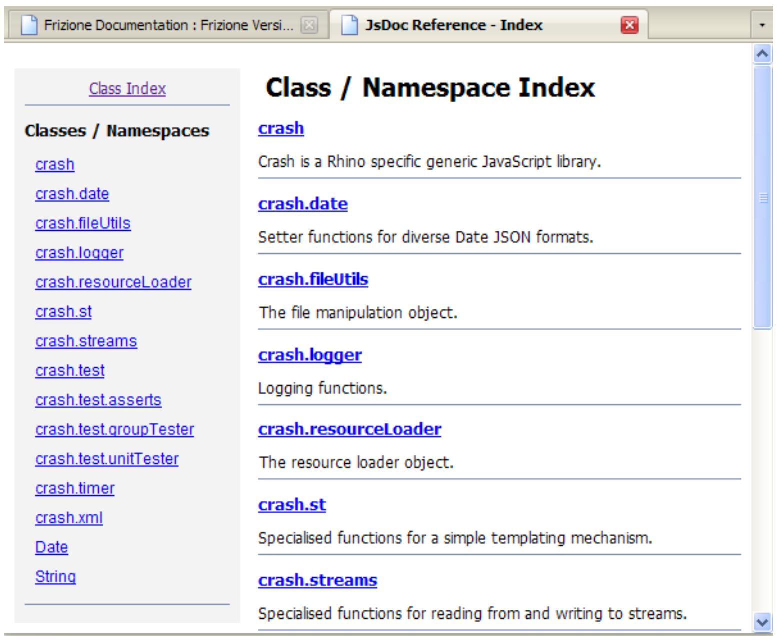

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crash
Crash is a Rhino specific generic JavaScript library.

crash.date
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crash.fileUtils
The file manipulation object.

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Logging functions.

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The resource loader object.

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Specialised functions for a simple templating mechanism.

crash.streams
Specialised functions for reading from and writing to streams.

Requirements, Installation and Architecture

Clutch consists of a set of HTML pages, CSS and JavaScript files, together with an essential web application and server. The Clutch web application is written in JavaScript, using the Helma JavaScript Web Server, and Java. To use Clutch you will need to install Java (I'm using version 1.6.0).

First, install Java if not already present on your computer. Then extract the archived file (or SVN repository) into `/Frizione-0.5`.

The Clutch web application, apart from serving the static text files, also provides a set of services, listed below:

Service URL	Description
`/jslint`	Runs JSLint on a specific JavaScript file.
`/jsonview`	Displays a JSON file contents.
`/htmlview`	Displays (redirects to) a static HTML file.
`/cssjoin`	Joins or concatenates a series of CSS files into a single file.
`/jsjoin`	Joins (concatenates) a series of JavaScript files into a single file.
`/cssminify`	Minifies (compresses) a CSS file.
`/jsminify`	Minifies (compresses) a JavaScript file
`/jsdoc`	Runs JsDoc Toolkit on a series of JavaScript files.
`/jstest`	Runs a unit test JavaScript file.
`/jsontest`	Displays a unit test JSON formatted results file.
`/readfixture`	Provides GET (read) operations for fixture (unit testing data) files.

`/writefixture`	Provides POST (write) operations for fixture (unit testing data) files.

Clutch also provides a simple unit testing framework, written in JavaScript, which runs within the browser or the server, depending on the environment. The unit test results are written to hard disk automatically in JSON format, and can then be viewed by retrieving the written results.

The following sections give further details of the services and unit testing library.

Running the Clutch Web Application

Clutch can only perform it's magic with the modified Helma web server running. To start the web server, open a command prompt in the `/Frizione-0.5/Frizione` directory, then type:

```
start
```

The modified Helma web server runs as `localhost` on port `80`, which might conflict with other web servers. After issuing the command the prompt should look something like:

```
Starting HTTP server on port 80
Serving applications from C:\Frizione-0.5\Frizione\
Starting Helma 1.6.2 (August 22 2008) on Java 1.6.0_03
```

That's it, Clutch is up and running. You can stop the web server at any time by pressing `Ctrl-C`.

Changing the Port Number

If port 80 does not suite your needs, you can change the value by editing the `start.bat` or `start.sh` script. Open the file in your favourite text editor, where you should see (`start.bat`):

```
...
:: Set TCP ports for Helma servers
:: (comment/uncomment to de/activate)
set HTTP_PORT=80
rem set XMLRPC_PORT=8081
rem set AJP13_PORT=8009
rem set RMI_PORT=5050
```

or (`start.sh`)

```
...
# Set TCP ports for Helma servers
# (comment/uncomment to de/activate)
HTTP_PORT=80
# XMLRPC_PORT=8081
# AJP13_PORT=8009
# RMI_PORT=5050
```

Change the `HTTP_PORT` setting to the port value that you want, then restart the web server.

Running as a Pseudo Domain

In some circumstances, particularly for Gears development, you may want to use an URL such as `http://clutch.syger.it` instead of `http://localhost`. This can be achieved by setting the `hosts` file.

On Windows you'll find the hosts file in `C:\Windows\system32\drivers\etc`, whereas on most Linux systems it is located in `/etc`. Again, using your favourite text editor, open the file and add a line as follows:

```
127.0.0.1       clutch.syger.it
```

Save the file, and with the web server running, open your browser and type the URL `http://clutch.syger.it/` which should now present you with the Helma home page. Typing the URL `http://clutch.syger.it/frizione/` should present you with the Frizione home page.

Services

The Frizione web application provides a suite of services which aid in the development, testing, and deployment of JavaScript software. These services are made automatically available, based on a small, simple set of file naming conventions.

Frizione searches the `/apps`, `/frizione-projects` and `/modules` sub directories of the web server, looking for a `frizione.json` file which (currently) contains a single name element:

```
{
    "name":   "Clutch Library"
}
```

Only those sub directories containing a valid `frizione.json` file will be included for special treatment by Clutch.

The `/apps` and `/modules` sub directories are specific to Helma web application development, and currently a reduced set of Clutch services are available.

The `/frizione-projects` sub directory, on the other hand, is designed specifically for client side JavaScript development, and is explained in detail in the following sections.

JSLint Service (/jslint)

The original lint program analysed C source code for potential (and subtle) malpractices likely to lead to run-time bugs. Modern C compilers now provide sufficient syntactic and semantic checking that `lint` is now rarely required or used.

Fortunately for JavaScript programmers, Douglas Crockford has built a lint program specifically for JavaScript, in JavaScript, called JSLint. Finding and removing potentially poor code before unit testing is an essential process, at least for me. Unfortunately, cutting and pasting code to the web page can itself be error prone.

Clutch alleviates this problem by running JSLint on any JavaScript file ending in `.js`, except those ending in `.join.js`, `.min.js`, `.jsdoc.js`, or `.test.js`, which are treated differently. Clutch also creates a `jslint.options.json` file which provides project wide JSLint options settings. This file can be modified using your favourite text editor.

To invoke the service, select the "`JSLint files`" link under "`JavaScript files`" in the desired project page (see http://clutch.syger.it/frizione/projects/clutch/ for an example), then select a file to check. Clutch will then run JSLint on the JavaScript file, using the `jslint.options.json` values.

You can also make file specific settings by creating special comments inside the JavaScript file itself. Use `/*jslint ... */` to make specific options settings, and `/*global ... */` to define specific global variables. See http://clutch.syger.it/frizione/projects/clutch/jslint/js/dev/browser.js for an example.

JSON file view (/jsonview)

Clutch will display the contents of a JSON file ending in `.json`, except those ending in `.test.json`, which are treated with greater respect.

To invoke the service, select the "`Viewable files`" link under "`JSON files`" in the desired project page (see http://clutch.syger.it/frizione/projects/clutch/ for an example), then select a file to view. Clutch will then display the contents of the JSON file.

HTML file view (/htmlview)

Clutch will display the contents of a HTML file ending in `.html`.

To invoke the service, select the "`Viewable files`" link under "`Static files`" in the desired project page (see http://clutch.syger.it/frizione/projects/clutch-gears/ for an example), then select a file to display. Clutch will then display (actually redirect to) the HTML file.

CSS Join Service (/cssjoin)

The join (or concatenate) service can be run on any CSS file that ends with `.join.css`. The actual join parameters are specified inside the CSS file in a special `/*join ... */` comment. Clutch checks that you supply an output URL, and that it is not identical to the input URL. Clutch then joins together a list of CSS files, producing a single concatenated file. Each file can contain `include` commands which contain relative URLs to other files to be included at the point of the `include` command itself. This process can also be repeated within the included files (nesting).

To invoke the service, select the "`Join files`" link under "`CSS files`" in the desired project page (see http://clutch.syger.it/frizione/projects/clutch/ for an example), then select a file to join. Clutch will then execute and display the results of the join operation.

CSS Join Service Example

This example is taken from `/Frizione-0.5/Frizione/frizione-projects/clutch/css/dev-browser/clutch.join.css`.

```
/*join to: /css/clutch-all.css
     gzip: /css/clutch-all.css.gz */
<%= include('./clutch.css', './jslint.css') %>
```

Given the following directory layout:

```
/Frizione-0.5
  /Frizione
    /frizione-projects
      /clutch
        /css
          /dev-browser
            clutch.join.css
            clutch.css
            jslint.css
          clutch-all.css
          clutch-all.css.gz
        ...
        frizione.json
```

The relative URL to the two included files is `./`. Note also that the `/*join ... */` command comment requires each parameter on a separate line.

CSS join parameters:

Name	Value
`to`	The destination file URL within the project directory.
`gzip`	The optional destination gzip file URL within the project directory.

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/css/dev-browser/clutch.join.css`.

JavaScript Join Service (/jsjoin)

The join (or concatenate) service can be run on any JavaScript file that ends with `.join.js`. The actual join parameters are specified inside the JavaScript file in a special `/*join ... */` comment. Clutch then joins together a list of JavaScript files, producing a single concatenated file. Each file can contain `include` commands which contain relative URLs to other files to be included at the point of the `include` command itself. This process can also be repeated within the included files (nesting).

To invoke the service, select the "`Join files`" link under "`JavaScript files`" in the desired project page (see http://clutch.syger.it/frizione/projects/clutch/ for an example), then select a file to join. Clutch will then execute and display the results of the join operation.

JavaScript Join Service Example

This example is taken from `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-browser/browser-unittester.join.js`.

```
/*join to: /js/browser-unittester.cjs
     gzip: /js/browser-unittester.cjs.gz */
<%= include('./json2.js', './xhr.js', '../dev/unit-test.js', './saver.js') %>
```

Given the following directory layout:

```
/Frizione-0.5
  /Frizione
    /frizione-projects
      /clutch
        /js
          /dev
            unit-test.js
          /dev-browser
            browser-unittester.join.js
            json2.js
            xhr.js
            saver.js
          browser-unittester.cjs
          browser-unittester.cjs.gz
        ...
        frizione.json
```

The relative URL to the four included files is `./` and `../dev` respectively. Note also that the `/*join ... */` command comment requires each parameter on a separate line.

JavaScript join parameters:

Name	Value
`to`	The destination file URL within the project directory.
`gzip`	The optional destination gzip file URL within the project directory.

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-browser/browser-unittester.join.js`.

CSS Minify Service (/cssminify)

The minify or compressor service can be run on any CSS file that ends with `.join.css`. The actual minify parameters are specified inside the CSS file in a special `/*minify ... */` comment. Clutch checks that you supply an output URL, and that it is not identical to the input URL. Clutch then optionally joins together a list of CSS files, producing a single concatenated file, which is then minified using YUICompressor.

To invoke the service, select the “`Minify files`” link under “`CSS files`” in the desired project page (see `http://clutch.syger.it/frizione/projects/clutch/` for an example), then select a file to minify. Clutch will then execute and display the results of the minify operation.

CSS Minify Service Example

This example is taken from `/Frizione-0.5/Frizione/frizione-projects/clutch/css/dev-browser/clutch.min.css`.

```
/*minify to: /css/clutch-all.css
       gzip: /css/clutch-all.css.gz */
<%= include('./clutch.css', './jslint.css') %>
```

Given the following directory layout:

```
/Frizione-0.5
  /Frizione
    /frizione-projects
      /clutch
        /css
          /dev-browser
            clutch.join.css
            clutch.css
            jslint.css
          clutch-all.css
          clutch-all.css.gz
        ...
        frizione.json
```

The relative URL to the two included files is `./`. Note also that the `/*minify ... */` command comment requires each parameter on a separate line.

CSS minify parameters:

Name	Value
`to`	The destination file URL within the project directory.
`gzip`	The optional destination gzip file URL within the project directory.
`mc`	The optional maximum number of characters before a forced line break (default is 0).

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/css/dev-browser/clutch.min.css`.

JavaScript Minify Service (/jsminify)

The minify or compressor service can be run on any JavaScript file that ends with `.min.js`. The actual minify parameters are specified inside the JavaScript file in a special `/*minify ... */` comment. Clutch checks that you supply an output URL, and that it is not identical to the input URL. Clutch then optionally joins together a list of JavaScript files, producing a single concatenated file, which is then minified using YUICompressor.

To invoke the service, select the "`Minify files`" link under "`JavaScript files`" in the desired project page (see `http://clutch.syger.it/frizione/projects/clutch/` for an example), then select a file to minify. Clutch will then execute and display the results of the minify operation.

JavaScript Minify Service Example

This example is taken from `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-browser/browser-unittester.min.js`.

```
/*minify to: /js/browser-unittester.cjs
       gzip: /js/browser-unittester.cjs.gz */
<%= include('./json2.js', './xhr.js', '../dev/unit-test.js', './saver.js') %>
```

Given the following directory layout:

```
/Frizione-0.5
  /Frizione
    /frizione-projects
      /clutch
        /js
          /dev
            unit-test.js
          /dev-browser
            browser-unittester.join.js
            json2.js
            xhr.js
            saver.js
          browser-unittester.cjs
          browser-unittester.cjs.gz
        ...
        frizione.json
```

The relative URL to the four included files is `./` and `../dev` respectively. Note also that the `/*minify ... */` command comment requires each parameter on a separate line.

JavaScript minify parameters:

Name	Value
`to`	The destination file URL within the project directory.
`gzip`	The optional destination gzip file URL within the project directory.
`mc`	The optional maximum number of characters before a forced line break (default is 0).
`munge`	Optionally reduce function and variable names (default is `false`).
`ps`	Optional, preserve semicolons (default is `true`).
`opt`	Optional, use micro optimisations (default is `true`).

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-browser/browser-unittester.min.js`.

JavaScript Documentation Service (/jsdoc)

Although documentation is traditionally the least favoured aspect of programming, the JsDoc Toolkit is an excellent documentation generator, which has similar functionality to the JavaDoc utility, but also provides many additional tags which cater for the various nuances of the JavaScript language. In addition JsDoc Toolkit is written entirely in JavaScript.

The JavaScript documentation service can be run on any JavaScript file that ends with

.jsdoc.js. The actual JsDoc parameters are specified inside the JavaScript file in a special /*jsdoc ... */ comment. Clutch checks that you supply an output directory. Clutch then passes the specified source files and parameters to JsDoc Toolkit, which then generates the documentation.

To invoke the service, select the "JsDoc files" link under "JavaScript files" in the desired project page (see http://clutch.syger.it/frizione/projects/clutch/ for an example), then select a file to generate documentation. Clutch will then execute and display the results of the JsDoc Toolkit operation.

JavaScript Documentation Service Example

Whereas most of the other services use the project directory as the base URL for relative URL referencing, the JavaScript documentation service uses the web application directory instead (/Frizione-0.5/Frizione). This allows documentation to be produced from multiple projets.

This example is taken from /Frizione-0.5/Frizione/frizione-projects/clutch/clutch.jsdoc.js.

```
/*jsdoc src: /frizione-projects/clutch/js/dev/browser.js
        src: /frizione-projects/clutch/js/dev/introspect.js
        src: /frizione-projects/clutch/js/dev/string.js
        src: /frizione-projects/clutch/js/dev/unit-test.js
        src: /frizione-projects/clutch/js/dev/gears
          d: /../docs/clutch
          s: true */
```

Given the following directory layout:

```
/Frizione-0.5
  /Frizione
    /frizione-projects
      /clutch
        /js
          /dev
            browser.js
            introspect.js
            json2.js
            string.js
            unit-test.js
            /gears
              db-logger.js
              db-utils.js
              gears.js
              timer.js
              wp-messages.js
              wp-unit-test.js
              xhr.js
        ...
```

The relative URL to the main source directory is /frizione-projects/clutch/js/dev. Note that source files can be specified individually, or as a file set, by specifying the source directory.

Note also that the /*jsdoc ... */ command comment requires each parameter on a separate line.

JavaScript documentation parameters:

Name	Value
`src`	The source file path, either to a specific file or directory, with respect to the web application directory. More than one `src` parameter can be specified. At least one `src` parameter must be specified.
`a`	Include all functions, even undocumented ones (default is `false`).
`d`	Specifies the output directory, with respect to the web application directory. This parameter is required. Directories can be specified outside the web application directory by prefixing the directory with `/..` or `/../..`.
`e`	Specifies both the JavaScript file encoding and the output HTML file encoding (default is "`UTF-8`").
`n`	Ignores all code, only documenting comments with `@name` tags (default is `false`).
`p`	Includes symbols tagged as private, underscored and inner symbols (default is `false`).
`s`	Suppresses the output of highlighted source code (default is `false`).

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/clutch.jsdoc.js`.

JavaScript Test Service (/jstest)

The test service can be run on any JavaScript file that ends with `.test.js`. The actual test parameters are specified inside the JavaScript file in a special `/*test ... */` comment. Clutch checks that you supply an output URL, and that it is not identical to the input URL. Clutch then optionally joins together a list of JavaScript files, producing a single concatenated file, which is then optionally minified using YUICompressor, and the test is run.

To invoke the service, select the "`Test files`" link under "`JavaScript files`" in the desired project page (see `http://clutch.syger.it/frizione/projects/clutch/` for an example), then select a file to test. Clutch will then execute and display the results of the test.

JavaScript Test Service Example

This example is taken from `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-test/string.test.js`.

```
/*test to: /js/test/string.js
     json: /js/test/string.test.json */
<%= include('../dev/string.js') %>
<%= include('./string.js') %>
```

Given the following directory layout:

```
/Frizione-0.5
  /Frizione
    /frizione-projects
      /clutch
        /js
          /dev
            string.js
          /dev-test
            string.test.js
            string.js
          /test
            string.js
            string.test.json
        ...
        frizione.json
```

The relative URL to the two included files is `./` and `../dev` respectively. Note also that the `/*test ... */` command comment requires each parameter on a separate line.

JavaScript test parameters:

Name	Value
`to`	The destination file URL within the project directory.
`gzip`	The optional destination gzip file URL within the project directory.
`json`	The destination file URL within the project directory of the unit tests. Make sure that the URL ends with `.test.json` so that Clutch will recognise the file as a unit test results file.
`type`	The optional testing environment type, one of `browser`, `gears`, `rhino`, or `workerpool` (default is `browser`).

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-test/string.test.js`.

JSON Test Result View Service (/jsontest)

The test result view service can be run on any JSON file that ends with `.test.json`.

To invoke the service, select the "`Test results files`" link under "`JSON files`" in the desired project page (see http://clutch.syger.it/frizione/projects/clutch/ for an example), then select a file to view. Clutch will then display the results of the test.

Read Fixture Service (/readfixture)

This service allows you to read data from hard disk. When sent a `GET`, the service reads data from the file specified in the URL, optionally modifying the contents with parameter values specified in the `GET` request.

To invoke the service, send a `GET` request to `/frizione/projects/`*project-name*`/readfixture/`, appending the absolute file path, with respect to the project root directory, as part of the URL. Clutch will read that file, accepting and executing `include` commands (see the Join Service, above), as well as injecting parameters into the constructed text file.

You can use as many parameters as you like, with the following constraints:

- any parameter names starting with `frizione`, are reserved by Clutch,
- within the text file each parameter value can be referenced by name,
- more complicated expressions can be achieved using JavaScript code snippets.

Read Fixture Service Example

The following example is taken from `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-test/gears/xhr.js`:

```
var abort = clutch.xhr.executeRequest("GET",
    '/frizione/projects/clutch/readfixture/js/dev-test/gears/xhr-test-data.json',
    null, null, 2000, this.validUrlHandler);
```

Write Fixture Service (/writefixture)

The fixture service allows you to write text to hard disk. When sent a `POST`, the service writes the `POST` data to the file specified in the URL.

To invoke the service, send a `POST` request to `/frizione/projects/`*project-name*`/writefixture/`, appending the absolute output file path, with respect to the project root directory, as part of the URL.

Write Fixture Service Example

The write fixture service is used by the run unit test service to store the JSON formatted test results file. A JavaScript example of this usage is shown below:

```
function storeClutchTests(testFunction, jsonUrl, viewUrl) {

  jsonUrl = '/frizione/projects/clutch/writefixture' + jsonUrl;
  ...
  clutch.executeRequest("POST", jsonUrl, null,
      JSON.stringify(tests.summarise(), null, "\t"), handleRequest);
}
```

Here `jsonUrl` is the file path where the results are stored, and the POST body is created by the `JSON` library `stringify` function.

See `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-browser/saver.js` for the complete code example.

TODO: show true fixtures examples...

Unit Testing

Unit testing is another useful technique to better ensure the quality and correctness of your JavaScript code. Unfortunately, the dynamic nature of JavaScript makes it a difficult environment in which to perform unit testing. One of the most important aspects is to provide a simple and unobtrusive unit test library, which does not alter the characteristics of your own code.

To achieve this objective, Clutch uses a two pass technique. The first pass runs the unit testing code, and stores the results to a JSON file. The second pass reads and then displays the JSON file.

Note that the Clutch unit test framework, due to it's architecture, is not suited for user interface testing, for such needs you might want to consider something like Selenium.

In the first pass, Clutch necessarily adds the unit test framework to your unit test code, kept in two namespaces, `JSON` and `clutch`, so as not to interfere with your own code.

In order for the unit testing process to work, you must supply a `runClutchTests` function in your own code, which either returns a `clutch.test.unit` or a `clutch.test.group` object.

Here is an example of a `runClutchTests` function which returns a `clutch.test.unit` object:

```
function createUnitTests() {
  return clutch.test.unit('Assertion Tests', {

    testPass: function () {
      // ...
    },

    // other tests here

  }, 1000);
}

function runClutchTests() {
  return createUnitTests();
}
```

The `clutch.test.unit` function requires three parameters; the name of the unit test, the object to test, and a maximum timeout period in milliseconds.

Here is an example of a `runClutchTests` function which returns a `clutch.test.group` object:

```
function createUnitTests() {
  return clutch.test.unit('Assertion Tests', {

    testPass: function () {
      // ...
    },

    // other tests here

  }, 1000);
}

function createStringTests() {
  return clutch.test.unit('String Tests', {

    testTrim: function () {
      // ...
    },

    // other tests here
  }, 1000);
}

function runClutchTests() {
  return clutch.test.group([
    createUnitTests(),
    createStringTests()
  ], 2000);
}
```

The `clutch.test.group` function requires two parameters; an array of `clutch.test.unit` objects to test, and a maximum timeout period in milliseconds.

The second pass is independent of your unit testing code, and so can use Prototype to dynamically produce the unit test results display.

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-tests/` for example unit test code.

WorkerPool Unit Testing

Clutch also provides extensions to the unit testing framework to allow you to test your code within a `WorkerPool` environment. In this case, additional JavaScript files must be added to your code which will then be loaded together into a `WorkerPool` instance, again kept in one namespace, `clutch`, so as not to interfere with your own code.

The Unit Test Framework

The framework follows a similar pattern to the well known JUnit Java testing framework.

Create your test methods in a plain JavaScript object, then wrap that object in a `clutch.test.unit` function call, as shown in the first example above. All functions in your test object which begin with `test` will be executed by the unit test framework, but the order of function execution is not guaranteed.

Before a `test`*xxx* function is executed, the unit test framework will execute a `setUp` function in your object. After a `test`*xxx* function has been executed, the unit test framework will execute a `tearDown` function in your object. Clutch provides a default no-operation function for `setUp` and `tearDown` if none are defined in your object.

You can run more than one unit test object by wrapping each in a `clutch.test.group` function call, after you've wrapped each test object in a `clutch.test.unit` function call, as shown in the second example above.

When your test object is being executed, the following functions are available:

Function	Purpose
`this.log(message)`	Adds a 'log' `message` to the unit test results. Essentially works as a logging function, where traditional `console` functions are not available.
`this.fail(message)`	Adds a 'fail' `message` to the unit test results. Use to check that certain code statements are not executed, such as when an exception should have been thrown.
`this.error(/* Error */ err)`	Adds an 'error' message to the unit test results. The `err` parameter should be an instance of `Error`. Not usually required of the unit test code, as all errors are caught and logged by Clutch.
`this.assert(condition, message)`	Checks that the expression defined in `condition` evaluates to true. If not, adds a 'fail' message to the unit test results. The `message` parameter is optional.

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-tests/` for example unit test code. Additionally, `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-tests/gears/` contains Gears specific unit test code.

When the usual `test`*xxx* function naming convention is not suitable, or when you need to control the order of test function calls, Clutch provides a meta-programming mechanism of specifying the test methods, described below.

Asynchronous Unit Testing

Clutch can also perform asynchronous unit testing, but needs a little help from you, the programmer. Each asynchronous test must consist of a synchronous function, and zero or more asynchronous functions which you expect the system under test to call. Clutch only checks the first asynchronous function called, it currently has no provision for checking multiple asynchronous function calls triggered by a single synchronous function call.

The help that Clutch requires from you, is in the form of a small JSON like property within your test object with the name `clutchTests`. The following example shows the meta-programming information:

```
function createXhrTests() {

  return clutch.test.unit('XHR Tests', {

    clutchTests: [
      { func: 'validUrl', callbacks: [ 'validUrlHandler' ] },
      { func: 'invalidUrl', callbacks: [ 'invalidUrlHandler' ] },
      { func: 'abortedRequest', callbacks: [ 'abortedRequestHandler' ] }
    ],
    validUrl: function () {
      // ...
    },

    validUrlHandler: function (status, statusText, responseText) {
      // ...
    },

    // other tests here

  }, 18000);
}
```

The `clutchTests` property consists of an array of objects, each of which contain two properties; `func`, the name of the synchronous function, and `callbacks`, an array of callback functions, or `null` for a pure synchronous test.

The `clutchTests` property can also be used to guarantee the order of a set of synchronous unit tests, or to create a mix of synchronous and asynchronous tests, which again will be run in the specified order. If Clutch finds the `clutchTests` property in your test object, it will not look for the traditional `test`*xxx* functions.

In the following example a set of synchronous tests are executed in the specified order:

```
  function createUnitTests() {

    return clutch.test.unit('Assertion Tests', {

      clutchTests: [
        { func: 'logTest', callbacks: null },
        { func: 'passTest', callbacks: null },
        { func: 'failTest', callbacks: null },
        { func: 'errorTest', callbacks: null },
        { func: 'assertTest', callbacks: null }
      ],

      logTest: function () {
        // ...
      },

      // other tests here

    }, 1000);
  }
```

See also `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-tests/unit-test.js` for an example of synchronous unit test code, and `/Frizione-0.5/Frizione/frizione-projects/clutch/js/dev-tests/gears/xhr.js` for example asynchronous unit test code.

Creating Your Own Projects

Clutch lives a quiet life in a shady Subversion repository. Unfortunately this can make adding your own code to the Clutch framework difficult and potentially dangerous. However, from version 0.2 onwards, Clutch provides a `/frizione-projects` directory in which you can safely store your own JavaScript code, and keep it under the loving care of your own Subversion repository, while still being able to update both your own code, and Clutch itself. The Clutch library is also stored in the

`/frizione-projects/clutch` directory. Whether this can be considered a form of bootstrapping or dog food consumption is a matter of opinion.

Connecting your project to Clutch is relatively simple:

- add a directory for your project under `/frizione-projects`,
- create a `frizione.json` file in that folder,
- click on "`Refresh project list`" in the Clutch home page.

The `frizione.json` file contains the project name. The following is the clutch project `frizione.json` file:

```
{
  "name":   "Clutch Library"
}
```

See `/Frizione-0.5/Frizione/frizione-projects/clutch` and `/Frizione-0.5/Frizione/frizione-projects/clutch-gears` for examples of creating an external project.

JavaScript Library Documentation

Thanks to the addition of JsDoc Toolkit, all JavaScript library documentation is now in HTML format.

See the Clutch web application documentation, the Clutch library documentation, and the Crash library documentation.

Third Party Software

Clutch stands on the shoulders of giants. There are four important JavaScript applications used by Clutch; JSLint, JSON, JsDoc Toolkit, and Prototype. Some of these have been slightly modified for one reason or another, described below.

JSLint

To overcome a parsing bug in Opera, the seven regular expressions, `ax`, `cx`, `tx`, `lx`, `ix`, `jx` and `ux` were converted to string syntax format (at about line 475).

JSON

To overcome a parsing bug in Opera, the two regular expressions, `cx` and `escapable` were converted to string syntax format (at about line 180).

In order to run within a WorkerPool, the `eval(text)` call is replaced with a `new Function(text)()` statement (at about line 456).

JsDoc Toolkit

This excellent documentation generation utility was incorporated into the verion 0.5

release. Minor changes were made to the parser which increases parsing speed by about 30%. The modifications have been handed back to the original author, Michael Mathews.

Prototype

The Prototype library itself has not been modified, but the Clutch string library provides substitutions for `Date.prototype.toJSON()` and `String.prototype.evalJSON()` which allow for the Microsoft Date format, and a Clutch derivative in JSON text.

Why the Name Clutch?

Two reasons, firstly because I felt that I was clutching at straws, and secondly it is the mechanism that lies between the engine - your code - and the gearbox - the browser, or Gears, in my case. It is also the third pedal (the one on the left) in a motor car, which is usually missing on American cars, because they nearly all have automatic gearboxes. I felt it was also the 'missing pedal' in a Gears development environment.

Contacts

Syger can be contacted for consultancy work on any of the topics mentioned in this article, by sending an email to **info@syger.it**.

Clutch RoadMap

by John Leach

The latest release (0.5) is a further improvement in simplification and ease of use. The existing JavaScript code was modified to use the nascent Crash JavaScript library, much reducing the overall amount of code. Additionally, the JsDoc Toolkit code has been added, and documentation generated for the Frizione application, and the Crash and Clutch libraries. It just seems to feel right now, and it certainly makes sense to have a JavaScript tool written in, er, JavaScript.

The following notes are currently just musings, based on my own experience of using Clutch, and there is no guarantee that anything written here will see the light of day as working code. One important point though, I'm still prepared to make breaking changes 'for the common good'. They won't be gratuitous, I'm not that masochistic.

I'm currently treating this document as a reminder to myself that things can be improved. The writing style will probably reflect that statement.

The Good Parts

I'm happy with the unit testing code. Although there are already many JavaScript unit testing frameworks on the market, and this is yet another, I still think it has a few good points:

- It actually works,
- It is a small(ish) amount of code – about 18KB,
- It stores the results as an external JSON file,
- Er, that's it.

I'd like to improve (reduce the amount of) the code that's already there, but it's not very high on my list of priorities.

The JSLint service is a great help. I always check that my code is JSLint clean before running any tests. It's not foolproof, but it certainly acts like a 'missing' compiler. The feeling is definitely warm and fuzzy.

The Join service is just great for building up specialised libraries from small individual modules. I can't cope with 50-100KB JavaScript source files, but I don't want a dozen script tags in my HTML pages either. Plus `WorkerPools` accept only one URL.

The projects directory works nicely, using a simple JSON configuration file. I'm happy with that idea, and I think it can be used elsewhere too.

The simple file naming convention is just great. The tool has become much easier to use, I only have to write a couple of lines of comment commands inside the actual CSS or JavaScript file, so I think I've finally got a tool that I'll make great use of.

Finally, the JsDoc Toolkit integration went very well, and it's a great advantage to be able to generate documentation from embedded comments in the source code itself (ala JavaDoc).

The So-So Parts

In a separate sub project in the Subversion repository (Frizione-Rhino) I have finally amalgamated the Java code which uses Rhino into one single jar. That means that Helma and YUICompressor now work together, producing a huge execution speed up.

Which means that, in the latest release, even the so-so parts have gone.

The Bad Parts

Fortunately, in the latest release, most of the bad parts have disappeared.

The Missing Parts

Well, JavaScript is not such a bad language after all, and Gears is becoming a useful platform.

I think the next software development cycle is going to have to tackle the object relational management problem. Right now I'm using a ODBC/JDBC type model – the `clutch.logger` is an example. I'll get very tired of that after a dozen tables or so.

Clutch Development Notes

The following notes are my observations of several Rhino based, or pure JavaScript projects which are still on my radar, but which I don;t have time for right now.

Web Application Servers

Since it seemed a reasonable idea to move the server code into a server side JavaScript environment, the big question was, which web application server to choose? There are plenty around, mostly Apache/SpiderMonkey or Java/Rhino based, but I reduced the list to three, mostly based on my own home brew 'tyre kicking' process – well we all have one don't we?

The three finalists were:

- Aptana Jaxer, an Apache/SpiderMonkey combination,
- Phobos, a Java/Rhino combination,
- Helma, a Java/Rhino combination.

Although I had some doubts as to its activity level, my first choice was Phobos – until I found that there is no standalone download, you have to download Netbeans (over 100 MB) which contains a module for Phobos. Aptana Jaxer is interesting, but I'm not too happy with a page based controller pattern, nor with the fact that it's almost impossible to extend with C or Java libraries. Which left me with the mature and stable Java based Helma, which was only slightly behind Phobos on my points system - Phobos theoretically handles multiple scripting languages, whereas Helma is JavaScript only.

Helma was a little difficult to understand in terms of its philosophy, however after a few days I think I managed to master it, and the results felt good, especially the low quantity of code. I said quantity.

Similar Projects

This list provides links to projects that I consider to be similar to Clutch. I have only had time to read the advertising, so you'll have to make your own judgement (as always) of the software.

jsLex: this is a profiling tool, which integrates with Aptana Studio, or Eclipse. Designed to help produce efficient JavaScript and CSS, it also provides file concatenation and size reduction.

Maven JSTools Plugin: a Maven interface to a set of JavaScript reporting and documentation tools like JSDoc Toolkit and JSLint, along a simple approach for building JS artifacts and use them as dependencies in your Maven-based projects

newjs: a quite similar concept to Clutch, using the command line, and the Prototype unit testing framework. It provides file concatenation, and uploading to a web site.

JavaScript Libraries of Note

There are an enormous number of JavaScript projects lingering in various open source project sites on the Internet. The majority are either content free, incomplete, or abandoned. Those which pass my 'tyre kicking' process, and seem to have made enough effort to be worth further investigation are listed below. Again, I have only had time to read the advertising, so you'll have to make your own judgement (as always) of the software.

enrichmentkit: JavaScript lib for RIAs featuring URL state representation, rewriting, dispatching, named history entries, model locating, and object observance.

fbug: the Firebug Firefox add-on project.

JavaScriptMVC: a framework that brings methods to the madness of JavaScript development (their words, not mine).

jslibs: standalone Javascript development environment with general purpose native libraries.

jsSHA: a JavaScript implementation of the entire family of SHA hashes as defined in FIPS 180-2 (SHA-1, SHA-224, SHA-256, SHA-384, and SHA-512).

packer: Dean Edwards' JavaScript compressor.

trimpath: open-source web technologies, focused around JavaScript, synchronization, MVC, occasionally connected computing, and Google Gears. The Next Action offline web application is particularly interesting.

simile-widgets: A toolbox of several web widgets and APIs originated from the MIT Simile project. The timeline example is particularly fascinating.

Other Interesting Links

Higher Order JavaScript: a comparison of JavaScript with Perl, using the book Higher Order Perl as the example.

Ajax (and More) Frameworks

This is not an exhaustive list, that would probably require a book. Just some of the better known frameworks, most of which you'll already know about – but then again, you might find a surprise or two.

dojo: the Dojo Toolkit.

jMaki: a client-server framework for creating Jaax applications and mashups.

jQuery: is designed to change the way that you write JavaScript (their words, not mine).

MochiKit: makes JavaScript suck less (their words, not mine).

MooTools: a compact, modular, Object-Oriented JavaScript framework designed for the intermediate to advanced JavaScript developer.

Prototype: a JavaScript Framework that aims to ease development of dynamic web applications. Normally used together with script.acul.ous: provides you with easy-to-use, cross-browser user interface JavaScript libraries to make your web sites and web applications fly (their words, not mine).

qooxdoo: a comprehensive and innovative Ajax application framework.

YUI: the Yahoo! User Interface Library.

Frizione – Clutch Version History

by John Leach

This section notes changes made in the various version releases, in reverse chronological order.

Version 0.5 – 22/08/2008

The JavaScript code which makes up Frizione has been reorganised to make use of the nascent Crash library – a JavaScript library specifically designed for JavaScript applications running on Rhino. This has produced an overall reduction in the quantity of code. Additionally, this version adds JsDoc Toolkit to the battery of utilities available, and the various libraries have now been documented using this excellent utility.

Version 0.4 – 16/07/2008

This is a major shift both in the technology used, and, hopefully, in ease of use. The web application has been rewritten in JavaScript (with a heavy Java accent), using the Helma web application server. Most services are now available using a simple file naming convention, and commands are stored in the files on which the commands are performed. Much less typing, no HTML forms at all.

Version 0.3 – 26/06/2008

This is an important milestone as Clutch can now perform unit testing within a `WorkerPool`. The unit tests have been extended to include Gears WorkerPool, Gears Database, Gears Timer, and Gears XHR testing. The documentation has been updated to reflect most changes.

Minor bug fixes and modifications were made to the unit testing framework, including a message based protocol for remote WorkerPool testing and reporting.

Version 0.2 - 18/06/2008

Added JSMin (the Ruby version), to provide some compression functionality to those who don't want to install Java on their computer.

Added `/projects` directory for user projects which won't be disturbed when updating the Clutch Subversion repository. Migrated Clutch JavaScript code to `/projects/clutch` (Clutch – the library, is the first project for Clutch – the framework, dog food, etc).

Completed the first (working) model for asynchronous unit testing.

Version 0.1.1 – 10/06/2008

Never make changes at the last minute without running all your unit tests. Especially if it is 1 am in the morning. Such is life, and breaking this golden rule invokes numerous laws of Murphy, one of which was that the server stopped working. Fixed within half an hour, fortunately.

Version 0.1 - 10/06/2008

The first public release. Unfortunately, I had to change the project name at the last moment, since `clutch` was already being used on the Google Code web site – hence the new name `frizione` (which is Clutch in Italian).

John Leach

I'm a professional programmer, and Chief Technical Officer of a small software house in Verona, Italy, called Syger. The name came about from being influenced by a drawing by Roger Dean, of ferocious, intelligent badgers, which I transposed to the **S**iberian T**iger**, my favourite animal from childhood, hence Syger.

Most of the work done by my company is consultancy and software development for other software houses.

I now spend most of my time divided between scripting languages and frameworks such as Ruby, Groovy, Ruby on Rails, and Grails, and my old time favourites, Java and JavaScript.