



for Web Applications

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About Me

- Director, Jason Davies Ltd
- Apache CouchDB contributor
- Python, Django, JavaScript, jQuery
- Cambridge University (ML!)

CouchApps

- Pure CouchDB applications
- Standalone: hosted entirely on CouchDB “stack”, usually one app per _design doc
- Single step deployment via replication
- Enforces “scalable thinking”
- P2P Web

?!!

`couchapp`

- Scripts written in Python to make developing pure CouchDB applications easier
- `sudo easy_install couchapp`
- `couchapp generate relax && cd relax`
- `couchapp push http://127.0.0.1:5984/mydb`

Directory Structure

```
elyservice/  
  _attachments/  
  lib/  
    helpers/  
      ejs.js  
  templates/  
    layout/  
      head.html  
      tail.html  
  shows/  
    contact.js  
    page.js
```

Resulting Design Doc

Field	Value
_attachments	✕ index.html 413 bytes, text/html ✕ style/main.css 21 bytes, text/css ✕ vendor/couchapp/jquery.couchapp.js 6.8 KB, application/javascript
_id	"_design/relax"
_rev	"5-2484564001"
✕ couchapp	⊕ signatures ⊕ length ⊕ objects ⊕ manifest
✕ lib	⊕ templates ⊕ helpers
✕ lists	
✕ shows	
✕ vendor	⊕ couchapp
✕ views	

_list

- Arbitrary JS transformation for views
- http://127.0.0.1:5984/mydb/_design/app/_list/myview?startkey=...&endkey=...
- JSON -> HTML, JSON -> XML, ...
- E4X nice for XML generation
- Iteratively call `getRow()` and use `send(...)`

```
function (head, req) {  
  var row;  
  send('<ul>');  
  while (row = getRow()) {  
    send('<li>' + row.value.name + '</li>');  
  }  
  return '</ul>';  
}
```


_show

- Arbitrary transformation for documents
- http://127.0.0.1:5984/mydb/_design/app/_show/mydoc
- `function (doc, req) { return “foo”; }`

JavaScript Templating

- EmbeddedJS (EJS)
 - `<% /* execute arbitrary JS */ %>`
 - `<%= /* execute and include result */ %>`
 - `new EJS({ text: mytemplate }).render(doc);`
- John Resig's Micro-Templating
 - `new template(mytemplate)(doc);`
 - Doesn't preserve whitespace or LaTeX backslashes

Push Helper Macros

- Simple macros to facilitate code re-use
- Insert code directly
 - `// !code path/to/code.js`
- Encode file as JSON: `path/to/test.html`
 - `// !json path.to.test`
 - `// !json _attachments/test.html`

Experiments!



CouchDB on Wheels



Casual Lofa: the World's fastest furniture
(87 m.p.h.)



Ely Service

Specialists in Classic Rovers

We specialise in classic Rovers (P4, P5 and P6 models) as well as other classic cars, ranging from a 1937 Austin 10 Cambridge through the decades to modern-day classics from the '90s.

Classic Car Services

- Basic servicing
- M.O.T.
- complete restoration, including:
- mechanical work
- bodywork
- paintwork
- interior trim
- rechroming
- supply and fitting of correct tyres for your classic.



[Read more...](#)

Modern Car Services

For those of you unlucky enough ever to have anything but a modern 'tin box'—but we love them really!—we offer you a similar level of service to that which our classic-car customers enjoy.

[Read more...](#)



History

The business first opened sometime in 1930, but the important date is March 1st, 1931, when Mr Charles Hull purchased the business. The following years saw the Company go from strength to strength, enjoying a number of franchises, including those of the well-known Rootes



A Message from the Owner

I bought my first P6 in 1990 and they have gradually taken over. Over time I then progressed into P5 ownership as well. So when my chance came to take over at Ely, it seemed like manna from heaven!

[Read more...](#)



www.elyservice.co.uk

- “Just a very ordinary-looking garage Web site” @jchris
- Originally developed using Django
- 5 static pages
- 1 contact form that sends e-mail



Ely Service

Specialists in Classic Rovers

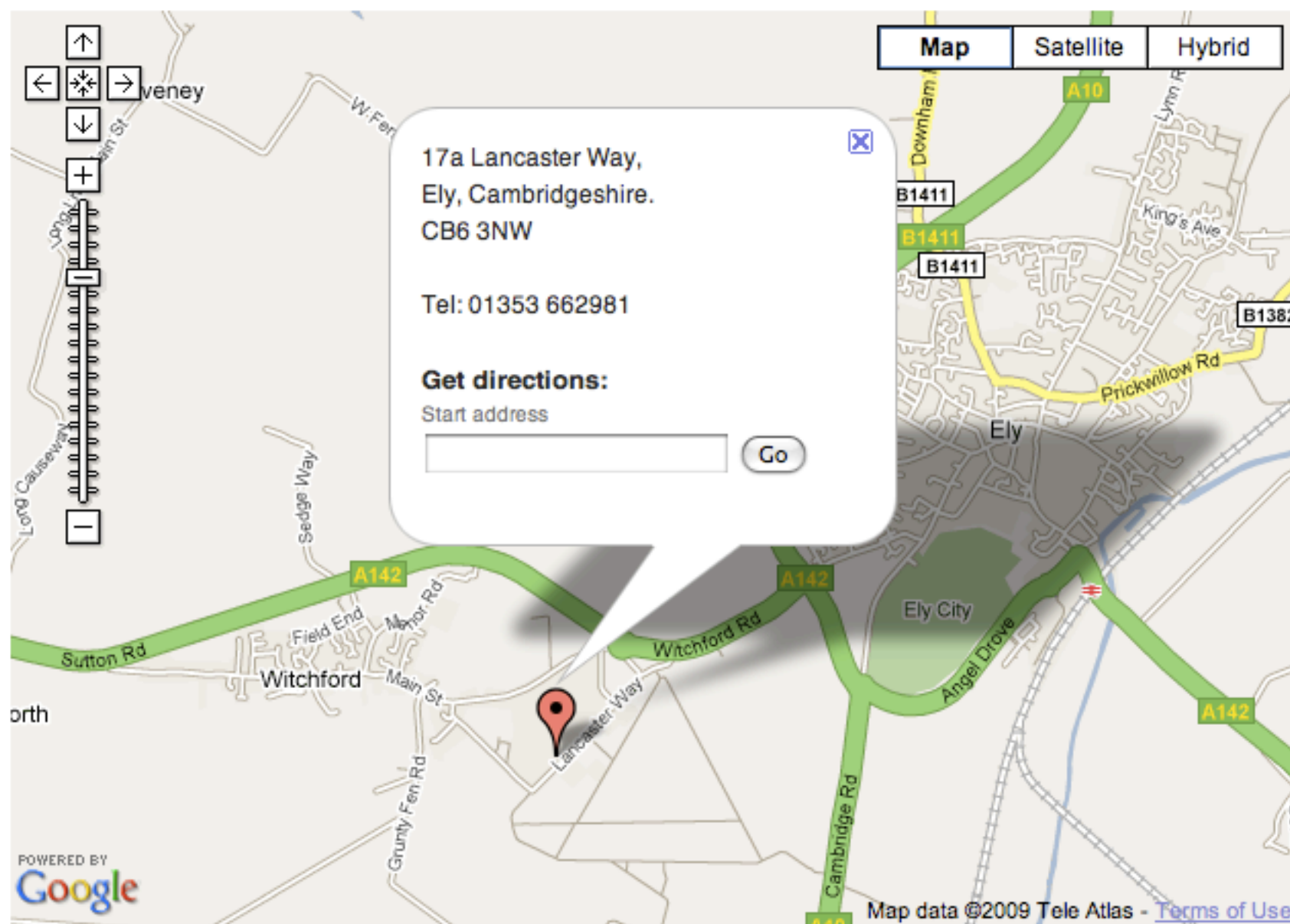
Contact Ely Service

Contact Form

Please use the form below to send us a message:

Name:

E-mail:



Static Pages

- Very easy to do
- Simple JS function in `shows/pages.js`
- Takes `doc.title`, `doc.content` and renders template using EJS

Example shows/page.js

```
function (doc, req) {  
  // !json templates  
  // !code lib/helpers/couchapp.js  
  // !code lib/helpers/ejs.js  
  var body = new EJS({  
    text: templates.layout.head + templates.page + templates.layout.tail  
  }).render({  
    assets: assetPath(),  
    doc: doc  
  });  
  return {  
    headers: { 'Content-Type': 'text/html; charset=UTF-8' },  
    body: body  
  };  
}
```

Pretty URLs

- / -> /elyservice/_design/elyservice/_show/pages:home
- /about/ -> /elyservice/_design/elyservice/_show/pages:about
- We need a flexible URL router

Nginx

- Use Nginx as a reverse-proxy
- Simple rewrite rules using regular expressions
- Works well
- Config is a bit unwieldy
- Have to edit config file and reload Nginx process every time I change a route

```
server {
    listen 89.145.97.172:80;
    server_name www.elyservice.co.uk;
    set $projectname elyservice;

    location / {
        if ($request_method !~ ^(GET|HEAD)$) {
            return 444;
        }

        proxy_pass http://127.0.0.1:5984/elyservice;
        proxy_redirect default;
        proxy_set_header X-Orig-Host '$host:$server_port';

        rewrite ^/media/(.+) $ /$projectname/_design/elyservice/$1 break;
        rewrite ^/$ '/$projectname/_design/elyservice/_show/pages' break;
        rewrite ^/(.*)/$ '/$projectname/_design/elyservice/_show/pages/pages:$1' break;

        return 404;
    }

    location /contact/ {
        if ($request_method !~ ^(GET|HEAD|POST)$) {
            return 444;
        }

        proxy_pass http://127.0.0.1:5984/elyservice;
        proxy_redirect default;
        proxy_set_header X-Orig-Host '$host:$server_port';

        if ($request_method = POST) {
            rewrite ^/contact/$ /$projectname/ break;
        }
        rewrite ^/contact/$ '/$projectname/_design/elyservice/_show/contact' break;

        return 404;
    }
}
```

`_rewrite`

- URL routing for pure CouchDB applications
- Still in experimentation phase
- Simple experiment using Webmachine-style syntax encoded as JSON in `_design` doc
- Atoms are encoded as “<atom>”, since “<” and “>” are invalid URL characters

rewrites.json

```
[
  {
    "match": ["media", "<*>"],
    "rewrite": ["_design", "bethabracha", "<*>"]
  }, {
    "match": ["products", "<id>"],
    "rewrite": ["_design", "bethabracha", "_show",
"<id>"]
  }, {
    "match": ["products", "<id>", "media", "<*>"],
    "rewrite": ["<id>", "<*>"]
  }
]
```

Code

- <http://github.com/jasondavies/couchdb/tree/rewrite>
- Supports Webmachine-style routes for URL rewriting
- Needs support for rewriting query string (or equivalent)
 - e.g. /blog/tags/foo/ -> .../_view/by_tag?

Sending E-Mail

- No native SMTP support in CouchDB (yet)
- Never give up! Implement simple message spooler in CouchDB
- Use an update_notification process
(python send_emails.py)
- Or run this as a cron job on N slaves

```

function (doc, req) {
  // !json elyservice
  // !json templates
  // !code lib/helpers/copyright.js
  // !code lib/helpers/couchapp.js
  // !code lib/helpers/ejs.js
  // !code lib/helpers/google_analytics.js
  var template = templates.head + templates.show + templates.
  doc = {
    title: 'Contact Us',
    content: new EJS({text: templates.contact}).render({
      assets: assetPath(),
      google_maps_api_key: elyservice.google_maps_api_key
    })
  };
  var slug = 'contact';
  var google_analytics = render_google_analytics('');
  return {
    headers: {'Content-Type': 'text/html; charset=UTF-8'},
    body: new EJS({text: template}).render({
      title: doc.title,
      doc: doc,
      copyright: copyright,
      assets: assetPath(),
      bodyclass: slug,
      google_analytics: google_analytics,
    })
  };
}

```

"shows/contact.js" 29L, 832C

```

db = server[db_name]
smtp_server = smtpplib.SMTP('localhost')
for row in db.view('mail_spool/mail_spool', include_docs=True):
    doc = row.doc
    # failsafe check
    if doc['status'] != 'spool':
        continue
    try:
        # update message status
        doc['status'] = 'processing'
        db[doc.id] = doc
        validate_str = doc['from'] + doc['from_name']
        if '\n' in validate_str or '\r' in validate_str:
            doc['status'] = 'invalid'
            db[doc.id] = doc
            continue
        message = "From: %s <%s>\r\nTo: %s\r\nSubject: %s\r\n\r\n%s" % (
            doc['from_name'], doc['from'], ', '.join(RECIPIENTS[db_name]['emails']),
            RECIPIENTS[db_name]['subject'], doc['text'])
        smtp_server.sendmail(doc['from'], RECIPIENTS[db_name]['emails'], message)
        doc['status'] = 'sent'
        db[doc.id] = doc
    except ResourceConflict:
        continue
smtp_server.quit()

```

Code

<http://github.com/jasondavies/couchdb-contact-form>

Security & Validation I

Configure Nginx to reject non-GET/HEAD requests:

```
if ($request_method !~ ^(GET|HEAD)$) {  
    return 444;  
}
```

Non-standard error code 444 causes Nginx to drop connection

- Use separate Nginx config block to allow POSTs to /contact/

Security & Validation II

validate_doc_update.js

```
function (newDoc, oldDoc, userCtx) {  
  // !code _attachments/validate.js  
  if (userCtx.roles.indexOf('_admin') !== -1) {  
    return;  
  }  
  if (oldDoc == null) {  
    return validate(newDoc);  
  }  
  throw {forbidden: "Invalid operation: existing messages cannot be modified."};  
}
```


IRC Experiments

- CouchDB good for storing large quantities of data for analysis
- Simple logger for #couchdb IRC chatroom
- Create pretty graphs

#couchdb

Update

jan_ (521 lines total)

30 APR 2009

30 APR 2009

30 APR 2009

30 APR 2009

30 APR 2009

30 APR 2009

30 APR 2009

1

24

rakieandjake.com

- Originally written using Django
- Converted to CouchApp for fun
- Auto-thumbnailing of wedding photos
 - Similar to spooler, a special view lists thumbnail sizes that still need to be generated
 - Python script pushes thumbnails into docs as attachments

JASON DAVIES & RACHEL LOVELL

[HOME](#)[PHOTOS](#)[PROGRAMME](#)[DIRECTIONS](#)[GIFT LIST](#)[F.A.Q.](#)

Married on the 26th of July, 2008

Welcome! Please ensure you [reply to your invitation](#) by the first of July, in order for us to confirm numbers with [New Hall College](#). So far, 200 people have confirmed they are attending.

The proceedings will begin with the wedding ceremony at 2 o'clock in the afternoon, followed by the Drinks Reception and photographs in the Scholar's Garden. Please see the [Programme](#) for more information about the day.

If you are travelling from London or elsewhere outside Cambridge, please refer to the [Directions](#).

Those wishing to buy us gifts should refer to the [Gift List](#) for ideas.

If you have any other questions, please [get in touch](#).



The important date: Saturday, the twenty-sixth of July at 2 o'clock in the afternoon.

Time since Saturday, the twenty-sixth of July, MMVIII at two o'clock p.m.: 335 days, 11 minutes and 59 seconds.

JASON DAVIES & RACHEL LOVELL

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Login

Username:

Password:

Login

Time since Saturday, the twenty-sixth of July, MMVIII at two o'clock p.m.: 335 days, 15 minutes and 22 seconds.



Secure Cookie Authentication

- Reasonable performance/simplicity of JavaScript implementation
- Mutual authentication
- Resistance to off-line dictionary attacks based on passive eavesdropping
- Passwords stored in a form that is not plaintext-equivalent
- Limited resistance to replay attacks



EPIC BEARD

Safest place to keep your private key

Tamper-Proof Cookies

```
username + ':' + timestamp + ':' + HMAC(username + ':' + timestamp)
```

Timestamp + signature => limited forward-security
(outside of timestamp window)

Secure Remote Password Protocol (SRP)

- Zero-Knowledge Password Proof
- Simple to implement in Erlang using BigInteger and crypto libraries
- JavaScript too slow: over 5s for 1024 bits
- Vulnerable to active injection attacks
- There are simpler protocols that can be used to give equivalent security
- Just add SSL for protection from active attacks (or lobby for TLS-SRP/J-PAKE!)

couch_httpd_auth |

- Drop-in replacement for default_authentication_handler
 - Populates user_ctx (req.userCtx)
 - Falls back to HTTP Basic for replication

couch_httpd_auth II

- <http://github.com/jasondavies/couchdb/tree/cookie-auth>
- Uses simple plaintext authentication for now, will add pluggable authentication mechanisms
- Due to be merged into trunk “soon”
- Used in <http://nymphormation.org>

login

latest

comments

add

NYMPHORMATION.01

About Nymphormation

Nymphormation is a **Couchapp** that allow people to share links. You can find code on **bitbucket**.

Software Copyright ©
2009 **benoit chesneau**.
Design by **edna piranha**

Latest links

cg society - artistic collaboration features.cg society.org

by  **cypherpunk** 6 days ago at 04:07 **2 comments** **0 vote**

pirates www.youtube.com

by  **benoitc** Wed Jun 17 21:13:37 2009 **0 comments** **0 vote**

drizzle: rethinking the mysql database kernel www.linux-mag.com

by  **benoitc** Wed Jun 17 11:46:12 2009 **0 comments** **0 vote**

the couchdb framework in python couchdbkit.org

by  **benoitc** Tue Jun 16 09:44:50 2009 **0 comments** **0 vote**

working on it blog.macromates.com

by  **benoitc** Sun Jun 14 17:52:06 2009 **0 comments** **1 vote**

couchdbkit api couchdbkit.org

by  **benoitc** Sun Jun 14 11:43:39 2009 **0 comments** **0 vote**

Bet Ha Bracha

- Mum's Web site
- Fun experiment: E-commerce on pure CouchDB!
- Product catalogue
- Google Checkout integration
- Google Base Atom feed
- Again, originally written in Django

Shop by Category

[Anointing Oil](#)

[Books & Bibles](#)

[Candlesticks](#)

**Edom Dead Sea
Products**

[Flags](#)

[Hanukkah](#)

[Jewellery](#)

[Kiddush Cups](#)

[Kippahs](#)

[Menorahs](#)

[Mezuzahs](#)

[Music](#)

[Prayer Shawls \(Tallit\)](#)

[Shofars](#)

[T-shirts](#)

[Wall Hangings & Prints](#)

Edom Dead Sea Products

The remarkable benefits of the Dead Sea minerals on skin and body are now available to you with Edom's range of Dead Sea mineral-rich skin care products. The minerals in Edom's products stimulate the flow of oxygen to the skin cells, improving their metabolism and vitality, and thus improving the overall appearance of the skin.



Edom Dead Sea Body Lotion

In stock

£9.99

For all skin types. This Dead Sea mineral rich Body Lotion is mild, non-greasy and absorbed quickly by the skin. It ...

[More details...](#)



Edom Dead Sea Shower Gel

In stock

£8.99

Spoil yourself with a refreshing, invigorating and nourishing shower gel. Scented and mineral-rich, Edom shower Gel leaves your skin feeling ...

[More details...](#)

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Currency

[Pound Sterling \(£\)](#)

Shopping Cart

- Store shopping cart in cookie (4kb max)
- Requires no persistent server-side session state, good for clusters!
- Obvious size limitation, for a larger site we would probably store the cart in CouchDB keyed by a session cookie

The Endless Quest for Purity

- Google Checkout integration currently needs `_external` + Python script, since the callback uses XML
- For 100% purity we need `_update` handler to transform XML -> JSON

`_update`

- Analagous to `_show`
- Precise semantics still being worked on
- e.g. `function (doc, req) { /* mutate doc */
return doc; }`
- Watch this space: <http://github.com/jasondavies/couchdb/tree/update>

Joe's Blog

- Simple blog experiment from Joe Armstrong's lightning talk
- Uses contentEditable
- Original version used simple Erlang server to save versions of blog post
- Super-easy to replace with CouchDB!

CouchDB “Revisions”

- These are used for optimistic concurrency control
- Not for implementing a VCS!
- To store a revision history we can simply create a new doc for each revision and never change it

Other Wishlist Items

- View intersections and unions
- Load HTML page in single request e.g. the categories/tags list in the sidebar

Thank you for listening!

www.jasondavies.com