



Who's Talking

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- CouchDB Developer
- jan@apache.org / @janl
- github.com/janl
- Erlang & JavaScript Hacker, Web Enthusiast
- Director Relaxed, Inc. & couch.io
- Helps running N★SQL Berlin

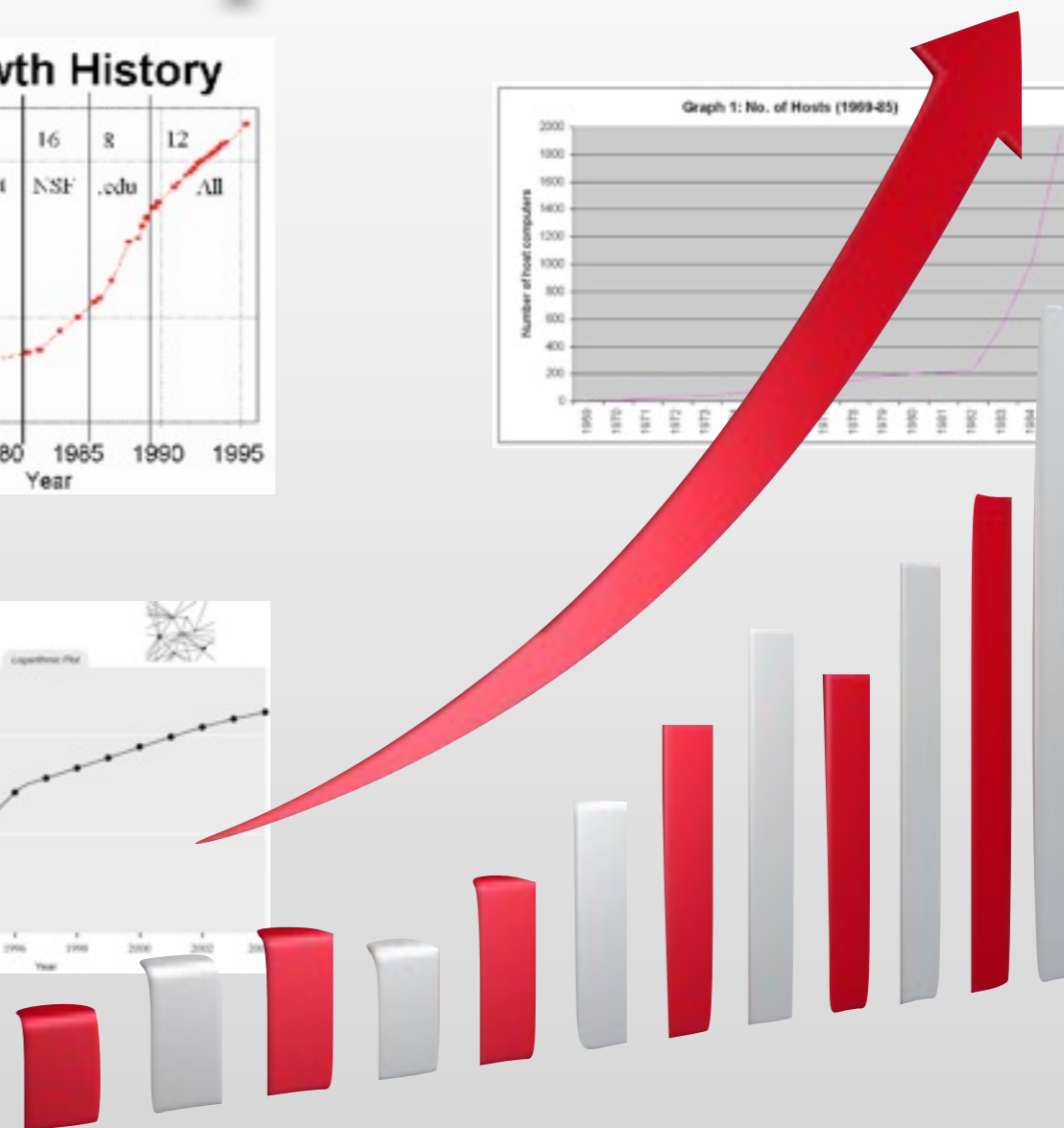
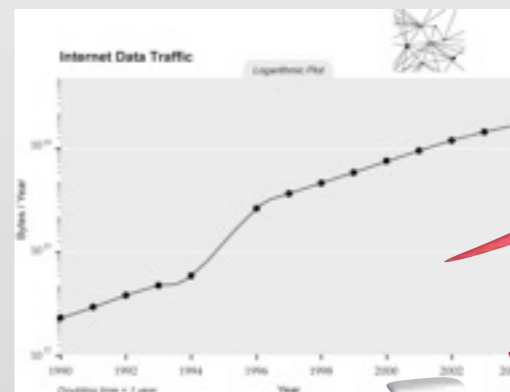
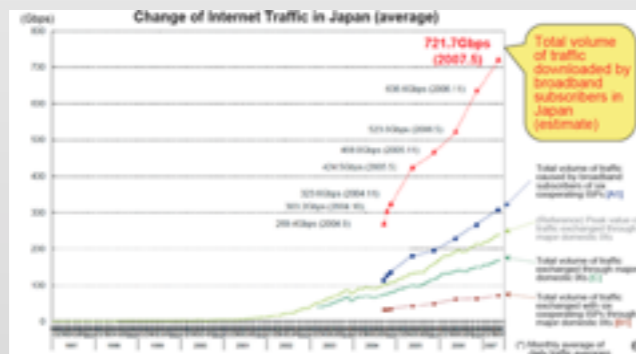
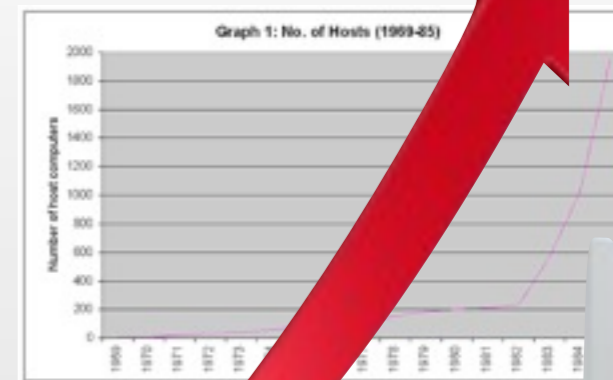
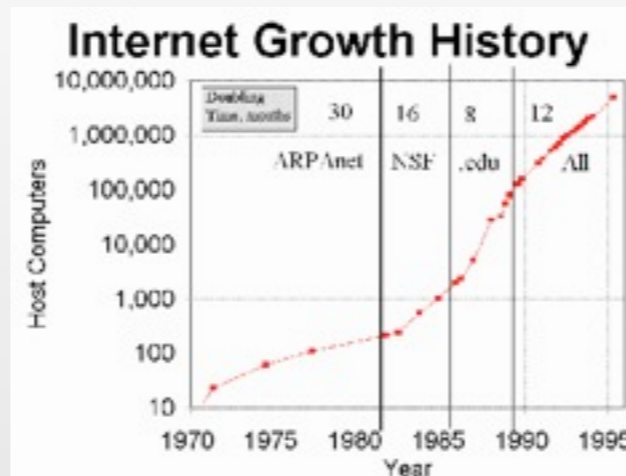
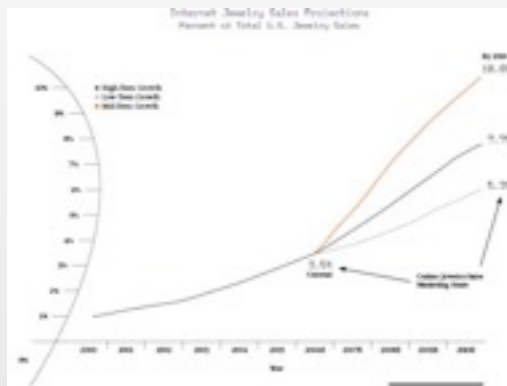
Relax

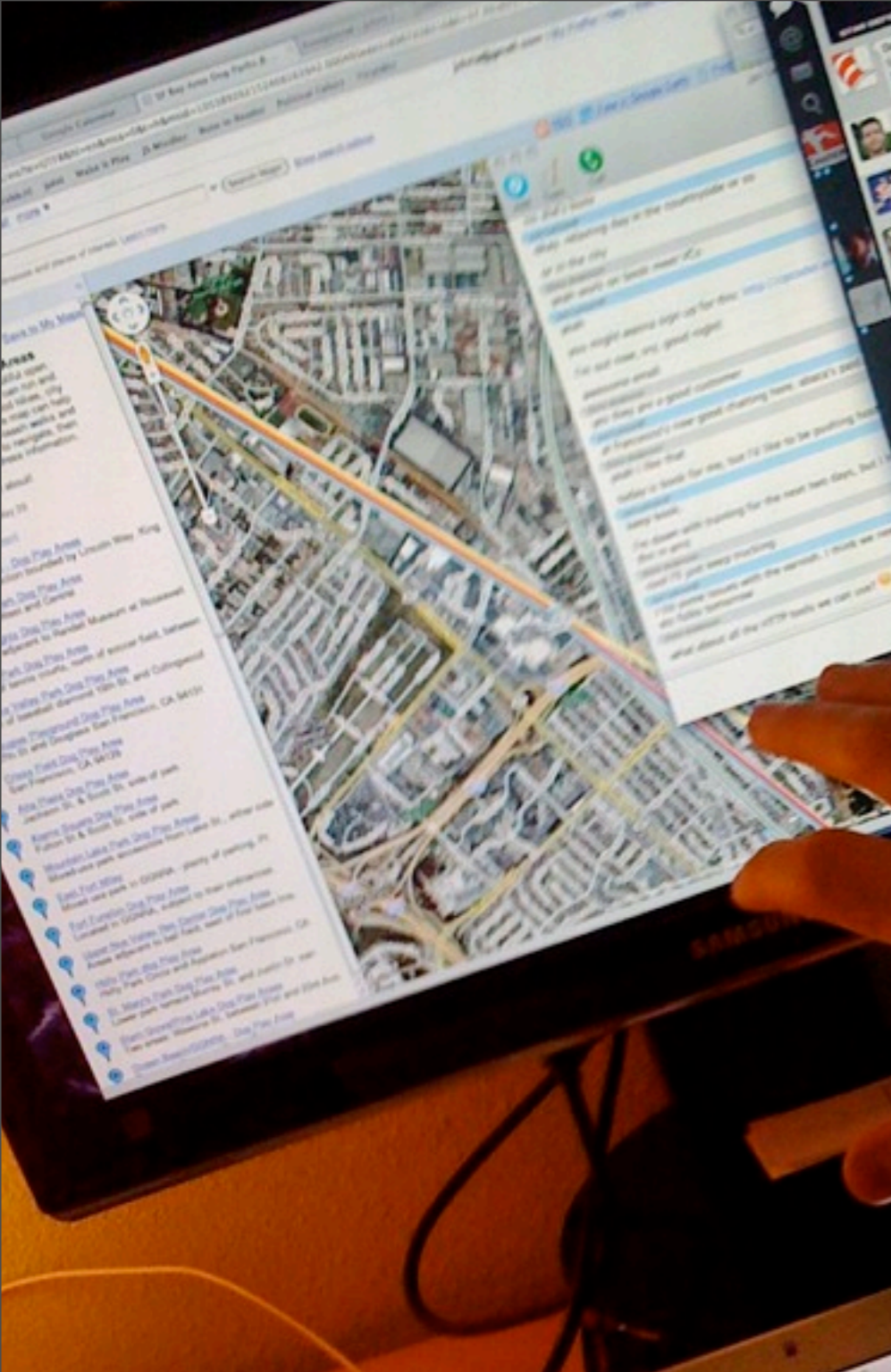


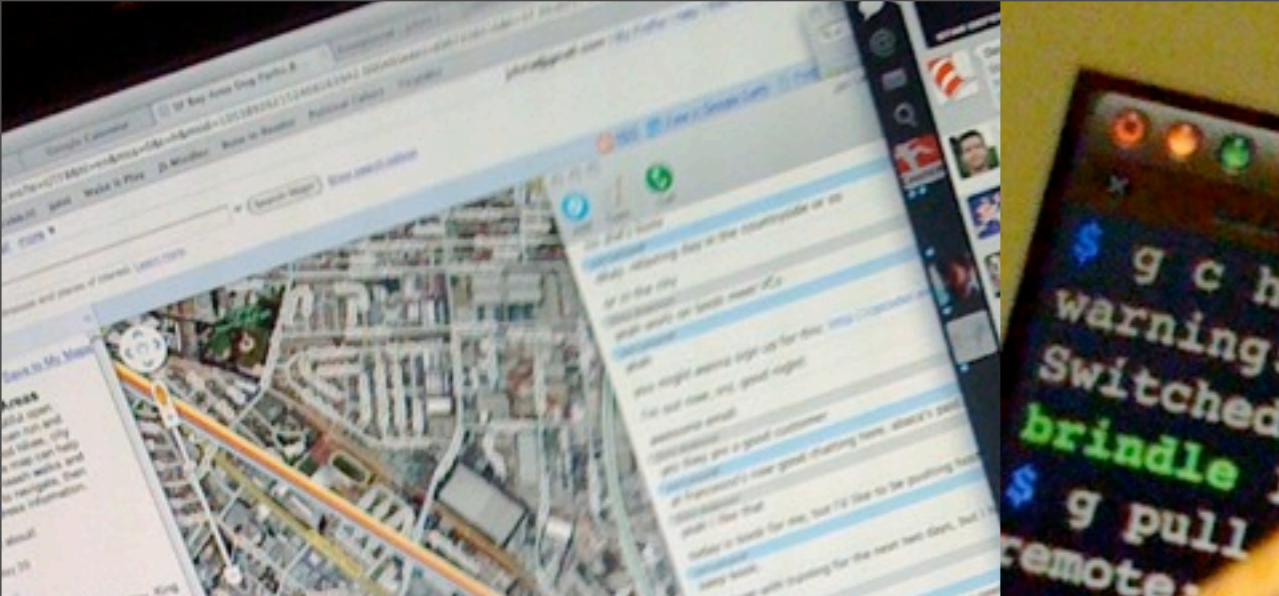
http://www.flickr.com/photos/freelancing_god/3271488152/

Thursday, 22 October 2009

Bandwidth Explosion









“no bars”



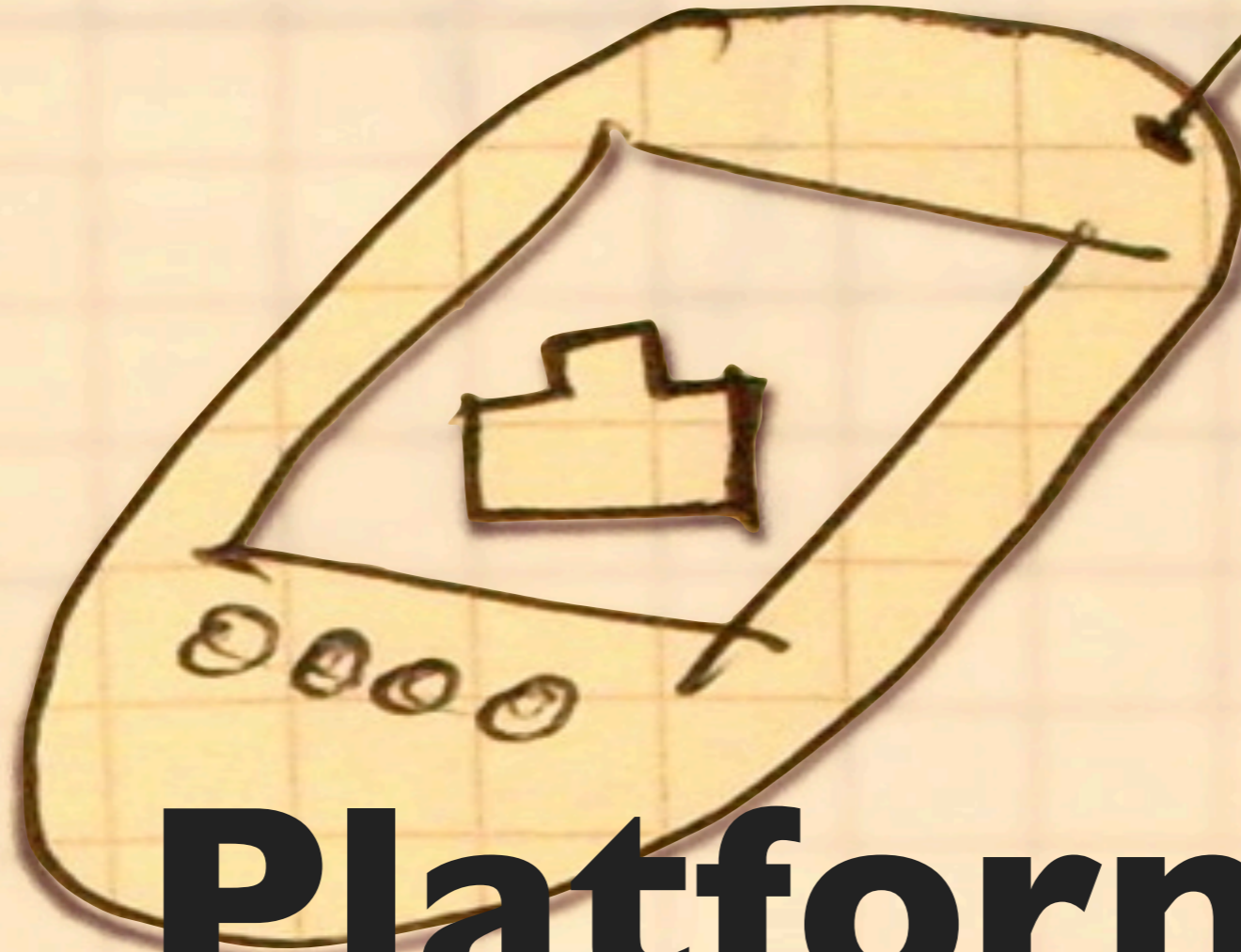
http://de.wikipedia.org/w/index.php?title=Datei:Birkholzaue_Ortseingang.jpg&filetimestamp=20060413223336

Latency Sucks

$$rt^b = rt^a + \sum_{i \in \text{Links}} (l_i^b - l_i^a) \cdot \vec{\nabla} \bar{rt}(l_i)$$

What is CouchDB?

Local Web



Platform

“Ground Computing”

@jhuggins

<http://www.flickr.com/photos/mcpig/872293700/>

Offline by Default



http://de.wikipedia.org/w/index.php?title=Datei:Birkholzaue_Ortseingang.jpg&filetimestamp=20060413223336



Offline by Default

<http://www.flickr.com/photos/shane-h/280084650>

“Of the Web”

— *Jacob Kaplan-Moss*

<http://jacobian.org/writing/of-the-web/>

Apache CouchDB - Futon: Test Suite

http://127.0.0.1:5984/_utils/couch_tests.html?script/couch_tests.j

Smart Bookmarks ReCSS Make it Play http://jchris.mfdz.co... Apache CouchDB: Fu... Share on Tumblr ChartForPage MemColor

1Password Use Wallet Use Identity Restore (none) Save... Generate Password 1Password v2.9.31 (build 7574)


Apac... Index o... jsMath (... jsMath (... installat... http...tml Apache ... jsMa > +

Overview > Test Suite

Run All Reload Custom Test

Note: Each of the tests will block the browser. If the connection to your CouchDB server is slow, running the tests will take some time, and you'll not be able to do much with your browser while a test is being executed.

Name	Status	Elapsed Time	Details
basics	success	1466ms	
all_docs	success	222ms	
attachments	success	3213ms	
attachment_names	success	129ms	
attachment_paths	success	1926ms	
attachment_views	success	144ms	
batch_save	success	2589ms	
bulk_docs	success	329ms	
changes	success	904ms	
compact	success	845ms	
config	running...		
conflicts	not run		
content_negotiation	not run		
cookie_auth	not run		
copy_doc	not run		
delayed_commits	not run		



CouchDB
relax

Tools

- Overview
- Configuration
- Replicator
- Status
- Test Suite**

Recent Databases

- aim-dev
- dri
- sofa
- test_suite_db
- toast

Futon on Apache CouchDB
0.10.0a814838

YSlow S3 Fox

Done

Learning Curve



Document
Modeling

{ "_id": "foo",

"_rev": "2..." }

```
{
  "_ID": "BC4EA69CE1A73AA7D21D23B609D221D9",
  "_REV": "1-967A000FF5E92ADD41819138ABB3284D",
  "TYPE": "PERSON",
  "NAME": "DARTH VADER",
  "AGE": 63,
  "HEADWARE":
    ["HELMET", "SOMBRERO"],
  "DARK_SIDE": TRUE
}
```

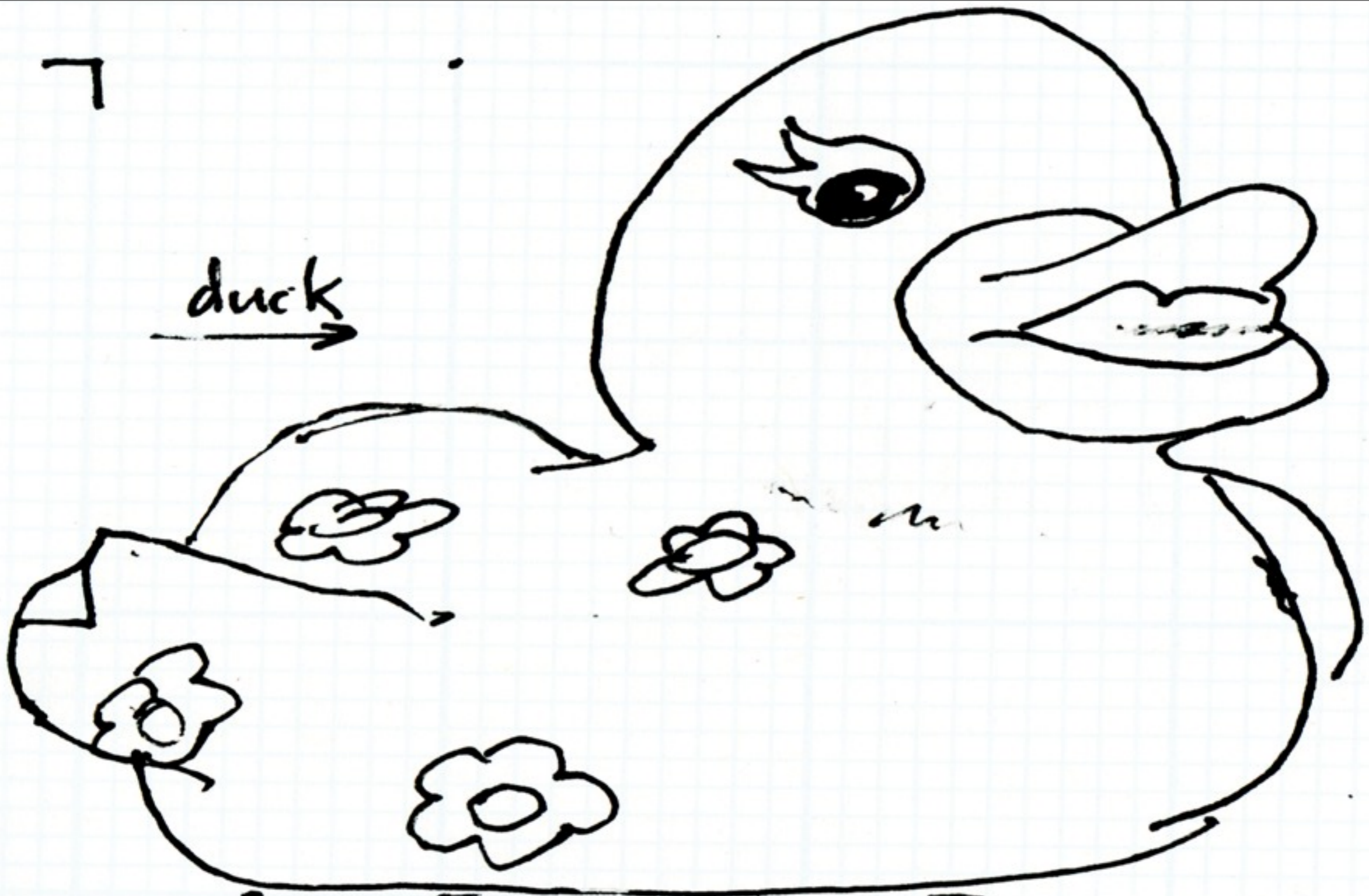
JSON Documents

```
{
  "_ID": "BC4EA69CE1A73AA7D21D23B608D221D9",
  "_REV": "1-967A000FF5E02ADD41819138ABB3284D",
  "TYPE": "PERSON",
  "NAME": "DARTH VADER",
  "AGE": 63,
  "HEADWARE":
    ["HELMET", "SOMBRERO"],
  "DARK_SIDE": TRUE
}
```

JSON Documents

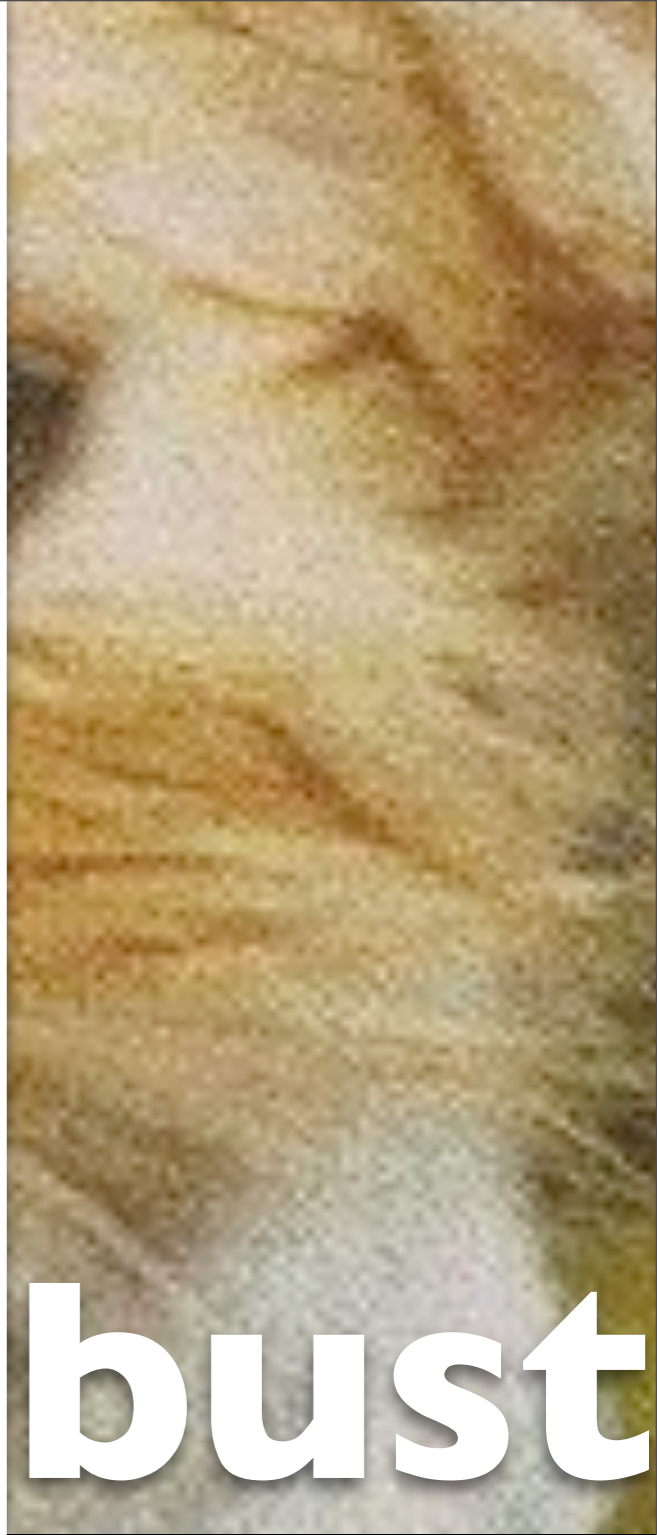
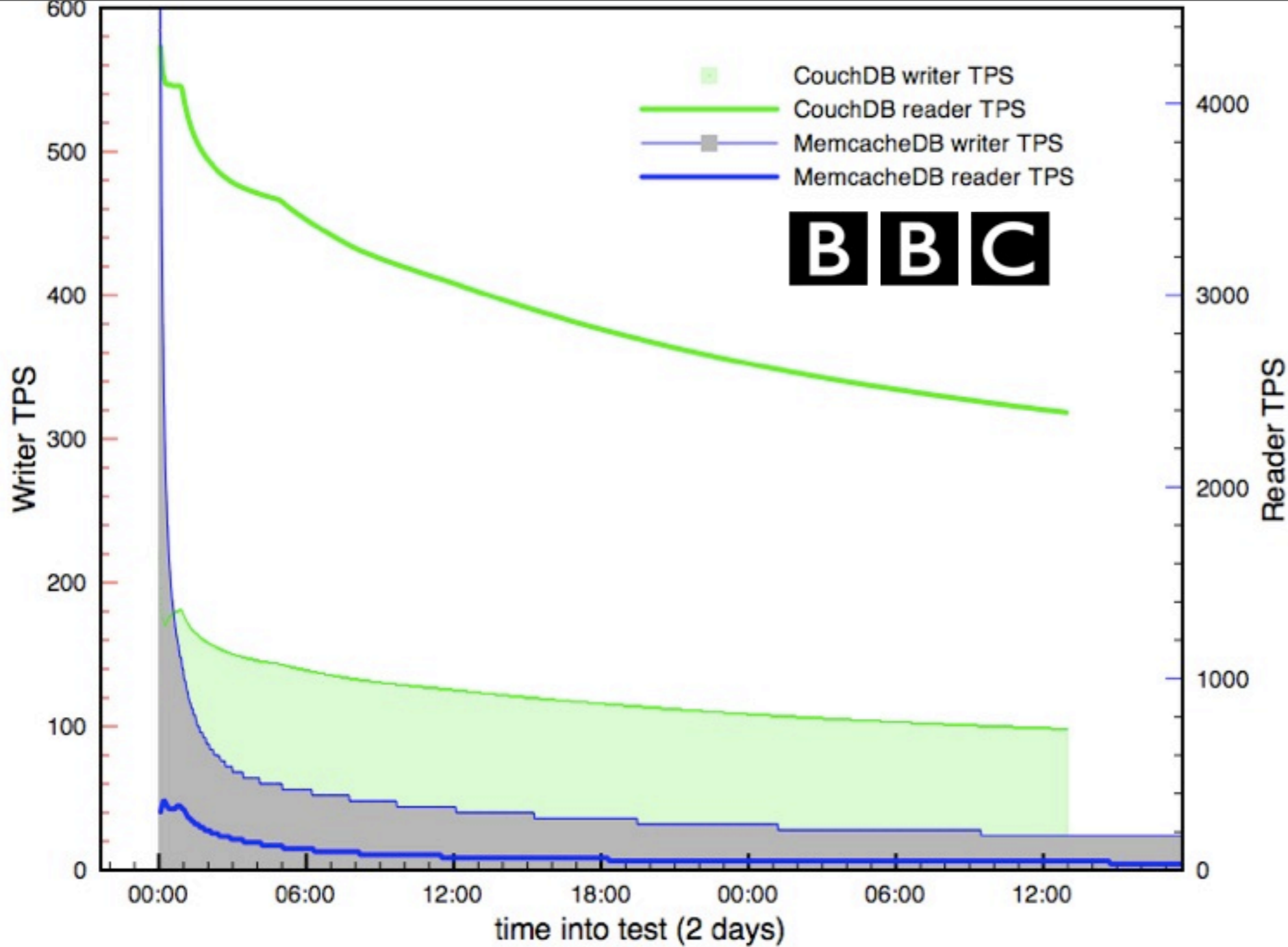
```
{
  "_ID": "BC4EA69CE1A73AA7D21D23B608D221D9",
  "_REV": "2-41819138ABB32967A000DFF5E02A0D084D",
  "TYPE": "PERSON",
  "NAME": "DARTH VADER",
  "AGE": 63,
  "HEADWARE":
    ["HELMET", "SOMBRERO"],
  "DARK_SIDE": "MORE COWBELL!"
}
```

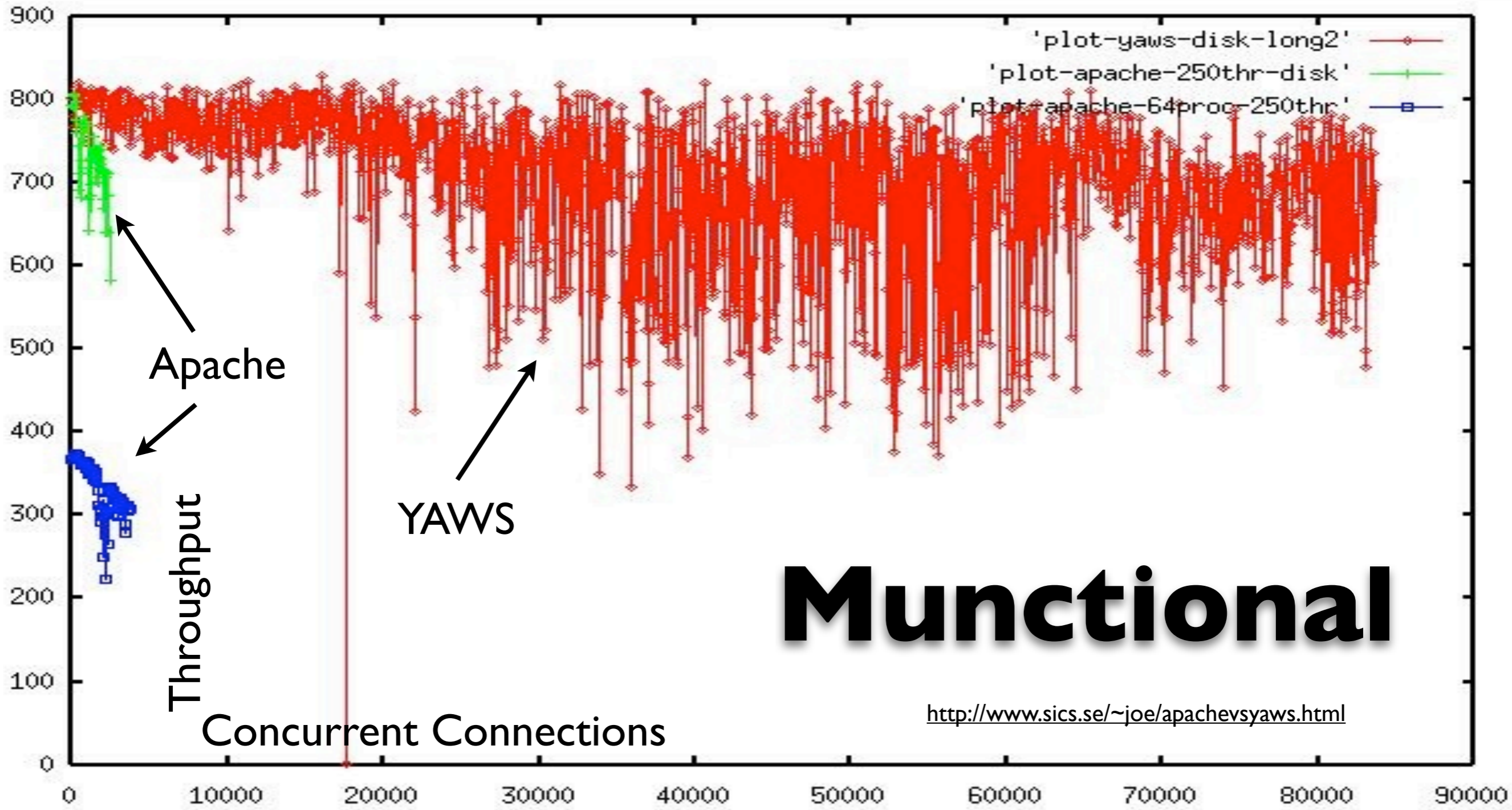
JSON Documents





Robust





Munctional

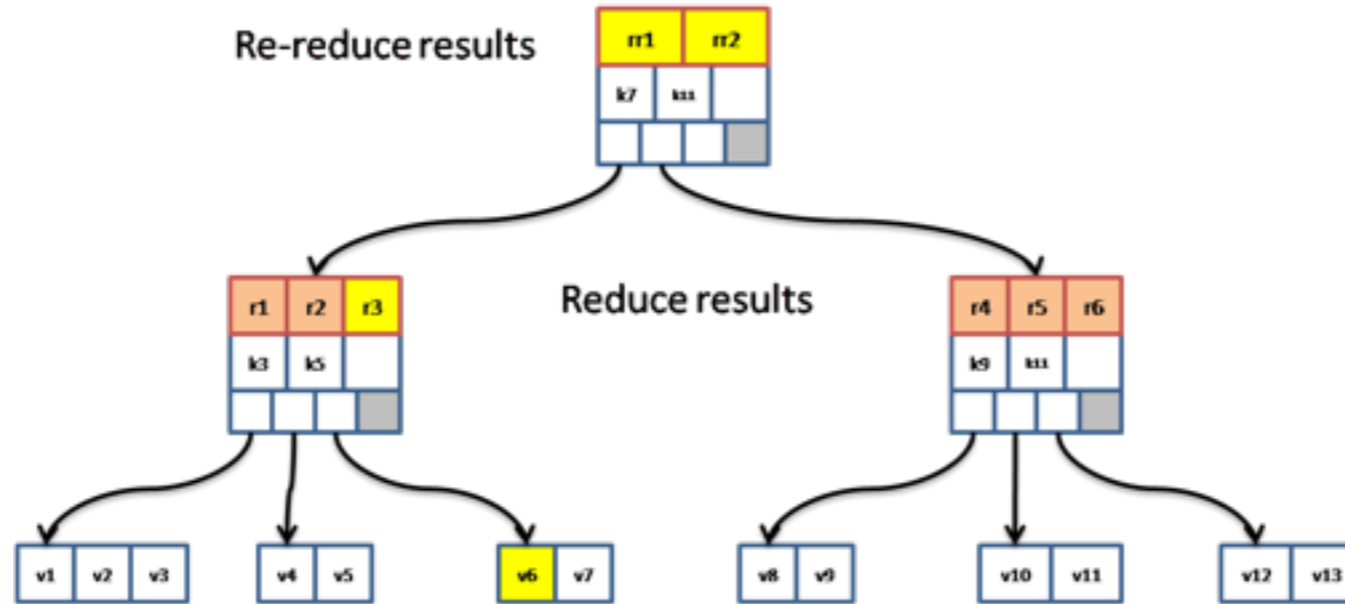
<http://www.sics.se/~joe/apachevsyaws.html>



INCREMENTAL

Map Reduce

View Index B+ Tree



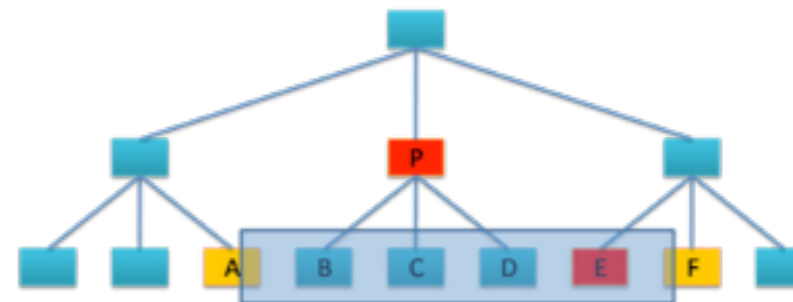
Map results: v8 is map result of k8

Multiple B+Trees
(one tree per view)

Each B+Tree holds the
results of the map()
execution

Key of B+Tree entry :
[emit_key, doc_id]

Header (B+Tree root)
Header Duplicate
B+Tree ViewX nodeA
nodeA's parent node
B+Tree ViewX root
B+Tree ViewY nodeB
nodeB's parent node
B+Tree ViewY root
B+Tree ViewX nodeP
nodeP's parent node
B+Tree ViewX root
B+Tree ViewZ nodeQ
nodeQ's parent node
B+Tree viewZ root



<http://horicky.blogspot.com/2008/10/couchdb-implementation.html>



REST*ful* HTTP

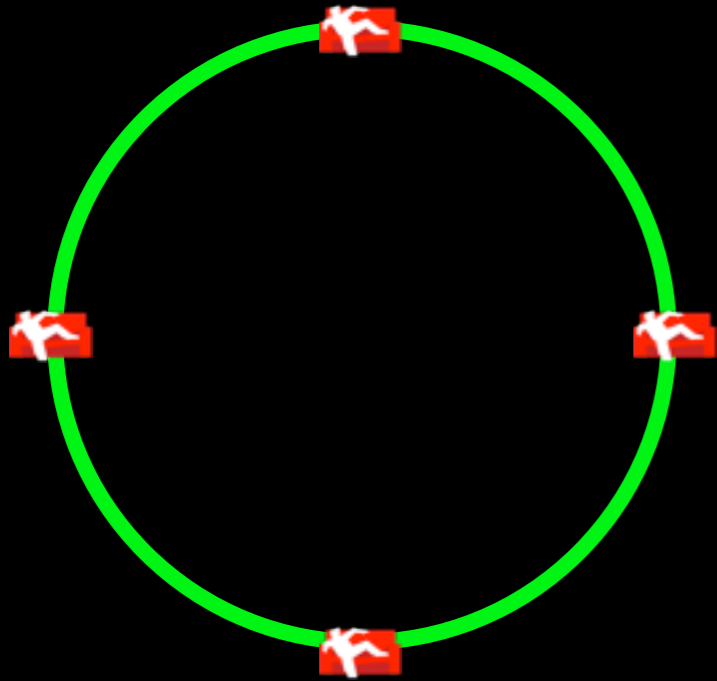
<http://www.flickr.com/photos/calliope/3573471166>

COUCHDB

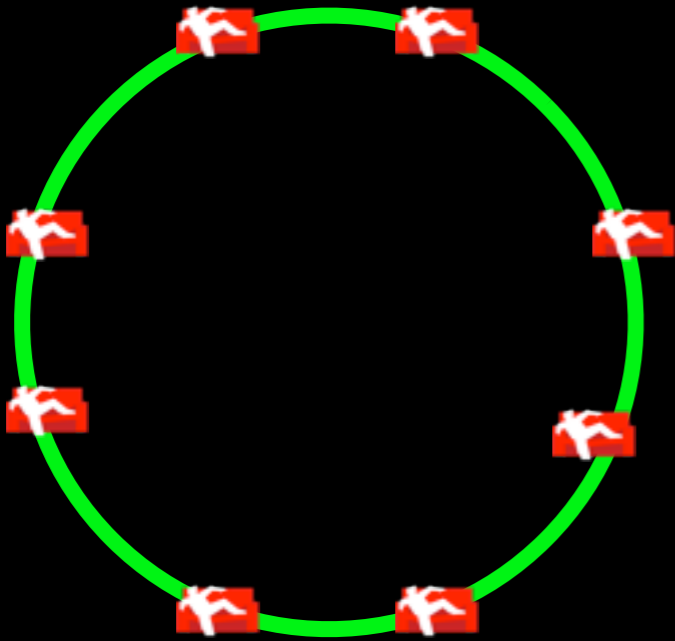
lounge

<http://tilgovi.github.com/couchdb-lounge/>

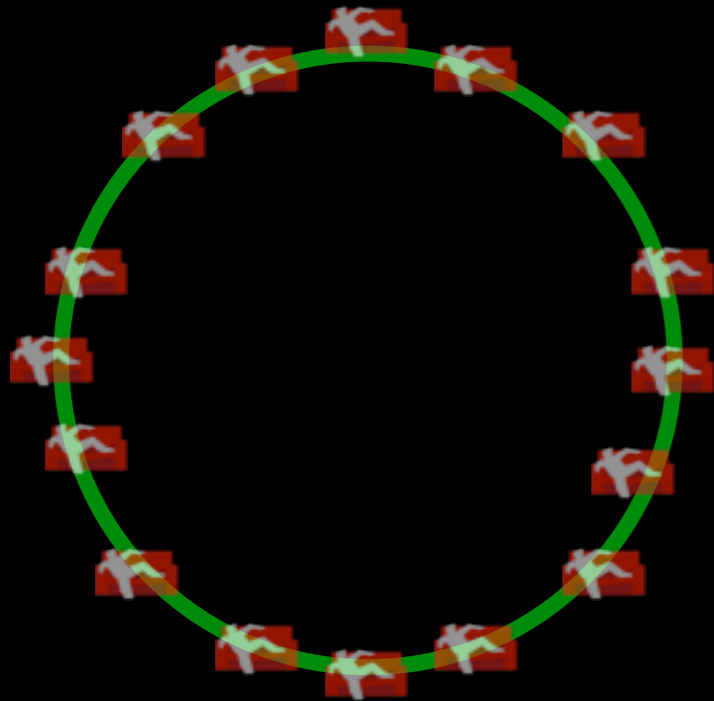
<http://www.flickr.com/photos/aussiegall/658457636>



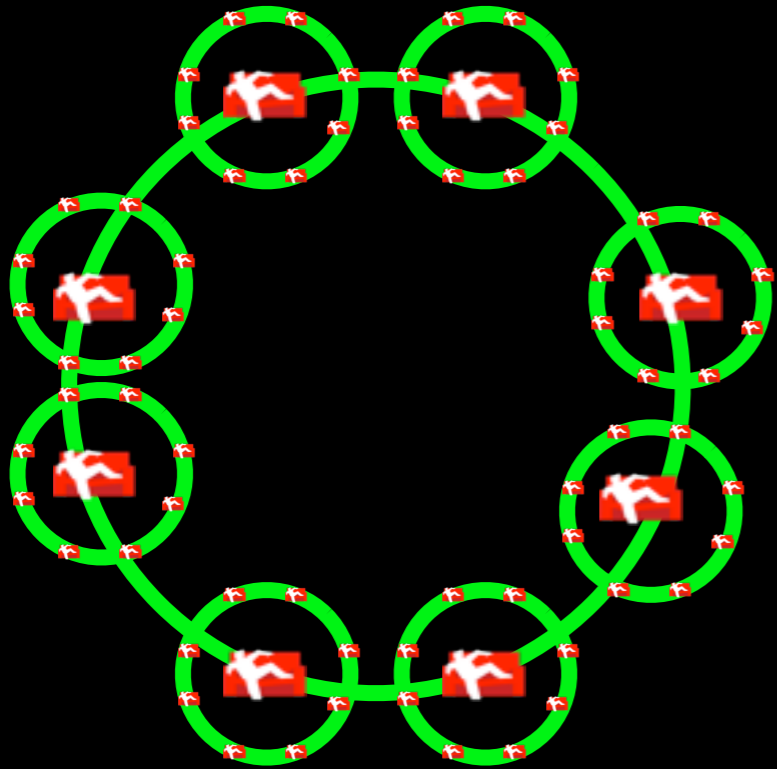
Shards: 16
Nodes: 4



Shards: 16
Nodes: 8



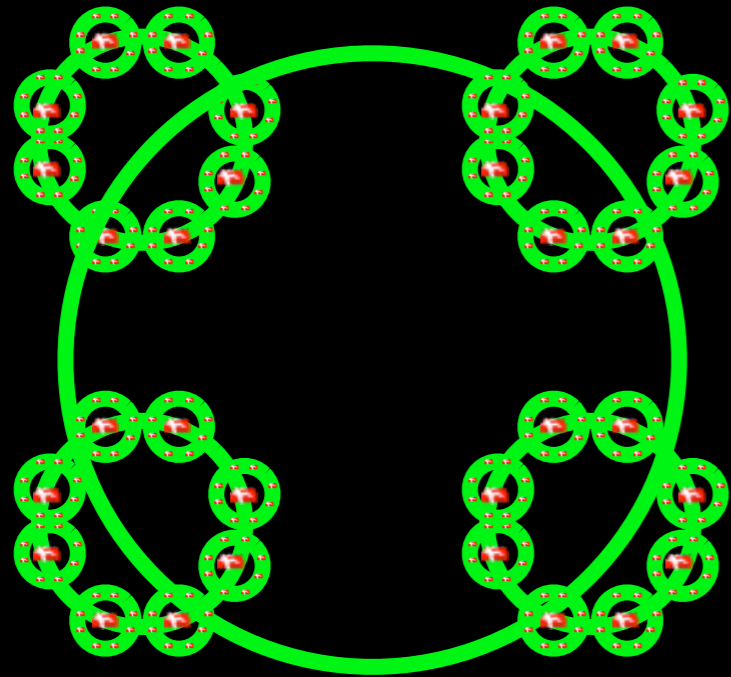
Shards: 16
Nodes: 16



Shards: 16
Nodes: 16

Sub Shards: 16
Sub Nodes: 4

and so on...



Fractal Scaling

<http://www.flickr.com/photos/aussiegall/658457636>

breathe...



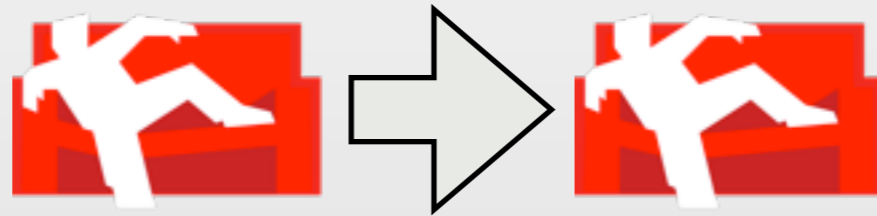


```
curl -X POST
  http://127.0.0.1:5984/_replicate
```

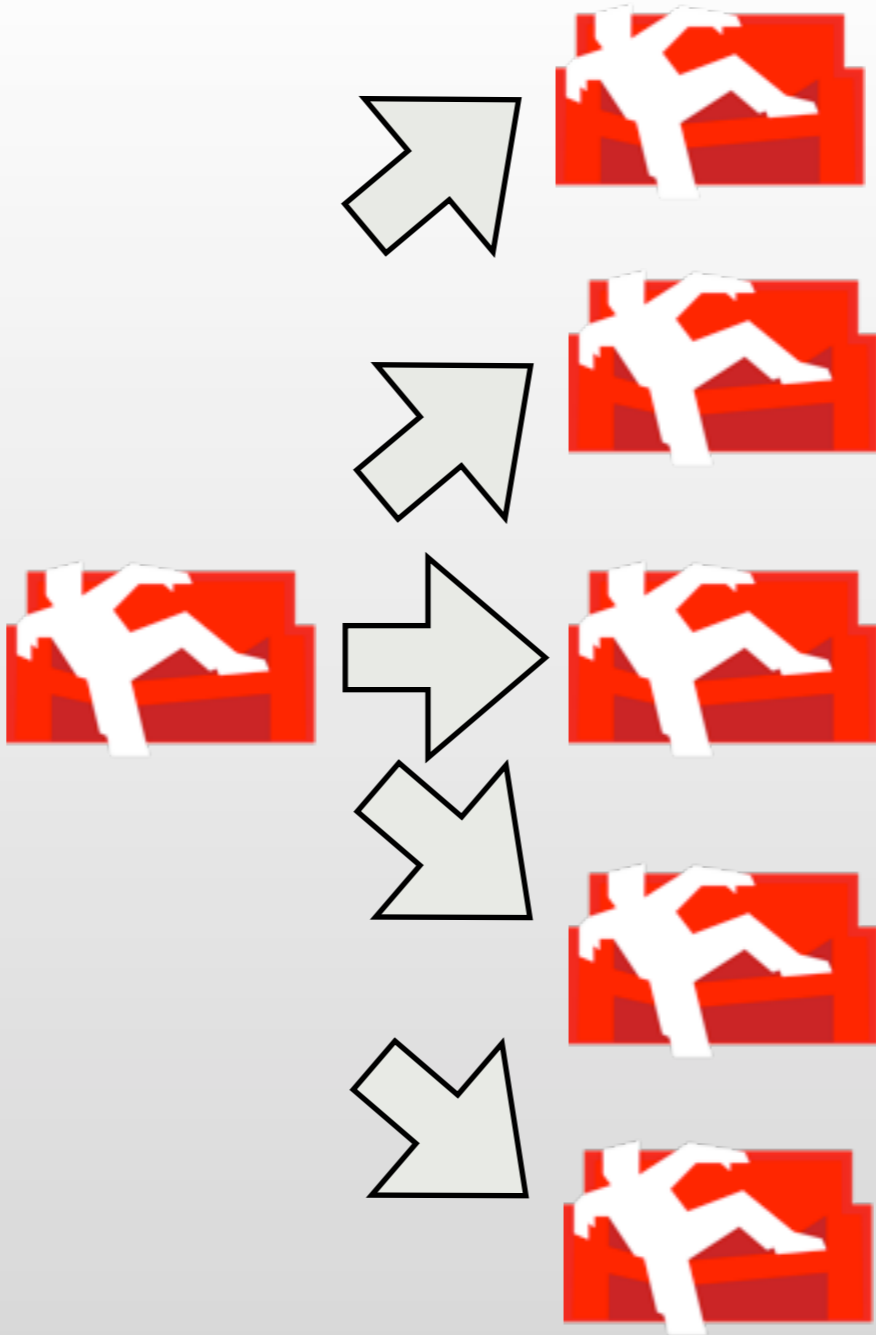
```
-d
' {
  "source":
    "http://couch.example.com:5984/remote-db",
  "target":
    "local-db"
}'
```

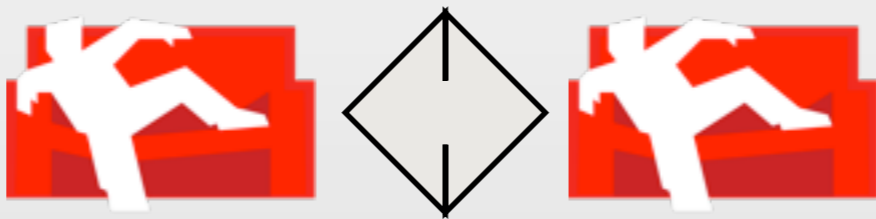


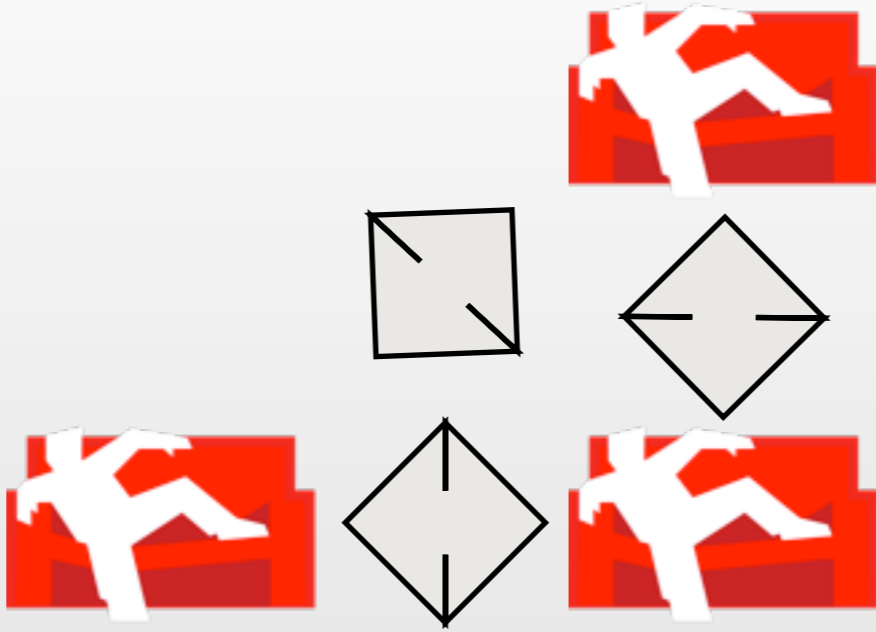
```
curl -X POST
  http://127.0.0.1:5984/_replicate
```

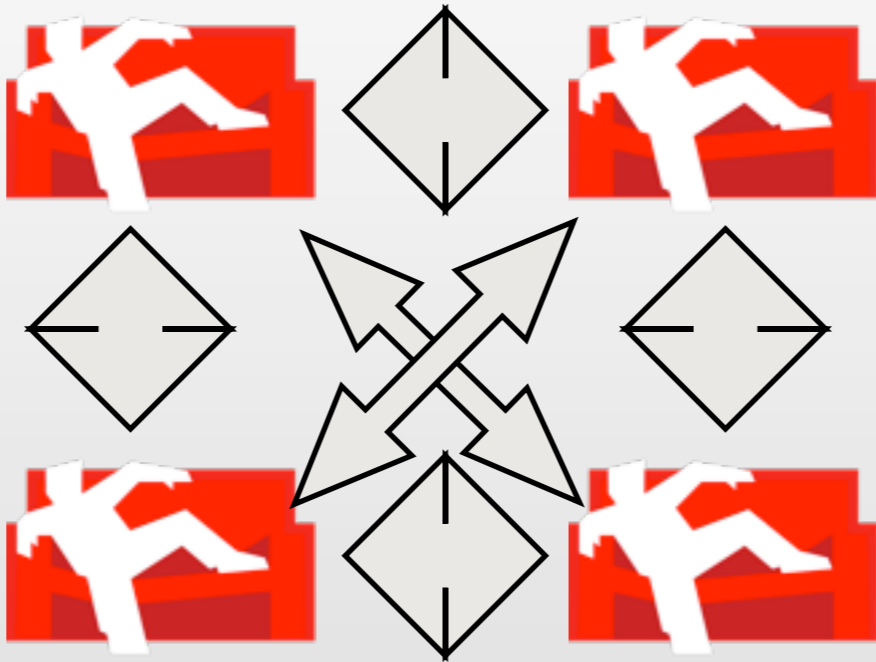


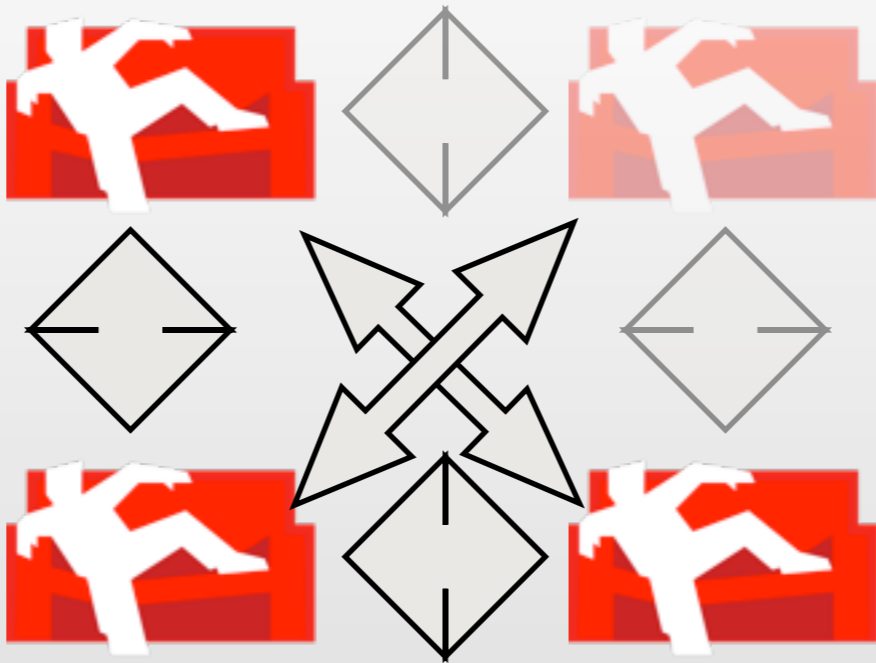
```
-d
' {
  "source":
    "http://couch.example.com:5984/remote-db" ,
  "target":
    "local-db"
}'
```

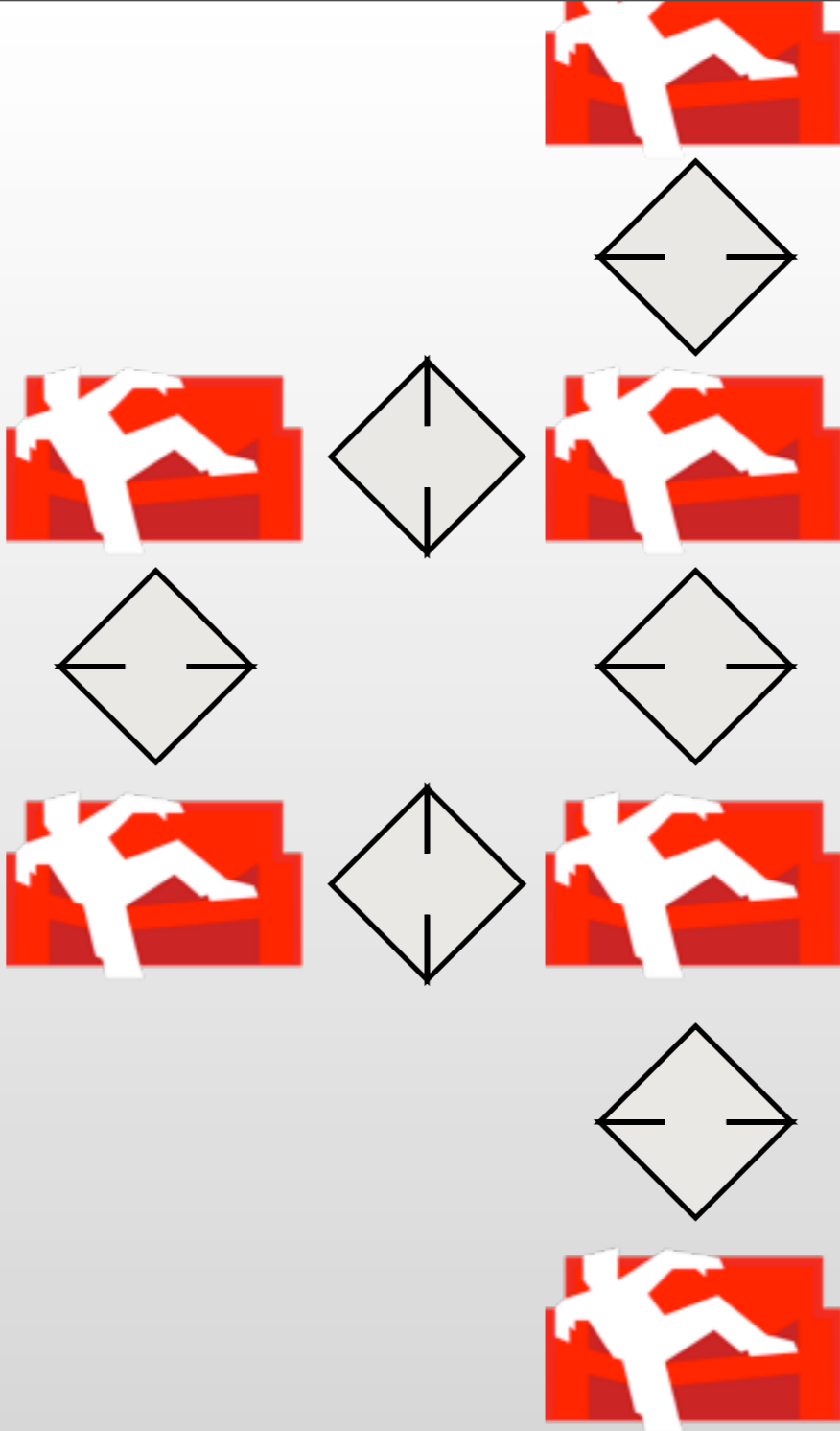


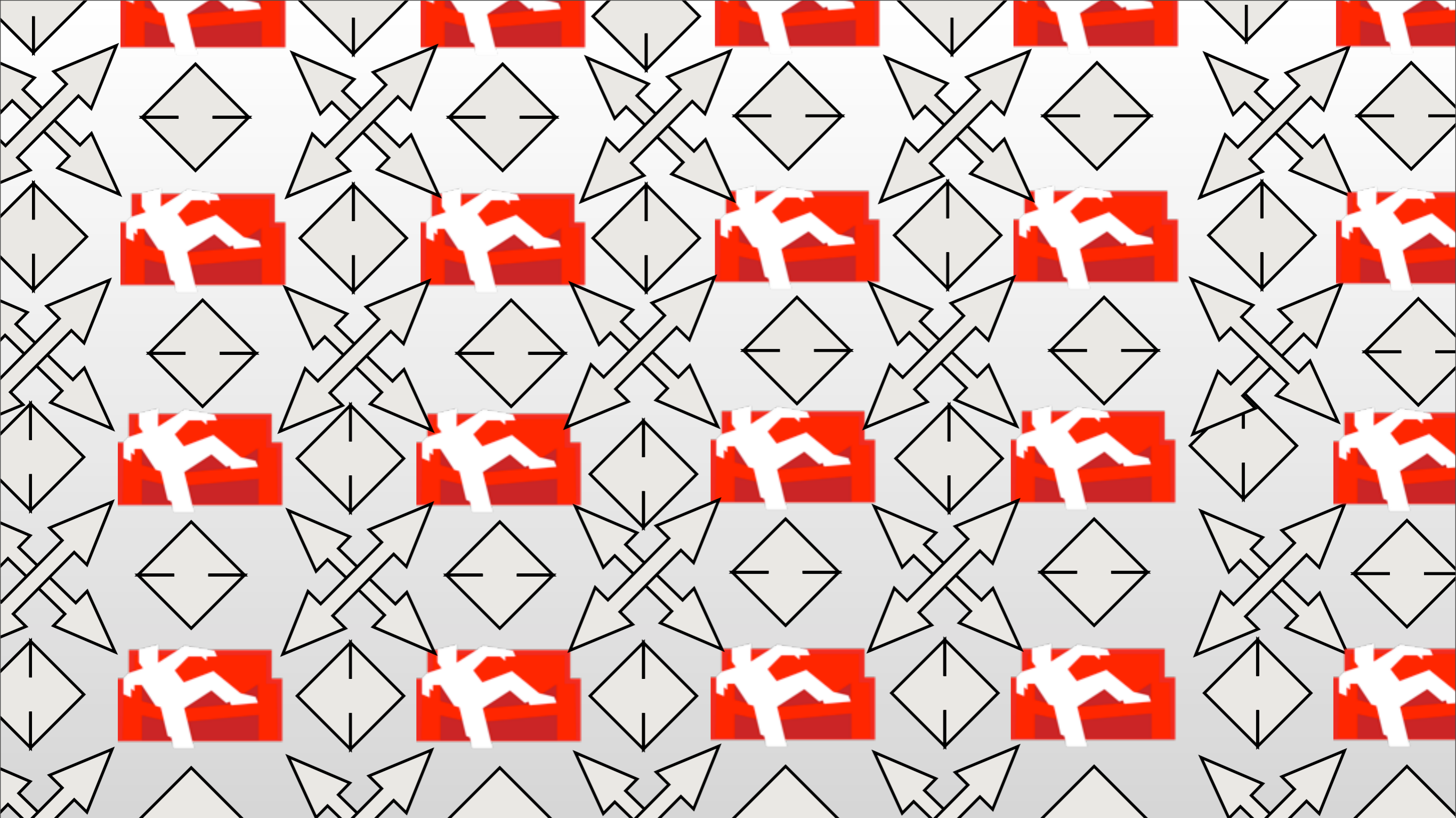














Scaling Down



BrowserCouch Test Suite

This file contains a simple test runner and suite for BrowserCouch.

The suite can be run [here](#).

The Runner

The `Testing` namespace is a simple test framework that supports the skipping of tests (for when the host system doesn't support required functionality for a test's execution), as well as asynchronous tests.

It doesn't currently have the ability to detect when an asynchronous test has failed, however.

Browser Couch Tests

You can read the source code documentation for these tests [here](#).

```
testDictionary OK
testViewMap_async OK
testViewMapFindDoc_async OK
testViewProgress_async OK
testViewMapReduceFindDoc_async OK
testViewMapReduceFindDoc_async running
testViewMapReduce_async pending
testLocalStorage_async pending

0x0000000000000000 "value" 0x00000000
0x0000000000000000 "value" 0x00000000
0x0000000000000000 "value" 0x00000000
```

The Suite

The `Tests` namespace contains the actual testing suite for BrowserCouch.

Browser Couch

```
var Tests = {
  run: function(listener, container, setTimeout) {
    if (!setTimeout)
      setTimeout = window.setTimeout;

    var tests = [];

    for (name in container)
      if (name.indexOf("test") == "0") {
        var test = {
          name: name,
          func: container[name],
          isAsync: name.indexOf("_async") != -1,
          id: tests.length,
          assertEquals: function assertEquals(a, b) {
            if (a != b)
              throw new Error(a + " != " + b);
          }
        };
        tests.push(test);
      }

    listener.onReady(tests);
    var nextTest = 0;

    function runNextTest() {
      if (nextTest < tests.length) {
        var test = tests[nextTest];
        listener.onRun(test);
        test.skip = function() {
          listener.onSkip(this);
          setTimeout(runNextTest, 0);
        };
        test.done = function() {
          listener.onFinish(this);
          setTimeout(runNextTest, 0);
        };
        test.func.call(container, test);
        if (!test.isAsync)
          test.done();
        nextTest++;
      }
    }

    runNextTest();
  };

  var Tests = {
    testDictionary: function(self) {
      var dict = new BrowserCouch.Dictionary();
      dict.set('foo', {a: 'hello'});
      dict.set('bar', {b: 'goodbye'});
      self.assertEqual(dict.get('foo').a, 'hello');
      self.assertEqual(dict.get('bar').b, 'goodbye');
      self.assertEqual(dict.getKeys().length, 2);
      self.assertEqual(dict.has('foo'), true);
      self.assertEqual(dict.has('bar'), true);
      self.assertEqual(dict.has('spatula'), false);
      dict.remove('bar');
      self.assertEqual(dict.getKeys().length, 1);
      self.assertEqual(dict.has('foo'), true);
    },
    _setUpTestDb: function(cb) {
      var documents = this._testDbContents;
      BrowserCouch.get(
        "blarg",
        function(db) {
          db.wipe(
            function() {
              db.put(
                documents,
                function() {
                  ModuleLoader.require(
                    "JSON",
                    function() { cb(db); }
                  );
                }
              );
            }
          );
        }
      );
    },
    new FakeStorage()
  };
  _testDbContents: [{id: "monkey",
                    content: "hello there dude"},
                    ...
  ]
};
```

JavaScript port

Uses HTML5 storage

Replicates with CouchDB

<http://hg.toolness.com/browser-couch/>

Computerfreaks und Computermuffel

Anteil der 11-Jährigen, die an Wochentagen durchschnittlich drei oder mehr Stunden vorm Computer verbringen

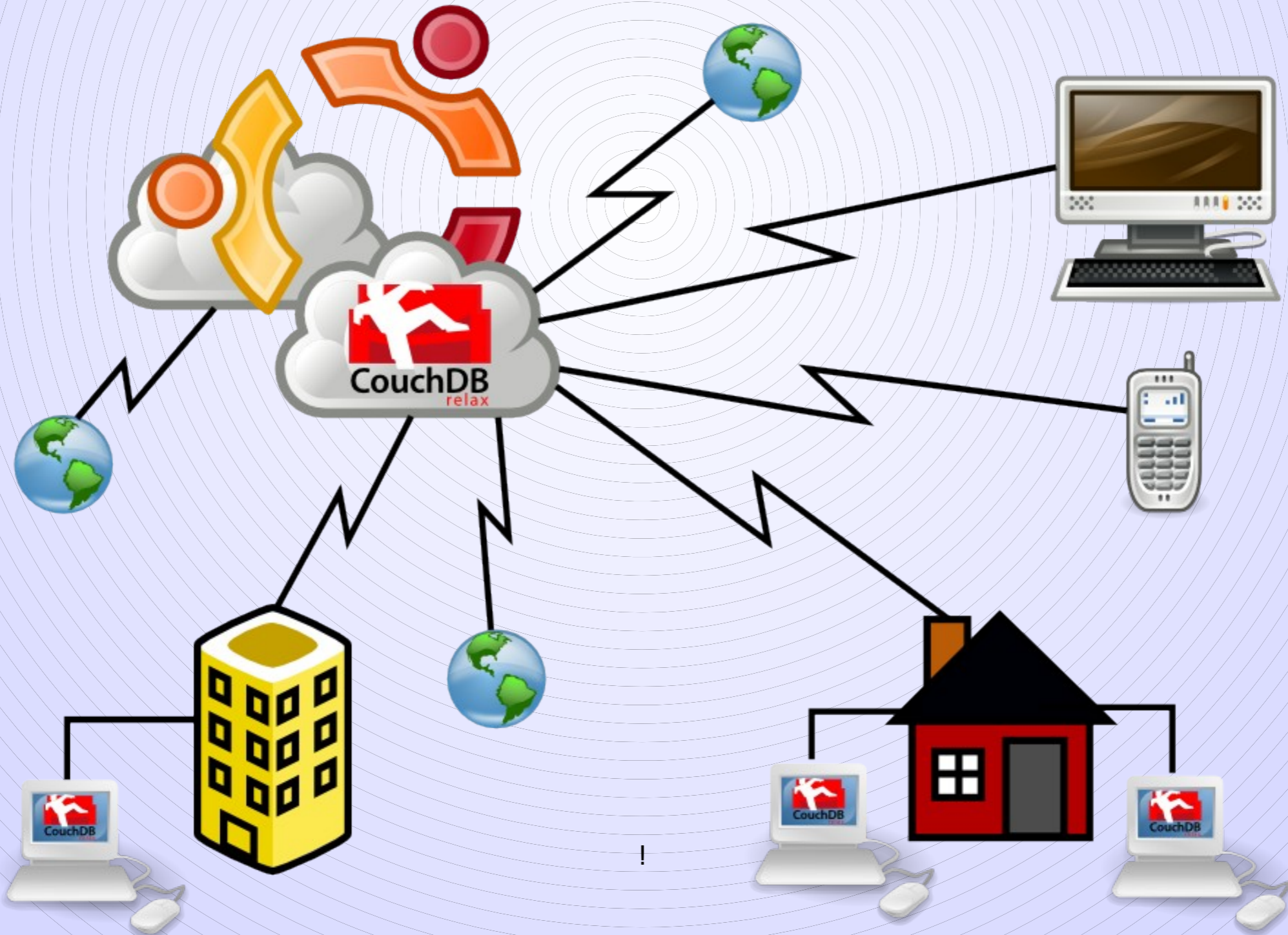
Jungen

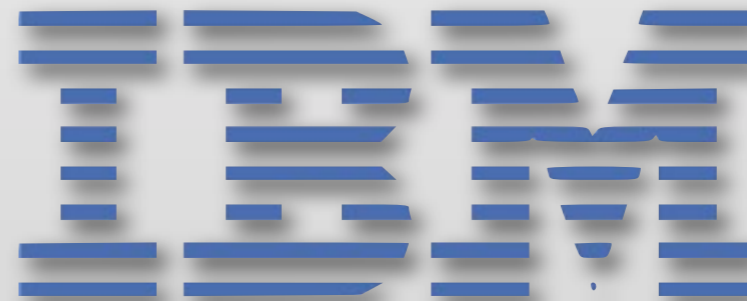
Mädchen



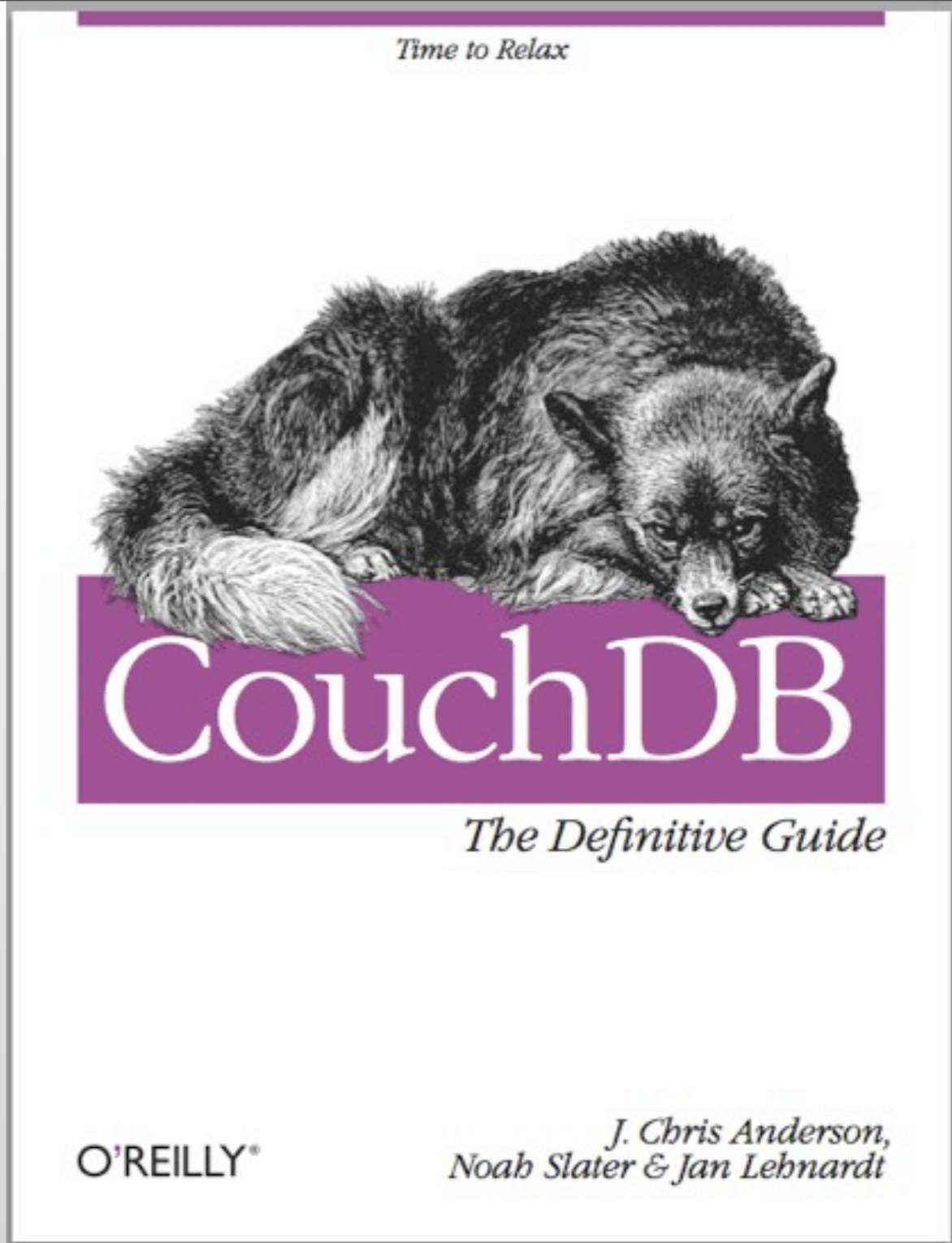
CC-BY-SA <http://www.flickr.com/photos/kelleys/492253912/>

Quelle: WHO



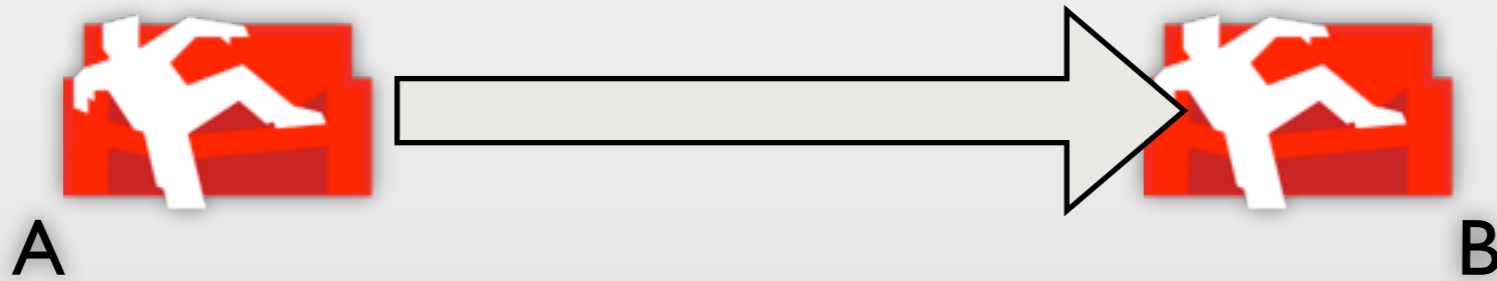


<http://books.couchdb.org/relax>



Thanks!

Conflict resolution by example



Conflict resolution by example



Conflict resolution by example



Conflict resolution by example



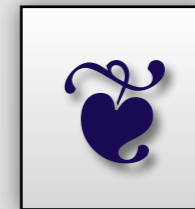
Conflict resolution by example



A



B



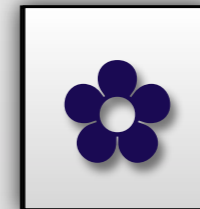
Conflict resolution by example



A



B



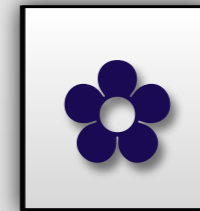
Conflict resolution by example



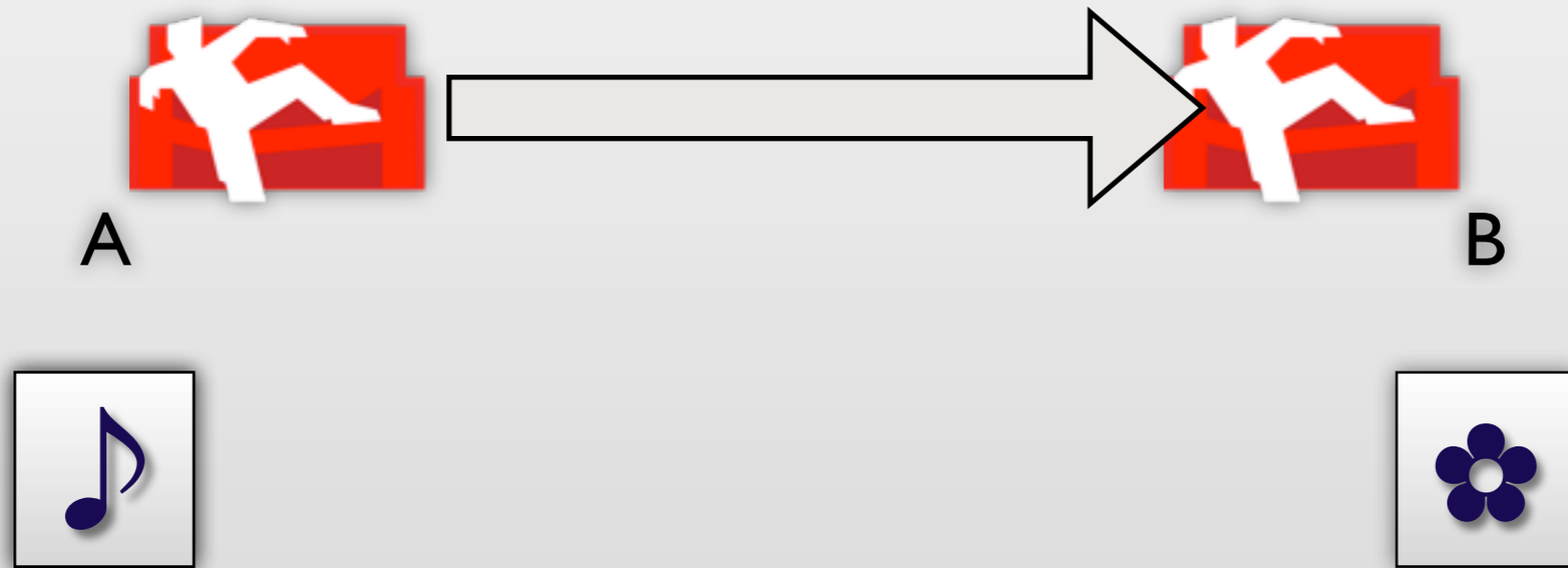
A



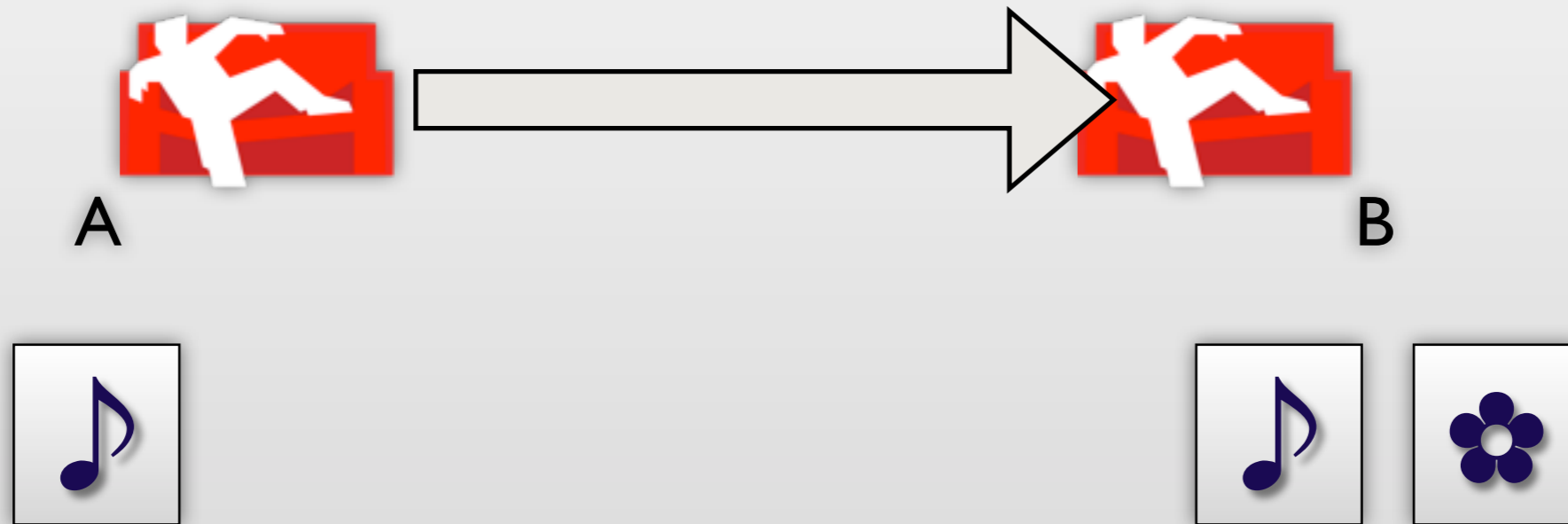
B



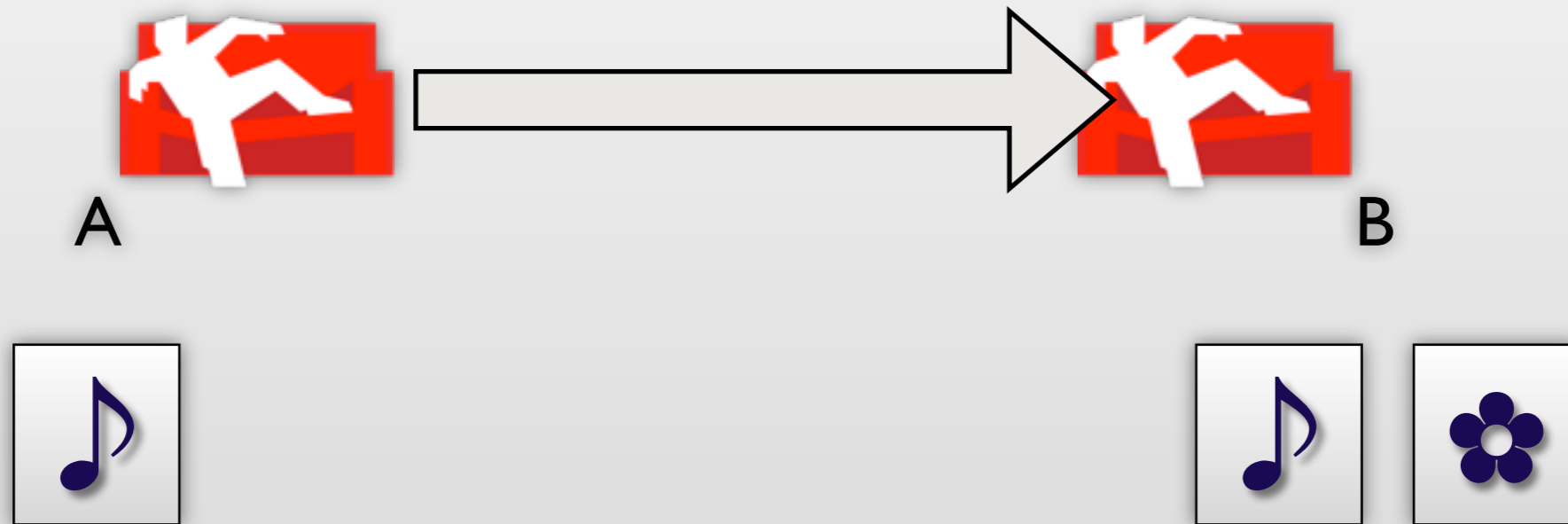
Conflict resolution by example



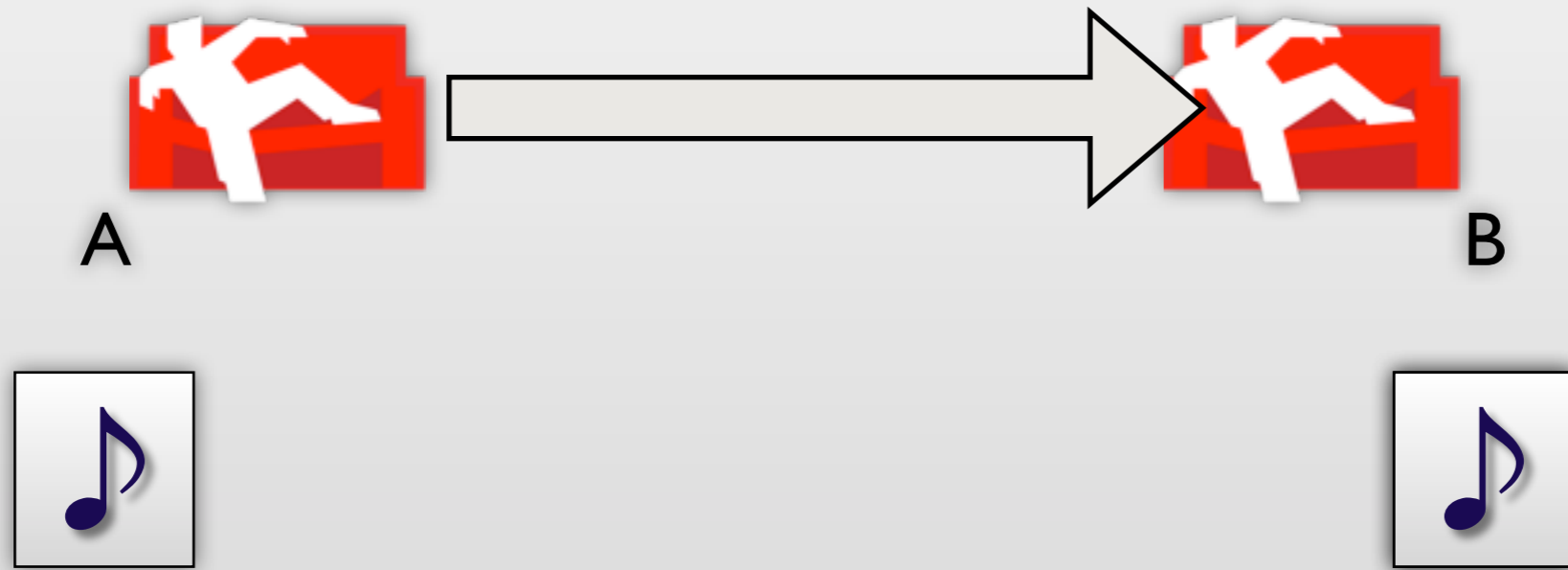
Conflict resolution by example



Conflict resolution by example



Conflict resolution by example





CC-by-nd <http://www.flic.kr/photos/eifelyeti/10/273939759/>

