

CouchDB

Relax!

Was ist CouchDB?

- Cluster of unreliable commodity Hardware
- Dokument-Datenbank
- keine feste „Datensatz-Struktur“
- JSON + REST API
- Map-Reduce
- „eingebauter“ Web-Server
- Replikation

HTTP

□ Hypertext Transfer Protocol

□ Request:

Method (GET|POST|PUT...)

Resource (/foo/bar/baz.html)

□ Response:

Status z.B. 200 OK

Content (html, json...)

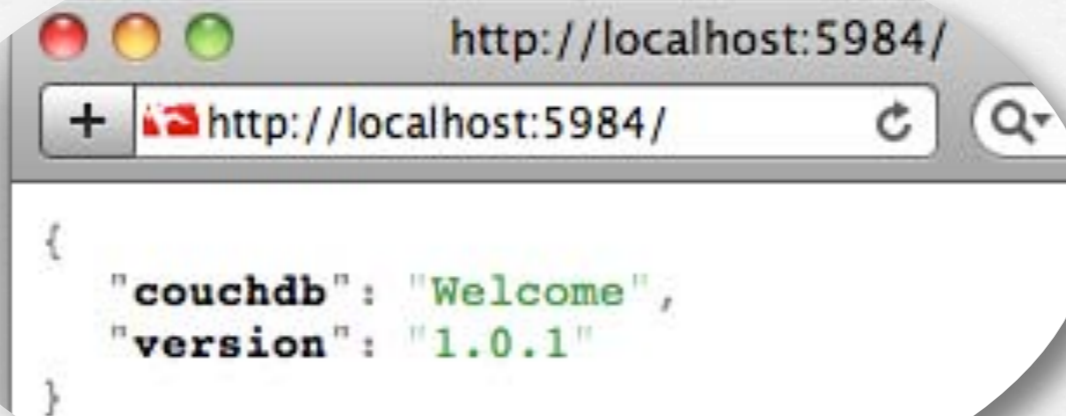
```

/Users/wo
$ telnet 127.0.0.1 5984
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'
GET / HTTP/1.1

HTTP/1.1 200 OK
Server: CouchDB/1.0.1
Date: Wed, 13 Oct 2010
Content-Type: text/plain
Content-Length: 40
Cache-Control: must-revalidate

{"couchdb": "Welcome", "v
```

Erster Kontakt



A screenshot of a web browser window. The title bar shows the URL `http://localhost:5984/`. The address bar also contains `http://localhost:5984/`. The main content area displays a JSON object:

```
{  
  "couchdb": "Welcome",  
  "version": "1.0.1"  
}
```



A screenshot of a terminal window titled "Terminal — bash — 60x15". The terminal shows the following command and output:

```
$ curl -X GET http://localhost:5984  
{"couchdb":"Welcome","version":"1.0.1"}  
$
```

JSON

□ JavaScript Object Notation

□ serialisierte Objekte

{ "schluessel": wert , ... } // "Hash"

[wert, ...] // "Array"

"text" // "String"

42 213.7 -1.2e12 // "Numerisch"

true false // "Boolean"

Futon: GUI

Apache CouchDB - Futon: Overview

http://localhost:5984/_utils/index.html

Overview

+ Create Database ...

Name	Size	Number of Documents	Update Seq
_users	4.1 KB	1	1
books	0.7 MB	8	30
demoapp	1.1 MB	6	44
profiles	108.1 KB	2	2
sofa	79 bytes	0	0
taskr	216.1 KB	1	1
wkapp	144.1 KB	1	1
wolfgang	56.1 KB	2	6

Showing 1-8 of 8 databases ← Previous Page | Rows per page: 10 | Next Page →

CouchDB relax

Tools

- Overview
- Configuration
- Replicator
- Status
- Test Suite

Recent Databases

- books
- demoapp
- wkapp

Welcome to Admin Party!
Everyone is admin. [Fix this](#)

Futon on Apache CouchDB 1.0.1

Menü anzeigen

Dokument-Liste

Apache CouchDB - Futon: Browse Database

http://localhost:5984/_utils/database.html?books

Overview > books

+ New Document Security... Jump to: Document ID View: All documents Stale views

⊗ Compact & Cleanup... ⊗ Delete Database...

Key	Value
"programming_perl" ID: programming_perl	{rev: "2-9607271493d36bee0c43285ac4d7db7a"}
"perls_of_wisdom" ID: perls_of_wisdom	{rev: "2-46d8669a942ccc90c622c8a14289ead5"}
"perl_medic" ID: perl_medic	{rev: "2-7ddae03..."}
"intermediate_perl" ID: intermediate_perl	{rev: "2-88f9a5385884c0f3307edbf2a22f251e"}
"higher_order_perl" ID: higher_order_perl	{rev: "2-5a9ea53da3b71fbe5ab48290ad08cff0"}
"definitive_guide_to_catalyst" ID: definitive_guide_to_catalyst	{rev: "2-908bfd06f054d717d72437a7a12a72a6"}
"_design/books" ID: _design/books	{rev: "3-a58c293ea79e944fd2b1185418c2597e"}

Showing 1-7 of 7 rows Previous Page | Rows per page: 10 | Next Page →

Menü anzeigen

Schlüssel

Revision

Design Dokument

Ein Beispiel-Dokument

The screenshot shows the Apache CouchDB Futon interface for viewing a document. The browser address bar shows the URL: `http://localhost:5984/_utils/document.html?books/programming_perl`. The breadcrumb navigation is `Overview > books > programming_perl`. The document is displayed in the 'Fields' tab, showing a table of key-value pairs. Handwritten annotations in blue speech bubbles identify various parts of the interface: 'Anhänge' points to the `_attachments` field; 'Schlüssel' points to the `_id` field; 'Revision' points to the `_rev` field; 'editieren' points to the `price` field's input box; and '„Felder“' points to the 'Field' column header. The document data is as follows:

Field	Value
<code>_attachments</code>	<code>thumbnail.jpg</code> 17.7 KB, image/jpg
<code>_id</code>	<code>"programming_perl"</code>
<code>_rev</code>	<code>"2-9607271493d36bee0c43285ac4d7db7"</code>
<code>author</code>	<code>"Larry Wall"</code>
<code>price</code>	<input type="text" value="39.9"/>
<code>publisher</code>	<code>"O'Reilly"</code>
<code>title</code>	<code>"Programming Perl"</code>

At the bottom of the document view, it says 'Showing revision 1 of 2' and provides navigation links: `← Previous Version` and `Next Version →`.

Speicher-Strategie

- `_rev` ändert sich mit jeder Speicherung
- Neue Revision liegt am Ende der „Datei“
- Nur die letzte Revision läßt sich ändern

- `_id` kann Anfangs vergeben werden
- sonst zufällige UUID
- keine nachträgliche Änderung möglich

Dokumente abfragen

□ URL zum Dokument:

[http://host\[:port\]/«db»/«dok» \[/«anhang» \]](http://host[:port]/«db»/«dok» [/«anhang»])



Ende?

Design Dokumente

□ ID:

`_design/«name»`

□ URL:

[http://host\[:port\]/«db»/_design/«name»/...](http://host[:port]/«db»/_design/«name»/...)

□ Zweck:

□ Suchen, Sortieren, Aggregieren

□ Präsentieren

View

- Map-Reduce
- Dokument -> Index-Schlüssel
- Beispiel: `views/by_author`

```
map: function(doc) {  
    emit(doc.author,  
        {title: doc.title,  
         publisher: doc.publisher});  
}
```

View abrufen

The screenshot shows the Apache CouchDB Futon interface. The browser address bar displays the URL: `http://localhost:5984/_utils/database.html?books/_design/books/_view/by_author`. The page title is "Apache CouchDB - Futon: Browse Database".

Navigation and actions include: Overview > books, New Document, Security..., Compact & Cleanup..., Delete Database..., Jump to: Document ID, View: by_author, and Stale views checkbox.

The "View Code" section shows the following JavaScript code:

```
function(doc) {
  emit(doc.author,
    {title:doc.title, publisher:doc.publisher});
};
```

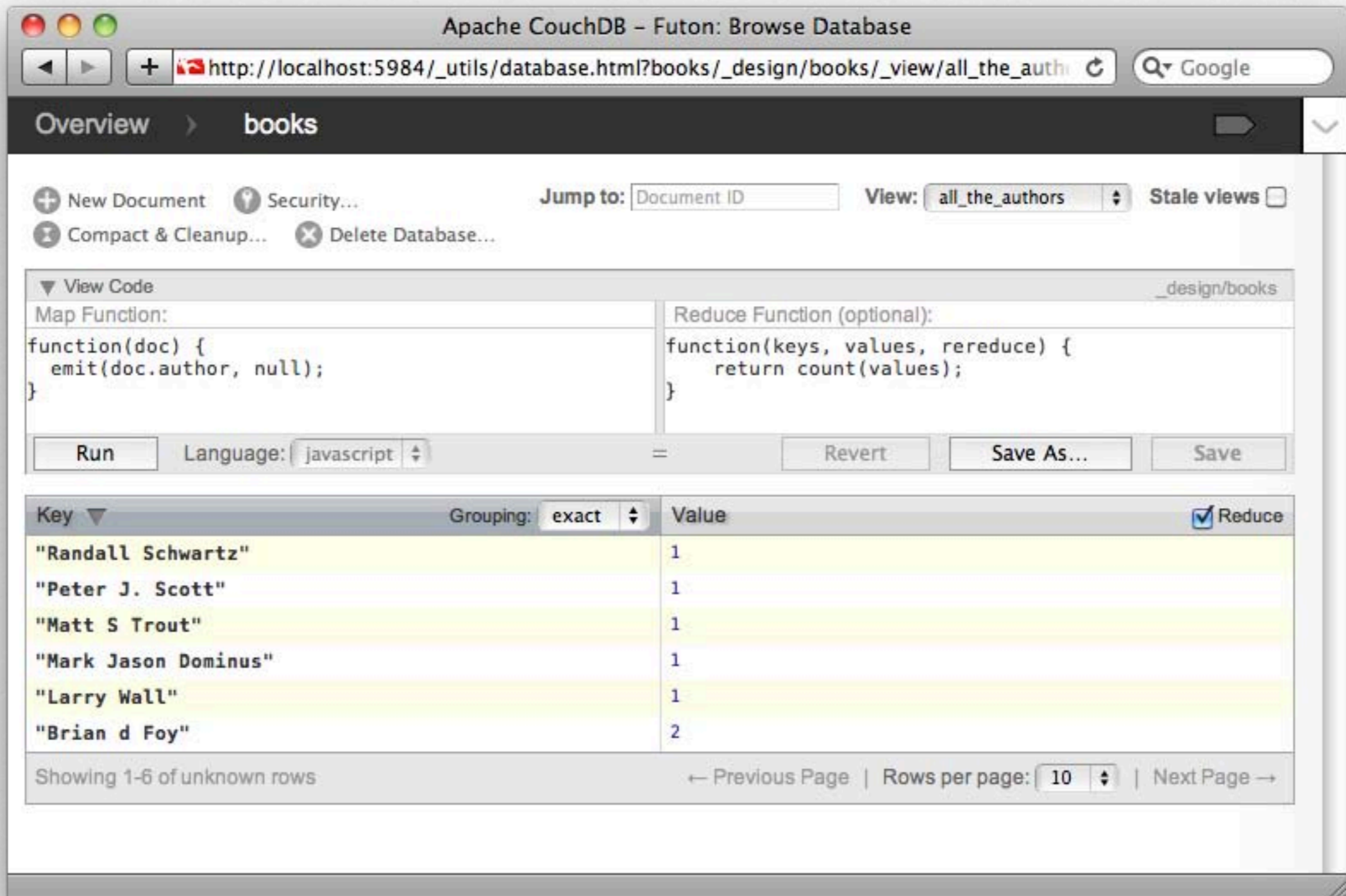
Buttons for Run, Language: javascript, Revert, Save As..., and Save are visible.

The view results are displayed in a table with the following data:

Key	Value
"Randall Schwartz" ID: perls_of_wisdom	{title: "Perls of Wisdom", publisher: "Apress"}
"Peter J. Scott" ID: perl_medic	{title: "Perl Medic", publisher: "Adison Wesley"}
"Matt S Trout" ID: definitive_guide_to_catalyst	{title: "The definitive Guide to Catalyst", publisher: "Apress"}
"Mark Jason Dominus" ID: higher_order_perl	{title: "Higher Order Perl", publisher: "Morgan Kaufmann"}
"Larry Wall" ID: programming_perl	{title: "Programming Perl", publisher: "O'REILLY"}
"Brian d Foy" ID: mastering_perl	{title: "Mastering Perl", publisher: "O'Reilly"}

Menü anzeigen

Daten Reduzieren



Apache CouchDB - Futon: Browse Database

http://localhost:5984/_utils/database.html?books/_design/books/_view/all_the_authors

Overview > books

New Document Security... Compact & Cleanup... Delete Database...

Jump to: Document ID View: all_the_authors Stale views

View Code _design/books

```
Map Function:
function(doc) {
  emit(doc.author, null);
}

Reduce Function (optional):
function(keys, values, rereduce) {
  return count(values);
}
```

Run Language: javascript = Revert Save As... Save

Key	Grouping: exact	Value	<input checked="" type="checkbox"/> Reduce
"Randall Schwartz"		1	
"Peter J. Scott"		1	
"Matt S Trout"		1	
"Mark Jason Dominus"		1	
"Larry Wall"		1	
"Brian d Foy"		2	

Showing 1-6 of unknown rows

← Previous Page | Rows per page: 10 | Next Page →

Gocha: ~~Fremdschlüssel?~~

Apache CouchDB - Futon: Browse Database

http://localhost:5984/_utils/database.html?books/_design/books/_view/all_publishers

Overview > books

New Document Security... Compact & Cleanup... Delete Database... Jump to: Document ID View: all_publishers Stale views

View Code _design/books

```
Map Function:
function(doc) {
  emit(doc.publisher, null);
};

Reduce Function (optional):
_count
```

Run Language: javascript Revert Save As... Save

Key	Value
"O'REILLY"	1
"O'Reilly"	2
"Morgan Kaufmann"	1
"Apresss"	1
"Apress"	1
"Adison Wesley"	1

Showing 1-6 of unknown rows

← Previous Page | Rows per page: 10 | Next Page →

Menü anzeigen

Mehr?

Web Server

The screenshot shows a web browser window titled "Books CouchApp". The address bar contains the URL "http://localhost:5984/books/_design/books/index.html". The page content includes a header "Books CouchApp", a dropdown menu set to "Apress", and a "Books" section. A book cover for "The Definitive Guide to Catalyst" by Matt S Trout is displayed, with the price "35.9" listed below it. To the right of the book list, a green-bordered box contains the text: "Edit welcome message. Ideas: You could easily turn this into a photo sharing app, or a grocery list, or a chat room."

CouchApp

The image shows a screenshot of a CouchApp project structure and its index.html file. On the left, a file explorer displays the project structure, including folders like `books`, `_attachments`, `style`, `_id`, `couchapp.json`, `evently`, `items`, `_init`, `profile`, `select_publisher`, `_init`, `before.js`, `data.js`, `mustache.html`, `query.json`, `selectors`, `language`, `README.md`, `vendor`, `views`, `all_authors`, `map.js`, `reduce.txt`, `all_publishers`, `map.js`, `reduce.txt`, and `by_author`. The `select_publisher` folder is highlighted, and a red arrow points from it to the `select_publisher` event listener in the JavaScript code.

The main window displays the `index.html` file, which contains the following HTML and JavaScript code:

```
<!DOCTYPE html>
<html>
  <head>
    <title>Books CouchApp</title>
    <link rel="stylesheet" href="style/main.css" type="text/css">
  </head>
  <body>
    <h1>Books CouchApp</h1>
    <div id="select_publisher"></div>
    <div id="items"></div>
    <div id="sidebar">
      <p>Edit welcome message.</p>
      <p>Ideas: You could easily turn this into a photo sharing app, or a</p>
    </div>
  </body>
  <script src="vendor/couchapp/loader.js"></script>
  <script type="text/javascript" charset="utf-8">
    $.couch.app(function(app) {
      $('#items').evently('items', app);
      $('#select_publisher').evently('select_publisher', app);
    });
  </script>
</html>
```

The JavaScript code uses the `$.couch.app` function to initialize the CouchApp. It then uses the `evently` plugin to bind events to the `#items` and `#select_publisher` elements. A red arrow points from the `$('#select_publisher').evently('select_publisher', app);` line in the JavaScript code to the `select_publisher` folder in the file explorer. Another red arrow points from the `$('#items').evently('items', app);` line to the `items` folder in the file explorer.

Ausblick

- validierungs-Funktionen zuschaltbar
- list- und show-Funktionen
- Replikation
- lauffähig auf Mobilgeräten (Android)
- URL-Rewriting, SSL-Unterstützung
- Benutzer- und Rechte-Management

Fragen?

Links

- <http://couchdb.apache.org>
- <http://wiki.apache.org/couchdb>
- <http://twitter.com/CouchDB>
- <http://guide.couchdb.org/index.html>
- <http://couchapp.org/page/index>

Jetzt ist aber wirklich

Schluss!

Danke für Eure
Aufmerksamkeit