COUCHDB

TELECOM NANCY, 1ᴱᴿᴱ ANNEE

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MAÎTRE DE CONFÉRENCES À TELECOM NANCY
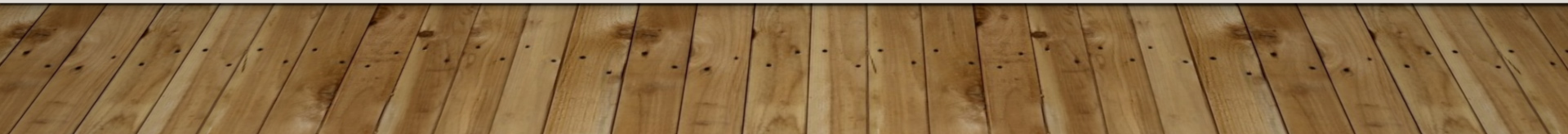
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OVERVIEW

- Introduction
- SQL vs CouchDB
- CouchDB Features
- CouchDB Core API
- Futon
- Security
- Application

OVERVIEW

- Advantages
- DisAdvantages
- Conclusion
- References

INTRODUCTION

- Created By : Damien Katz

- Year : 2005

- Language : Erlang

- License : Apache Software Foundation(2008)

INTRODUCTION...

- NoSQL Database

NOSQL DATABASES

- Schema-Free

- Distributed

- Open Source

- Horizontally Scalable

- Easy Replication Support

DOCUMENT-ORIENTED DBMS
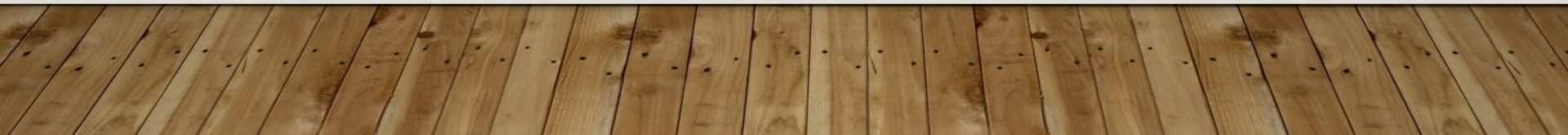
- Data is stored in documents

......and not in relations like an RDBMS

SQL VS COUCHDB

SQL	CouchDB
Relational	Non-Relational
Tables	Documents with types
Rows and Columns	Document Fields
SQL Query Engine	Map / Reduce Engine (*cours en 2A et 3A*)

COUCHDB FEATURES

- Data Representation - Using JSON

- Interaction - Futon / CouchDB API

- Querying - Map / Reduce

- Design Documents - Application code(Language : Javascript)
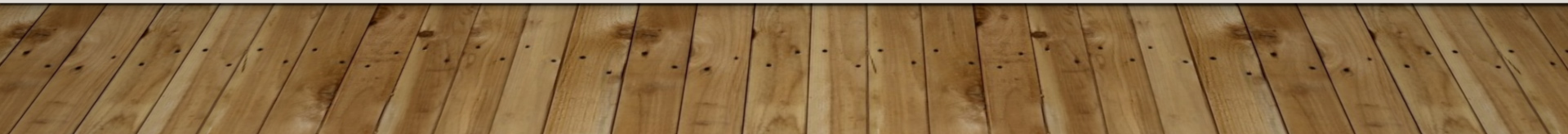
- Documents can have attachments

JSON

- Stands for Javascript Object Notation

- Derived from Javascript scripting language

- Used for representing simple data structures and associative arrays

JSON.....

- Example: {
- "firstName": "John",
- "lastName": "Smith",
- "age": 25,
- "phoneNumber": [
- {
- "type": "home",
- "number": "212 555-1234"
- },
- {
- "type": "fax",
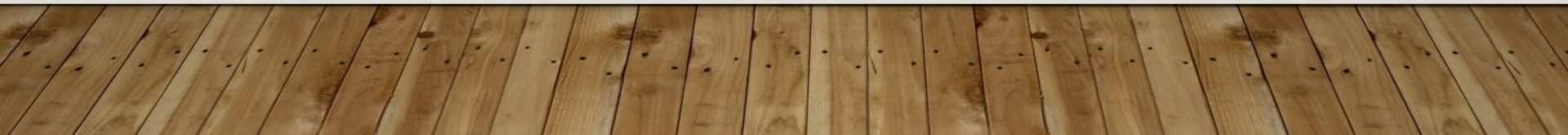 "number": "646 555-4567"
- }]
- }

COUCHDB CORE API (COMMAND LINE UTILITY)

- Server API

- Database API

- Document API

- Replication API

HTTP API

- Messages are self-described via HTTP Headers and HTTP Status Codes.

- URIs identify resources.

- HTTP Methods define operations on the resources.

HTTP REQUEST METHODS

Method	Description
PUT	PUT requests are used to create new resources where the URI of the request is different to the resource that is to be created.
GET	GET requests are used to request data from the database.
POST	POST requests are used to update the existing data, at the same resource the URI is requested from.
DELETE	DELETE requests to delete databases and documents.
COPY	Copies one resource to another resource.

HTTP STATUS CODES

Status Code	Description
200 (OK)	The request was successfully processed.
201 (Created)	The document was successfully created.
304 (Not Modified)	The document has not been modified since the last update.
400 (Bad Request)	The syntax of the request was invalid.
404 (Not Found)	The request was not found.
405 (Method Not Allowed)	The request was made using an incorrect request method.
409 (Conflict)	The request failed because of a database conflict.
412 (Precondition Failed)	could not create a database- a database with that name already exists.
500 (Internal Server Error)	The request was invalid and failed, or an error occurred within the CouchDB server.

CURL COMMAND - SERVER API

- Command to check if CouchDB is working at all?

  curl http://127.0.0.1:5984/

- Response :

  {"couchdb":"Welcome","version":"0.10.1"}

CURL COMMAND - DATABASE API

- Command to get a list of Databases :

curl -X GET http://127.0.0.1:5984/_all_dbs

- Command to create a Database :

curl -X PUT http://127.0.0.1:5984/DB_name

- Curl's -v option :

curl -vX PUT http://127.0.0.1:5984/DB_name

- Command to destroy a Database :

curl -X DELETE http://127.0.0.1:5984/DB_name

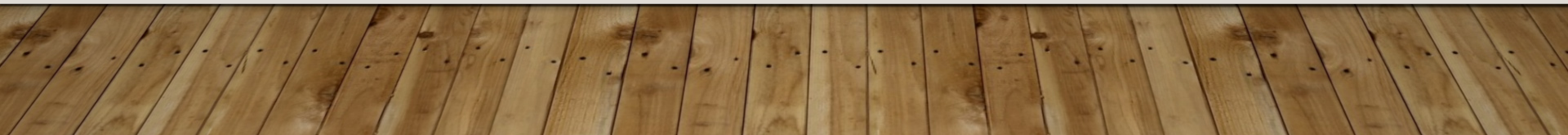# CURL COMMAND - DOCUMENT API

- Command to create a document :

    curl -X PUT http://127.0.0.1:5984/albums/6ert2g \ -d

    '{"title":"abc","artist":"xyz"}'

- Command to get a UUID :

    curl -X GET http://127.0.0.1:5984/_uuids

- Command to retrieve a Document :

    curl -X GET http://127.0.0.1:5984/albums/6ert2g

CURL COMMAND - DOCUMENT API

- Command for attachments :

  curl -vX PUT http://127.0.0.1:5984/albums/
  6ert2gh45ji6h6tywe324743rtbhgtrg/ \
  artwork.jpg?rev=2-2739352689 --data-binary
  @artwork.jpg -H "Content-Type: image/jpg"

- To view the image in the browser, URL is :

  http://127.0.0.1:5984/albums/6ert2gh45ji6h6
  tywe324743rtbhgtrg/artwork.jpg

CURL COMMAND- REPLICATION API

- Command to replicate a Database :

curl -vX POST http://127.0.0.1:5984/

_replicate \ -d '{"source":"albums","target":

"albums_replica"}'

FUTON

- Built-in admin interface

- Access to all CouchDB features

- Create and Destroy databases

- Create, View and Edit Documents

- Compose and run Map / Reduce Views

- Replicate a Database

FUTON INTERFACE DEMO...

DESIGN DOCUMENTS

- Contains application code
- They are like normal json documents but prefixed by _design/
- CouchDB looks for views and other application functions here...
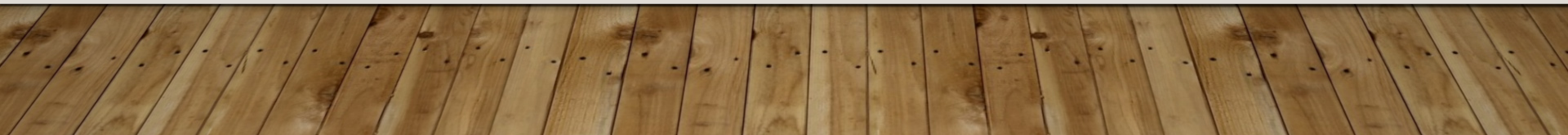
VIEWS

- Used for extracting data we need for a specific purpose

- Example :

```
function(doc){

    if(doc.Bname)

    {

        emit(doc.id,doc.Bname);

    }

}
```
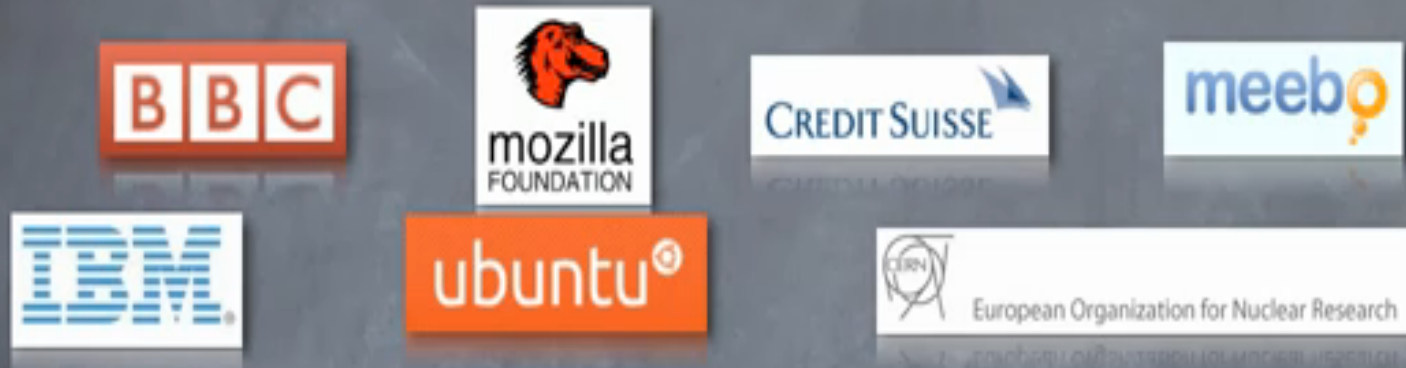
SECURITY

- Database Admins
- Validation Functions

VALIDATION FUNCTION

- Uses the function **validate_doc_update().**
- If the validation function raises an exception, the update is denied else the updates are accepted.
- Document validation is optional.

WHO USES COUCHDB?

- Features
- Not easy to learn especially if the user is familiar with SQL
- Security is weak
- Temporary views on large datasets are very slow.
- Replication of large databases may fail
- Documents are quite large as the data is represented using "JSON" format

REFERENCES

- CouchDB - The Definitive Guide , J. Chris Anderson, Jan Lehnardt & Noah Slater

- Beginning CouchDB, Joe Lennon

Thank You... Questions?