Advanced Databases
Developing of a social network using CouchDB

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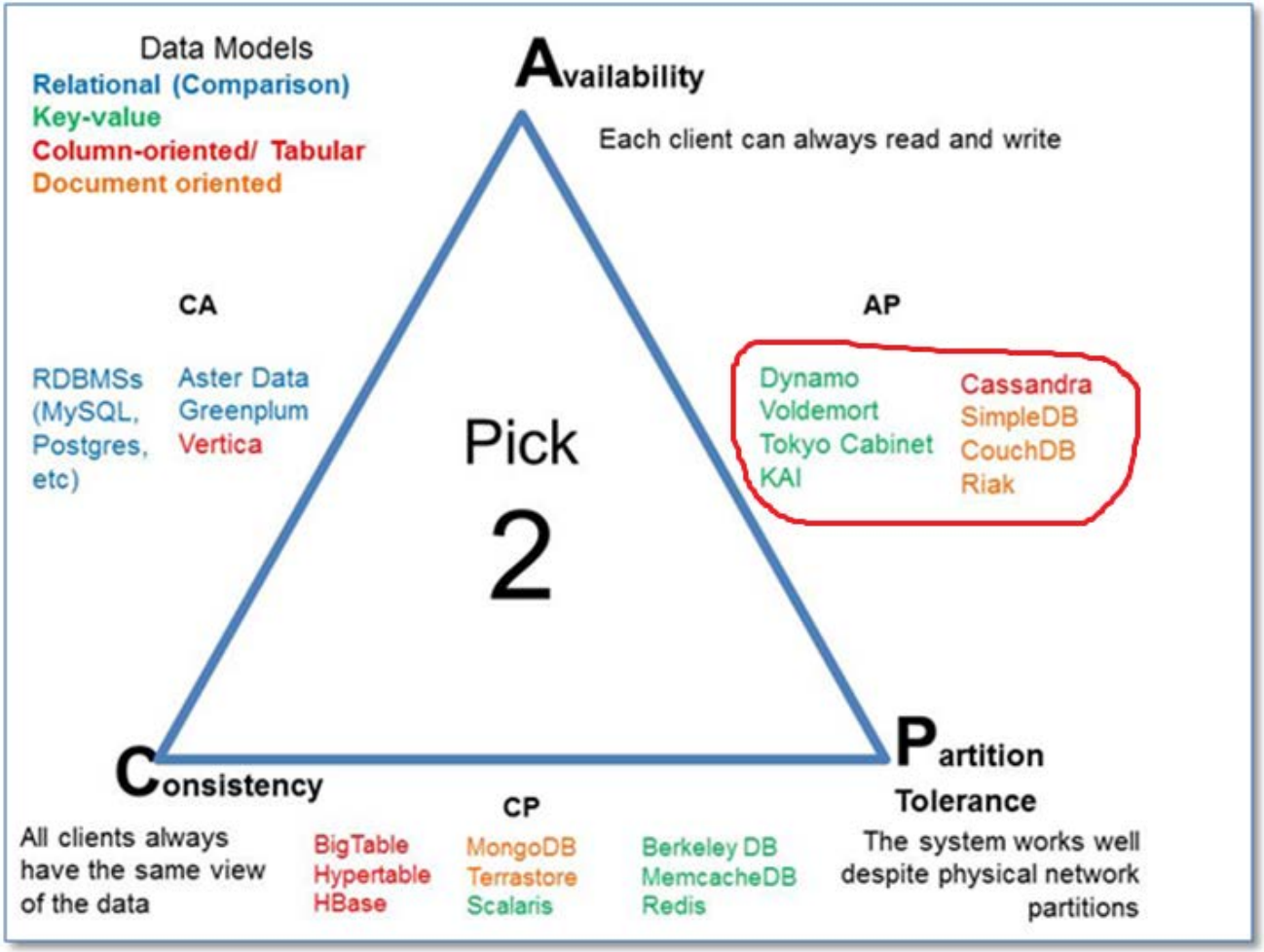
Introduction

Technical requirements:

- Security of personal data.
- Fast response time.
- Scalability.
- Data consistency.
- Simple modifying of functionality.

Why CouchDB? [1]

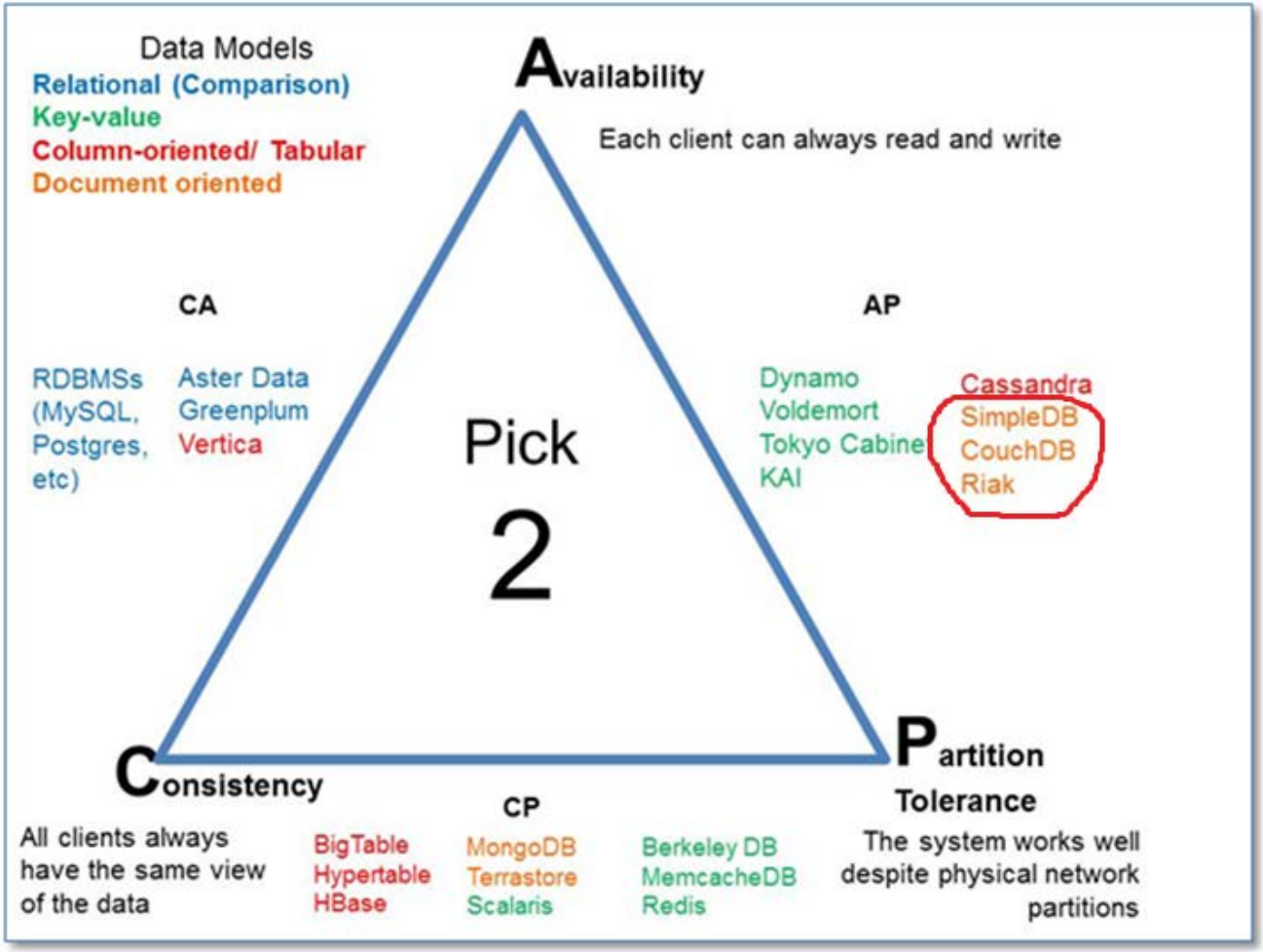
Availability and **Partition Tolerance** have higher priority



CAP theorem illustration.

Why CouchDB? [2]

Flexibility over **simplicity**



CAP theorem illustration.

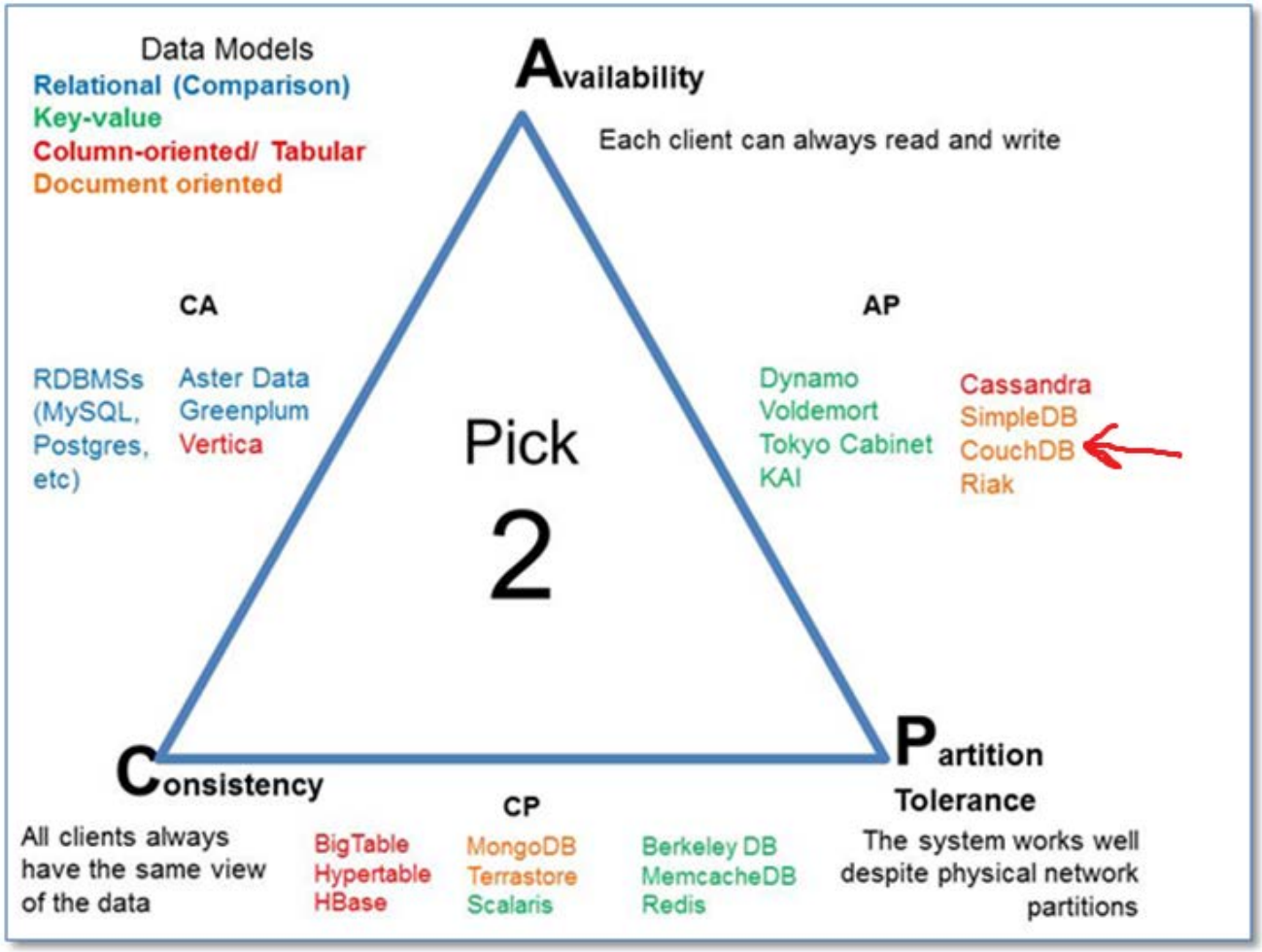
Why CouchDB? [3]

CouchDB vs. SimpleDB arguments:

- REST
- JSON
- Direct indexing

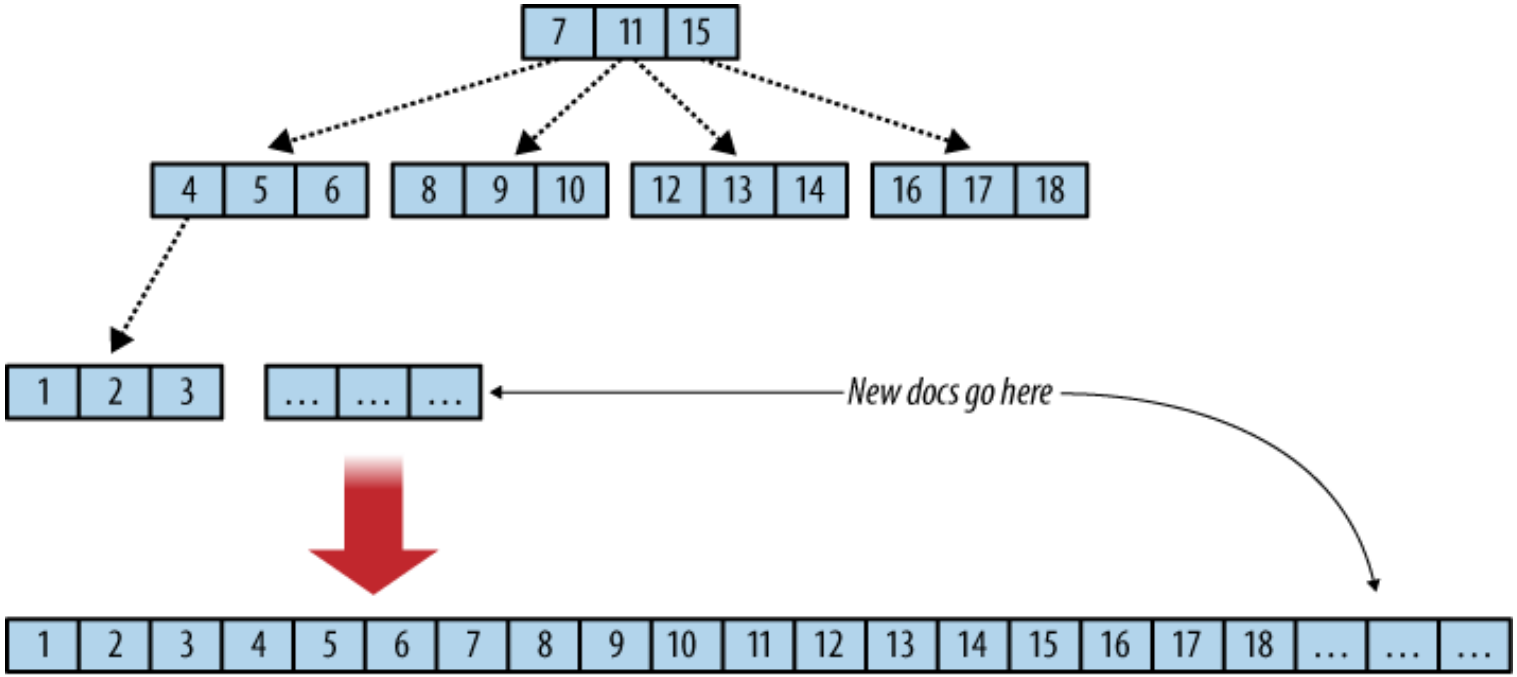
CouchDB vs. Riak arguments:

- Many more supporting OS.



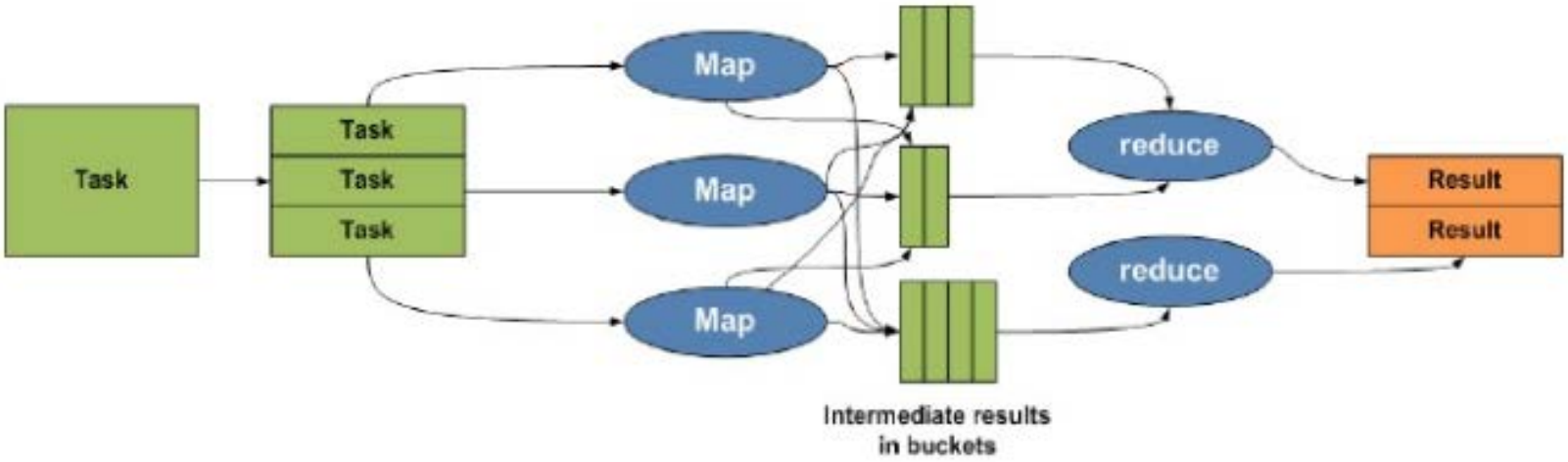
CAP theorem illustration.

CouchDB B-tree

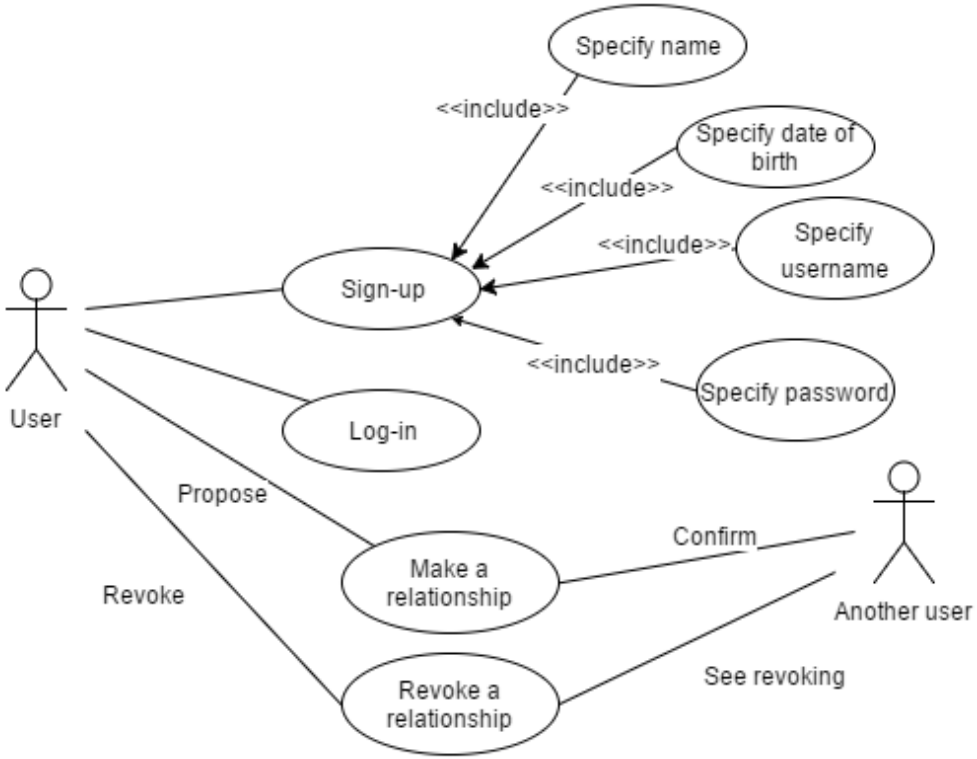


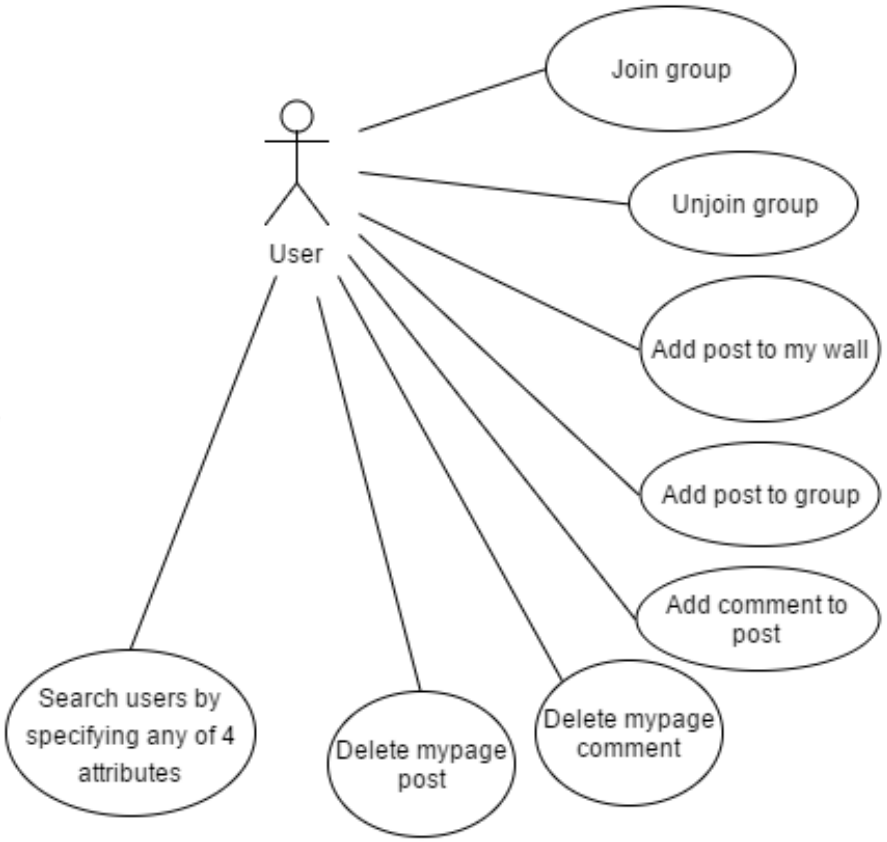
Append-only!

Map/reduce

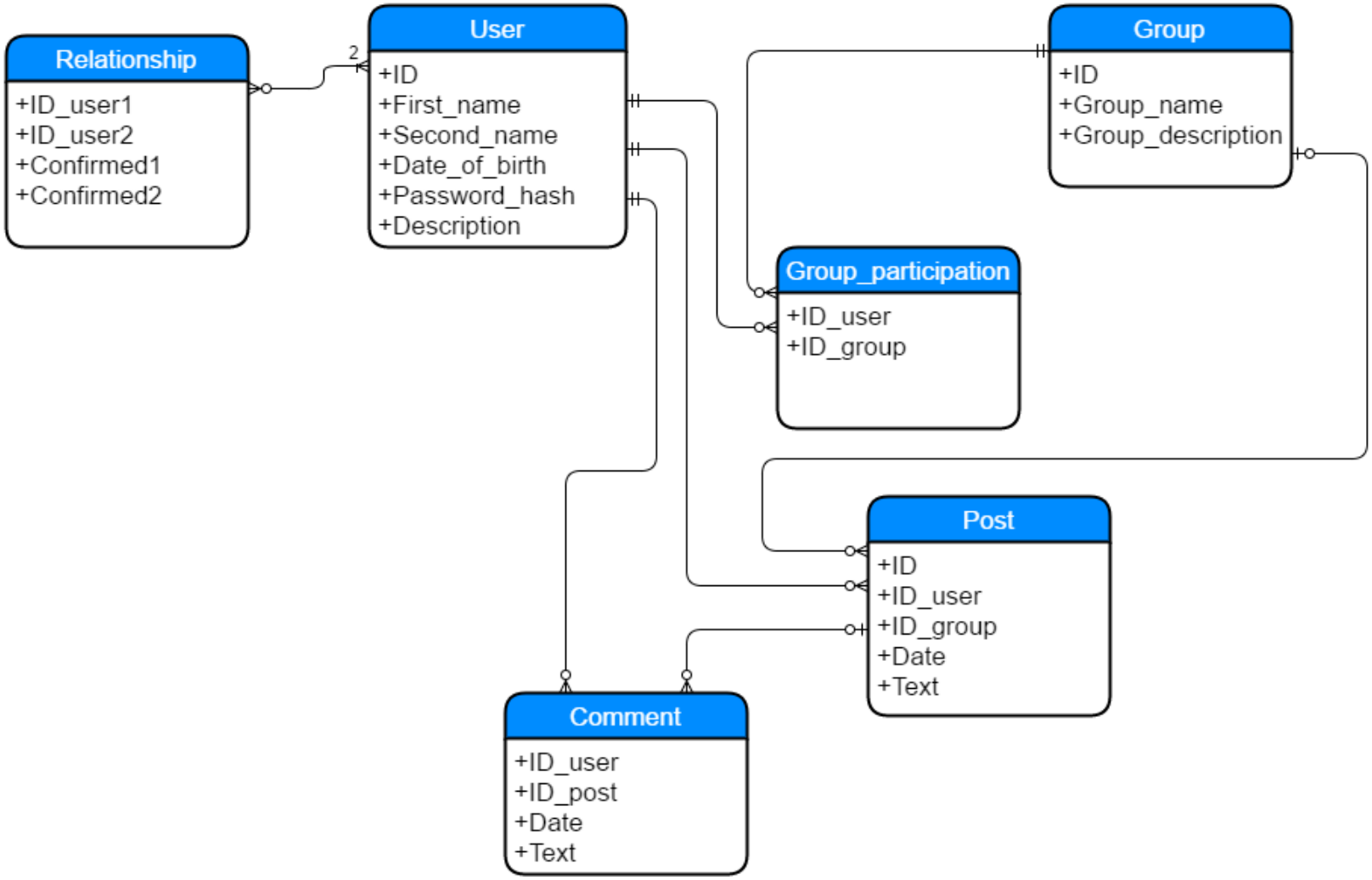

Task
Task
Task
Task
Task
Map
Map
Map
reduce
reduce
Result
Result
Intermediate results
in buckets

UML use case


Specify name
<<include>>
Specify date of birth
<<include>>
<<include>>
Specify username
Sign-up
<<include>>
Specify password
User
Log-in
Propose
Confirm
Make a relationship
Revoke
Another user
Revoke a relationship
See revoking


Join group
Unjoin group
User
Add post to my wall
Add post to group
Add comment to post
Search users by specifying any of 4 attributes
Delete mypage post
Delete mypage comment

ER-diagram


Relationship
+ID_user1
+ID_user2
+Confirmed1
+Confirmed2
2
User
+ID
+First_name
+Second_name
+Date_of_birth
+Password_hash
+Description
Group
+ID
+Group_name
+Group_description
Group_participation
+ID_user
+ID_group
Post
+ID
+ID_user
+ID_group
+Date
+Text
Comment
+ID_user
+ID_post
+Date
+Text

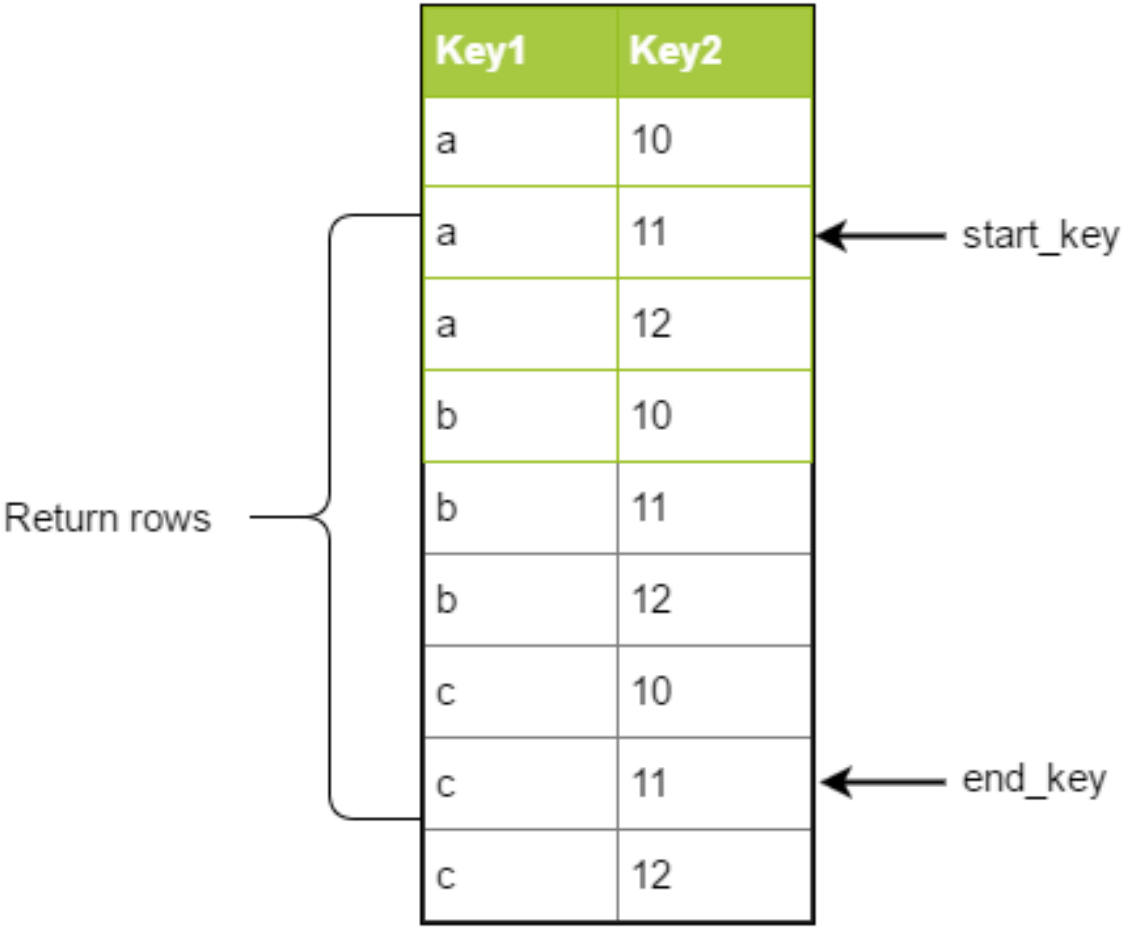
Object over document design

Post/comment merged document:

```
{
"_id": "dc3399efe88b8c4c9636ea…",
"_rev": "1-d0f2ac2de9a3855c2ca…",
"type": "post",
"username": "john",
"id_group": "192f2278f1902ed67…",
"date": "2016-09-02 12:00",
"text": "Quelqu'un a une imprimante?",
"comments":
            {
            "dc3399efe88b8c4…":
                        {
                        "username": "michelle",
                        "text": "Je l'ai ... mais la peinture est finie",
                        "date": "2016-09-02 12:10"
                        }
            }
}
```

	ER-entity	Document type
1.	User	User
2.	Relationship	Relationship
3.	Group	Group
4.	Group_participation	Group_participation
5.	Post	Post
6.	Comment	Post

Tuple key search

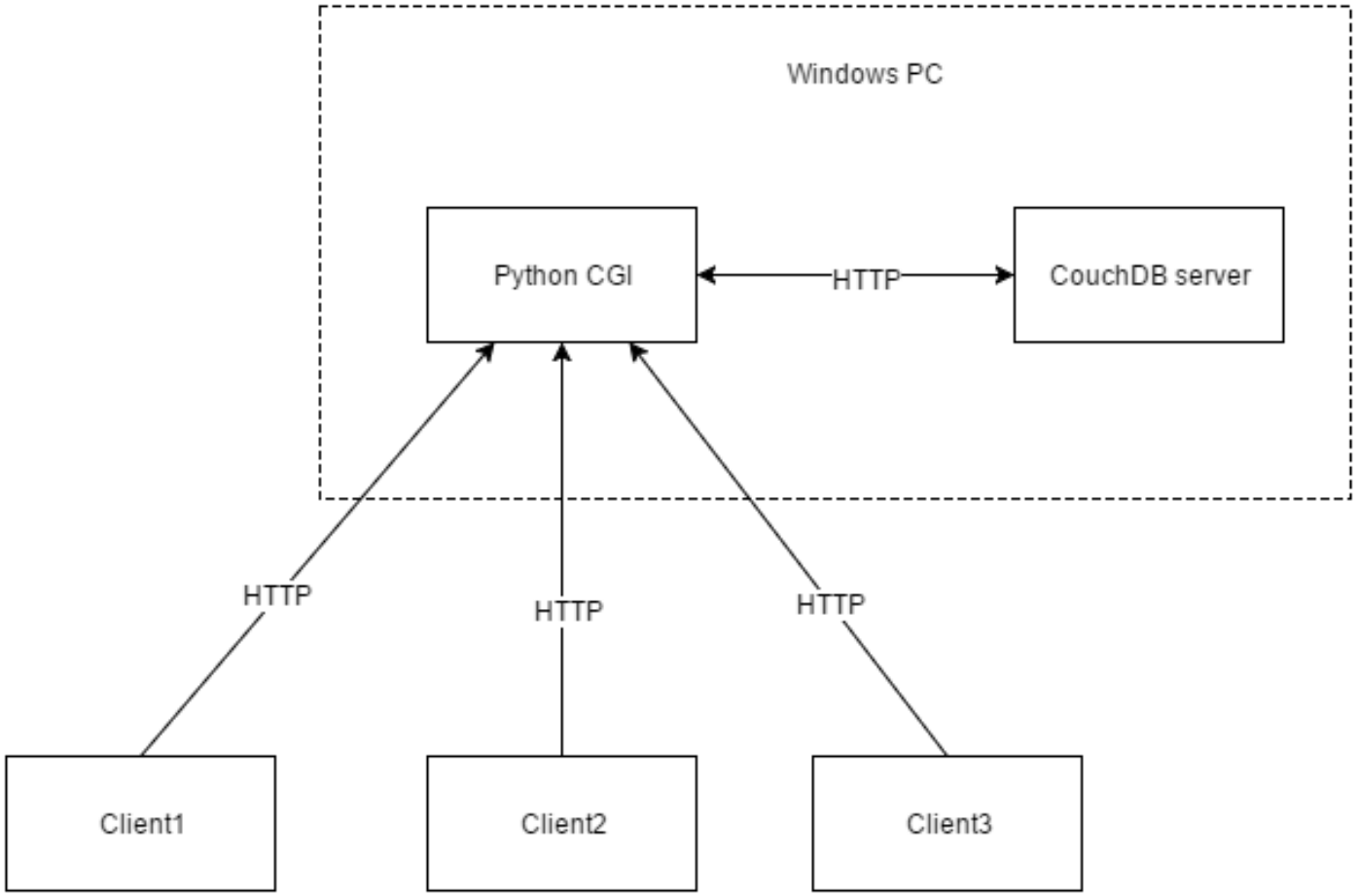


Ranged key request result

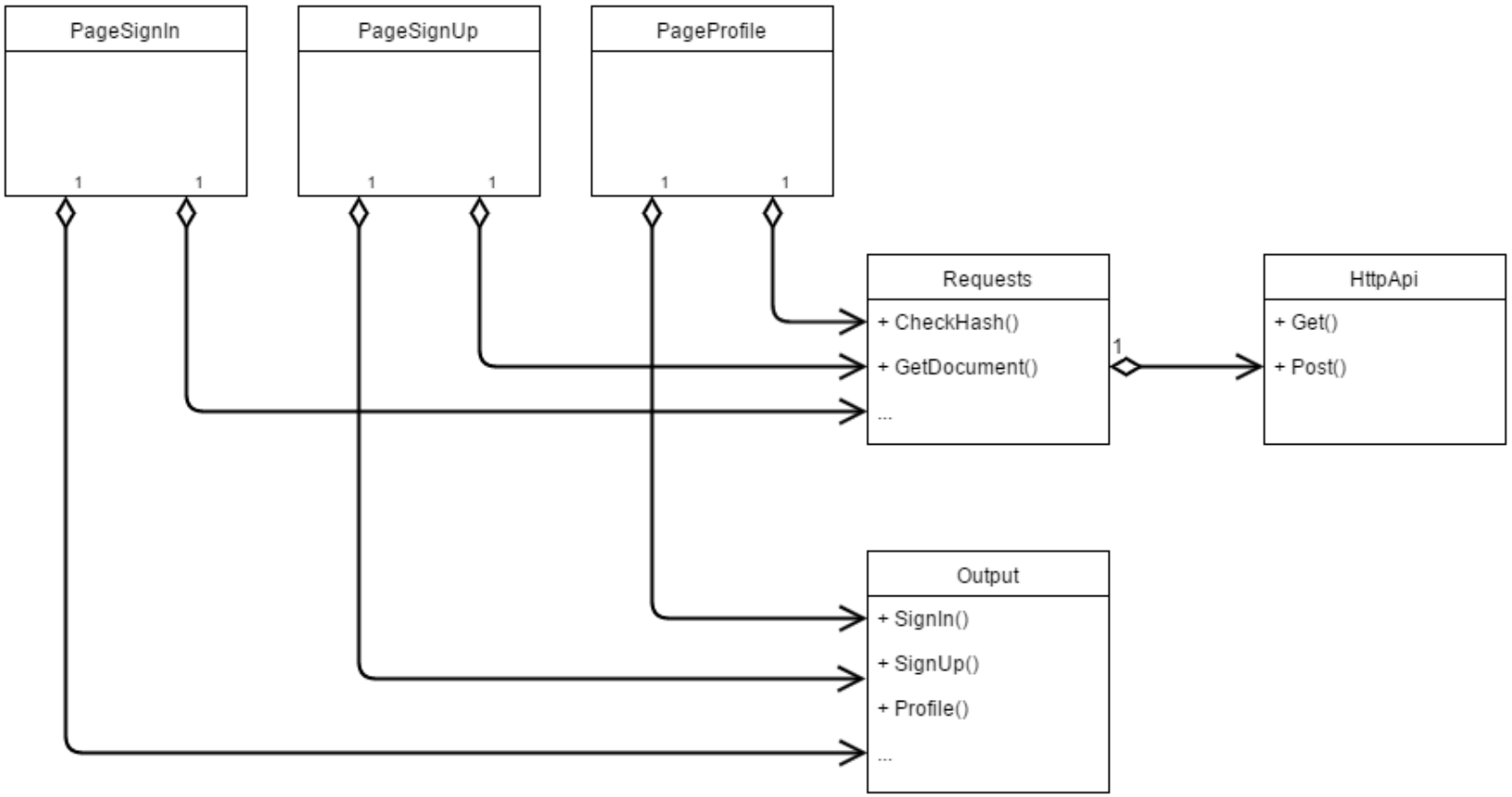
Index selection

Username is specified	FirstName is specified	SecondName is specified	Birthday is specified	Index
No	No	No	No	[Show all users]
No	No	No	Yes	user_by_bday_fname
No	No	Yes	No	user_by_sname_bday
No	No	Yes	Yes	user_by_sname_bday
No	Yes	No	No	user_by_fname_sname_bday
No	Yes	No	Yes	user_by_bday_fname
No	Yes	Yes	No	user_by_fname_sname_bday
No	Yes	Yes	Yes	user_by_fname_sname_bday
Yes	No	No	No	user_by_username
…	…	…	…	…

UML Deployment



UML Class


PageSignIn
PageSignUp
PageProfile
1
1
1
1
1
1
Requests
+ CheckHash()
+ GetDocument()
...
1
HttpApi
+ Get()
+ Post()
Output
+ SignIn()
+ SignUp()
+ Profile()
...

Thank you for attention!