

Different relations

Mag. Thomas Griesmayer

Introduction

- The key challenge in data modeling is balancing
 - the needs of the application
 - the performance characteristics of the database engine and the
 - data retrieval patterns.
- When designing data models, always consider the application usage of the data (i.e. queries, updates, and processing of the data) as well as the inherent structure of the data itself.

<https://www.mongodb.com/docs/manual/core/data-modeling-introduction/>

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Flexible Schema

- Unlike SQL databases, where you must determine and declare a table's schema before inserting data.
- MongoDB's collections, by default, do not require their documents to have the same schema.
- That is:
 - The documents in a single collection do not need to have the same set of fields and the data type for a field can differ across documents within a collection.
 - To change the structure of the documents in a collection, such as add new fields, remove existing fields, or change the field values to a new type, update the documents to the new structure.
- Schema Validation - In practice, however, the documents in a collection share a similar structure, and you can enforce document validation rules for a collection during update and insert operations.

<https://www.mongodb.com/docs/manual/core/data-modeling-introduction/>

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relationships

Embedded documents capture relationships between data by storing related data in a single document structure.

```
{
  "_id": "14a92b",
  "name": "Luigi",
  "adress": {
    "street": "Spengergasse 20",
    "zip": 1050,
    "city": "Vienna"
  }
}
```

References store the relationships between data by including links or references from one document to another.

<pre>{ "_id": "14a92b", "name": "Luigi", "shop_id": "23t42x" }</pre>	<pre>{ "_id": "23t42x", "name": "Billa" }</pre>
--	---



<https://www.mongodb.com/docs/manual/core/data-modeling-introduction/>

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Embedding documents

Customer	
<u>CustomerID</u>	INTEGER
FirstName	VARCHAR(20)

Lives	
<u>CustomerID</u>	INTEGER
<u>AdressID</u>	INTEGER

Adress	
<u>AdressID</u>	INTEGER
StreetName	VARCHAR(20)
HouseNumber	VARCHAR(20)
CityID	INTEGER

City	
<u>CityID</u>	INTEGER
ZIP	VARCHAR(5)
CityName	VARCHAR(20)

98% Customers have one home adress

Embedding documents

```
{
  "_id": "14a92b",
  "name": "Luigi",
  "adresses":
  [ {
    "street": "Maxgasse",
    "housenumber": "19/3/5"
    "zip": 2500,
    "city": "Baden" } ]
}
```

```
{
  "_id": "22x19e",
  "name": "Max",
  "adresses":
  [ { "street": "Maxgasse",
    "housenumber": "19/3/5"
    "zip": 2500,
    "city": "Baden" },
    { "street": "Spengergasse",
    "housenumber": "20"
    "zip": 1050,
    "city": "Vienna" } ]
}
```

Subset Pattern

- A potential problem with the embedded document pattern is that it can lead to large documents that contain fields that the application does not need. This unnecessary data can cause extra load on your server and slow down read operations. Instead, you can use the subset pattern to retrieve the subset of data which is accessed the most frequently in a single database call.
- This method improves read performance because it requires the application to read less data to fulfill its most common request. The application can make an additional database call to fetch the less-frequently accessed data if needed.

Subset Pattern movie

	ARIELLE, DIE MEERJUNGFRAU <i>auch zu sehen in:</i> REAL D 3D 5,1 ★★★★★★☆☆☆☆ The Little Mermaid Family, Fantasy, Musical 136 Minuten Ab 8 Jahren <i>Filmstart:</i> 25.05.2023	16:45 🏠 Saal 2 Digital 3D 19:45 🏠 Saal 2 Digital 3D
	ASTERIX & OBELIX IM REICH DER MITTE 7,6 ★★★★★★★★☆☆ Astérix & Obélix: L'Empire du Milieu Family, Komödie, Abenteuer 112 Minuten Ab 6 Jahren <i>Filmstart:</i> 17.05.2023	15:30 🏠 Saal 6 Digital 2D

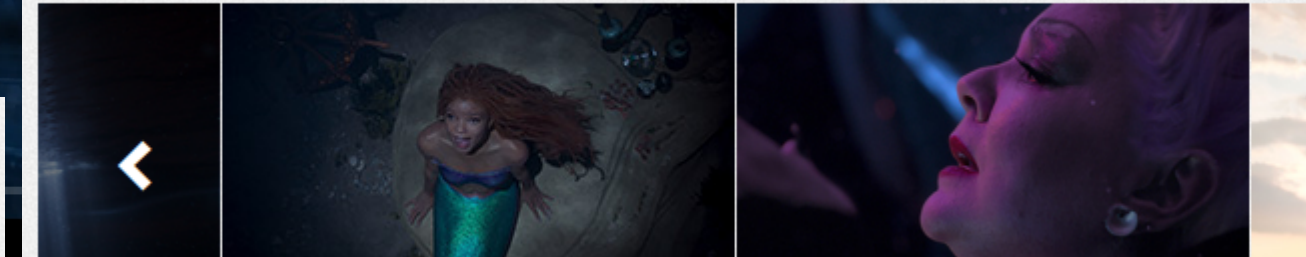
ARIELLE, DIE MEERJUNGFRAU

INHALT

Arielle, die jüngste und eigenwilligste Tochter von König Triton sehnt sich danach, mehr über die Welt jenseits des Meeres zu erfahren und verliebt sich bei einem Besuch an der Oberfläche in den attraktiven Prinz Erik. Obwohl Meerjungfrauen der Umgang mit Menschen verboten ist, muss



GALERIE



Der Oscar®-nominierte Rob Marshall führte Regie in der Live-Action-Neuinterpretation von Hans Christian Andersens Kurzgeschichte, auf der Ron Clements' und John Muskers Disney-Zeichentrickfilm basiert.

Originaltitel: The Little Mermaid
Filmstart: 25.05.2023
Filmlänge: 136 Minuten
Land/Jahr: USA/2023
Genre: Musical, Family, Fantasy
Darsteller: Halle Bailey, Jonah Hauer-King, Melissa McCarthy, Javier Bardem, Noma Dumezweni
Regie: Rob Marshall
Verleih: The Walt Disney Comp GmbH
Altersfreigabe: Ab 8 Jahren

HEUTE, DI
13.06.2023

16:45
Saal 2
Digital 3D

19:45
Saal 2
Digital 3D

VERFÜGBARE VERSIONEN

OV Dolby 3D REAL D 3D

MORGEN, MI
14.06.2023

16:45
Saal 2
Digital 3D

19:45
Saal 2
Digital 2D

D-BOX

DO
15.06.2023

16:45
Saal 6
Digital 3D

19:45
Saal 6
Digital 3D

FR
16.06.2023

15:50
Saal 3
Digital 2D

17:00
Saal 2
Digital 3D

20:00
Saal 2
Digital 3D

```
{
  "_id": "12ABD44"
  "title": "ARIELLE",
  "subtitle": "DIE MEERJUNGFRAU",
  "playing": [ {"datetime":"13.6. 16:45", "room":2, "type": "3D"},
                {...},
                {"datetime":"20.6. 16:45", "room":2, "type": "2D"} ],
  "ranking": 5.1,
  "duration": 136,

  "originaltitle": "The Little Mermaid",
  "description": "Arielle, die jüngste ...",
  "detaildescription": "Arielle, die jüngste und eigenwilligste
                        Tochter von König Triton..."
}
```

Subset Pattern

films collection

```
{
  "_id": "12ABD44",
  "title": "ARIELLE",
  "subtitle":
    "DIE MEERJUNGFRAU",
  "playing": [ ... ],
  "ranking": 5.1,
  "duration": 136
}
```

filmdetails collection

```
{
  "_id": "99RRE99",
  "movie_id": "12ABD44",
  "originaltitle":
    "The Little Mermaid",
  "description": "Arielle, die
    jüngste ...",
  "detaildescription": "Arielle,
    die jüngste und
    eigenwilligste Tochter ...",
  "trailer": VIDEO
}
```



Subset Pattern online shop

★★★★☆ **Not suitable for self-learning**

Rezension aus dem Vereinigten Königreich vom 12. Mai 2020

Verifizierter Kauf

Although the book is good, it does not provide the solutions to the exercises. So when you're stuck, there is no way of knowing how to progress. You can only buy it if you are assisted with a Java teacher, which means self-learning with this book is not possible. Apparently the corresponding solutions' book exists but is not available to the public, only to teachers registered in universities, which is a very segregational approach and prevents growth in learning.

3 Personen fanden diese Informationen hilfreich



★★★★☆ **Good book but not worth the price**

Rezension aus dem Vereinigten Königreich vom 17. September 2018

Verifizierter Kauf

It's a nice book. It could be priced at 20 pound if printed in black-and-white. It's just seems like all of your money is paid for the color printing and magazine-like paper. Wouldn't buy it if it isn't a recommended textbook by University.

[Alle Rezensionen anzeigen >](#)

```
{
  "_id": "34DSFG5345"
  "title": "Objects First with Java",
  "published": "2016-06-24",
  "reviews": [ {"user": "Max", "datetime": "12.5.",
    "title": "Not suitable for self-learning",
    "review": "Although the book is good, it does..."},
    {...}, {...}, {...}, {...}, {...}, {...}, {...},
    {...}, {...}, {...}, {...}, {...}, {...}, {...},
    {...}, {...}, {...}, {...}, {...}, {...}, {...},
    {...}, {...}, {...}, {...}, {...}, {...}, {...},
    {...}, {...}, {...}, {...}, {...}, {...}, {...},
    {...}, {...}, {...}, {...}, {...}, {...}, {...},
    {...}, {...}, {...}, {...}, {...}, {...}, {...} ]
}
```

Subset Pattern

books collection

```
{
  "_id": "34DSFG5345"
  "title": "Objects F...",
  "published": "2016-06-24",
  "reviews": [ {...},
               {...},
               {...} ]
}
```

bookdetails collection

```
{
  "_id": "99RRE99",
  "book_id": "34DSFG5345",
  "reviews": [ {...}, {...}, {...},
               {...}, {...}, {...},
               {...}, {...}, {...},
               {...}, {...}, {...},
               {...}, {...}, {...},
               {...}, {...} ]
}
```

Reference

```
{
  _id: "234DDE22",
  title: "MongoDB: The
         Definitive Guide",
  author: [ "Chodorow",
            "Dirolf" ],
  published: "2010-09-24",
  pages: 216,
  language: "English",
  publisher: {
    name: "O'Reilly Media",
    founded: 1980,
    location: "CA" }
} https://www.mongodb.com/docs/manual/tutorial/model-referenced-one-to-many-relationships-between-
Mag. The documents/15
```

Reference

books collection

```
{
  _id: "234DDE22",
  title: "MongoDB: The
        Definitive Guide",
  ...
  language: "English"
}
{
  _id: "234DDE23",
  title: "50 Tips and Tricks
        for MongoDB",
  ...
  language: "English"
}
```

publishers collection

```
{
  _id: "345RRF44",
  name: "O'Reilly Media",
  founded: 1980,
  location: "CA",
  book_ids: ["234DDE22",
             "234DDE23",
             "...", "...", "...",
             "...", "...", "...",
             "...", "...", "...",
             "...", "...", "..."]
}
```

[https://www.mongodb.com/docs/manual/tutorial/model-referenced-one-to-many-relationships-between-](https://www.mongodb.com/docs/manual/tutorial/model-referenced-one-to-many-relationships-between-documents/)

Mag. The documenter

Reference

books collection

```
{
  _id: "234DDE22",
  title: "MongoDB: The ...",
  ...
  language: "English",
  publisher_id: "345RRF44"
}
{
  _id: "234DDE23",
  title: "50 Tips and ...",
  ...
  language: "English",
  publisher_id: "345RRF44"
}
```

publishers collection

```
{
  _id: "345RRF44",
  name: "O'Reilly Media",
  founded: 1980,
  location: "CA"
}
```

m:n relations

Customer	
<u>CustomerID</u>	INTEGER
FirstName	VARCHAR(20)

Purchase	
<u>PurchaseDate</u>	DATE
<u>CustomerID</u>	INTEGER
<u>ProductID</u>	INTEGER
Pieces	INTEGER
PricePiece	DECIMAL(8,2)
BillID	INTEGER

Product	
<u>ProductID</u>	INTEGER
ProductName	VARCHAR(20)
ActualPrice	DECIMAL(8,2)

Bill	
<u>BillID</u>	INTEGER
BillDate	DATE
Payed	CHAR(1)

customers collection

```
{
  "_id": "493FF33",
  "firstname": "Thomas",
  "bills": [
    {
      "billdate": "2022-10-01",
      "payed": true,
      "purchases": [
        {
          "product_id": "675TT53",
          "productname": "Bohrer",
          "purchasedate": "2023-05-19",
          "pieces": 40,
          "pricepiece": 1.9
        }
      ]
    }
  ],
}
```

 redundant

 reference

```
{
  "billdate": "2023-06-01",
  "payed": false,
  "purchases": [
    {
      "product_id": "604ET43",
      "productname": "Standbohrm.",
      "purchasedate": "2022-09-08",
      "pieces": 2,
      "pricepiece": 119.9
    },
    {
      "product_id": "675TT53",
      "productname": "Bohrer",
      "purchasedate": "2022-09-20",
      "pieces": 20,
      "pricepiece": 1.7
    }
  ]
}
```