

# MongoDB Data Modeling

Marco Ghisellini – Assago, 20/09/2019

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# What I'm not going to speak about...

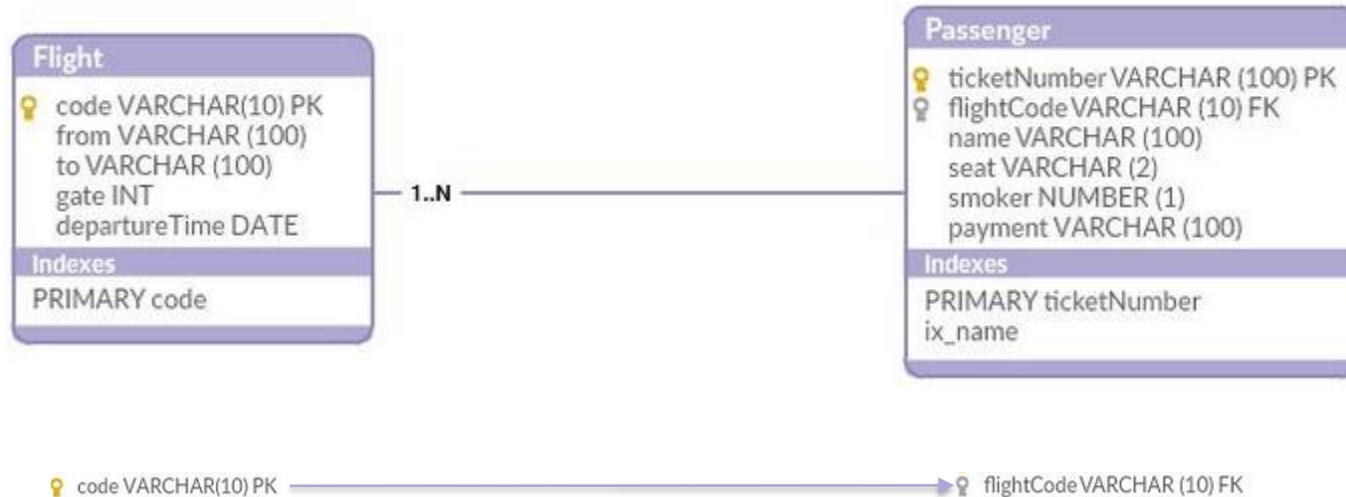
- Difference between traditional SQL and NoSQL database;
- Tell you which one is the best;
- When/Why use SQL or NoSQL database;
- I'm not going to make any performance/architecture comparison ...



Don't leave the room, I'm going to show you how to solve the next slide issue!

# SQL Diagram 1..N

## Booking Flight Diagram



# One step back

## Table/Document Diagram



Flight
<ul style="list-style-type: none"><li>code VARCHAR(10) PK</li><li>from VARCHAR (100)</li><li>to VARCHAR (100)</li><li>gate INT</li><li>departureTime DATE</li></ul>
Indexes
PRIMARY code

Passenger
<ul style="list-style-type: none"><li>ticketNumber VARCHAR (100) PK</li><li>flightCode VARCHAR (10) FK</li><li>name VARCHAR (100)</li><li>seat VARCHAR (2)</li><li>smoker NUMBER (1)</li><li>payment VARCHAR (100)</li></ul>
Indexes
PRIMARY ticketNumber ix_name



```
{
  "code": "AZ765RW",
  "from": "London Gatwick",
  "to": "Milan Malpensa",
  "gate": "22",
  "departureTime": "2017-03-24T14:47:00.000Z"
}
```

```
{
  "ticketNumber": "A44gc",
  "flightCode": "AZ765RW",
  "name": "Bryan Richard",
  "seat": "12A",
  "smoker": true,
  "payment": "Check"
}
```



We've three different options to model a “1..N” relation in NoSQL.

The choice should depend on how we're going to access the data.

# One to few

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 **Pagine Gialle**

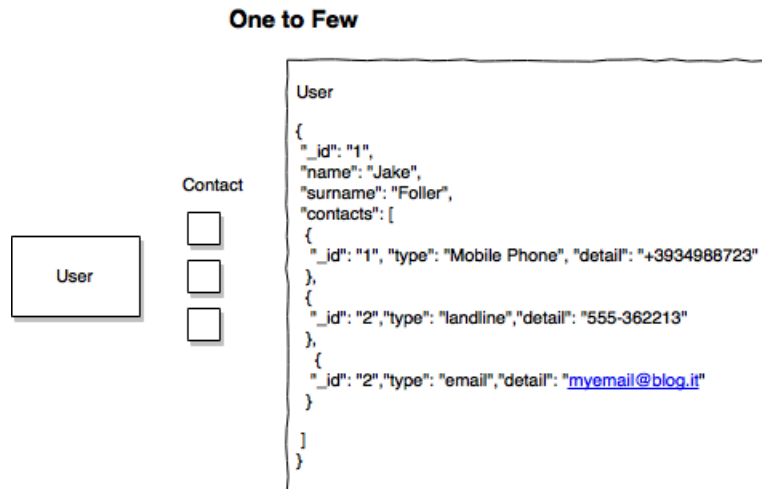
 **Pagine Bianche**

 **TuttoCitta**

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Il numero uno dei  
portali italiani

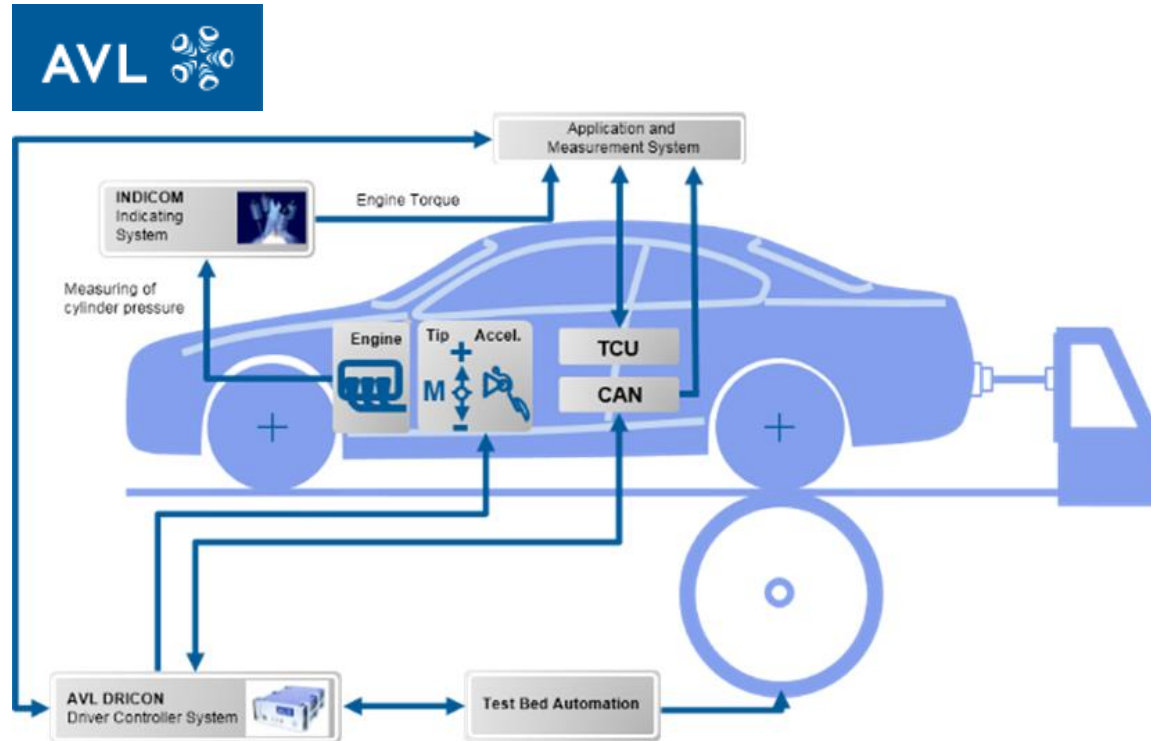


# One to few



*Embed the N side if the cardinality is one-to-few and there is no need to access the embedded object outside the context of the parent object.*

# Possible application





# Possible application/2



```
{
  "_id" : ObjectId("596775bec14d8ff1ed870daf"),
  "id" : "573e8f68470000a85b93acc4",
  "type" : "AWP",
  "status" : "published",
  "pgitCustomer" : {
    "opec" : "H02WXEGF",
    "name" : "Idroelettrica System",
    "phones" : [
      ...
    ],
    "emails" : [
      "idroelettricasystem@yahoo.it"
    ],
    "categories" : [
      ...
    ]
  }
}
```

*courtesy Alessandro Lacava*

# One to many

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Il primo portale  
internet nato in Italia



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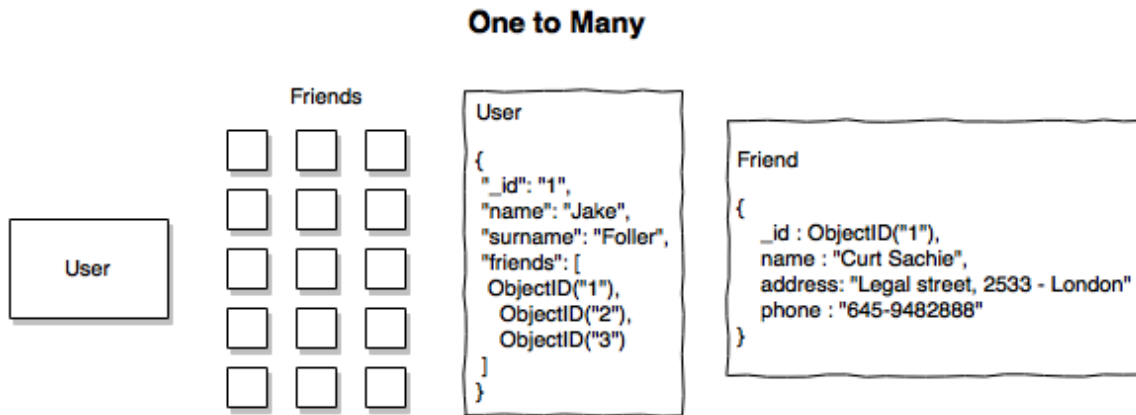
 **BuoniSsimo**

 **Pagine Gialle**

 **Pagine Bianche**

 **TuttoCitta**

# One to many



*Use an array of references to the N-side objects  
if the cardinality is one-to-many or  
if the N-side objects should stand alone for any reasons.*

# Possible application



# One to Squillions

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 **Pagine Gialle**

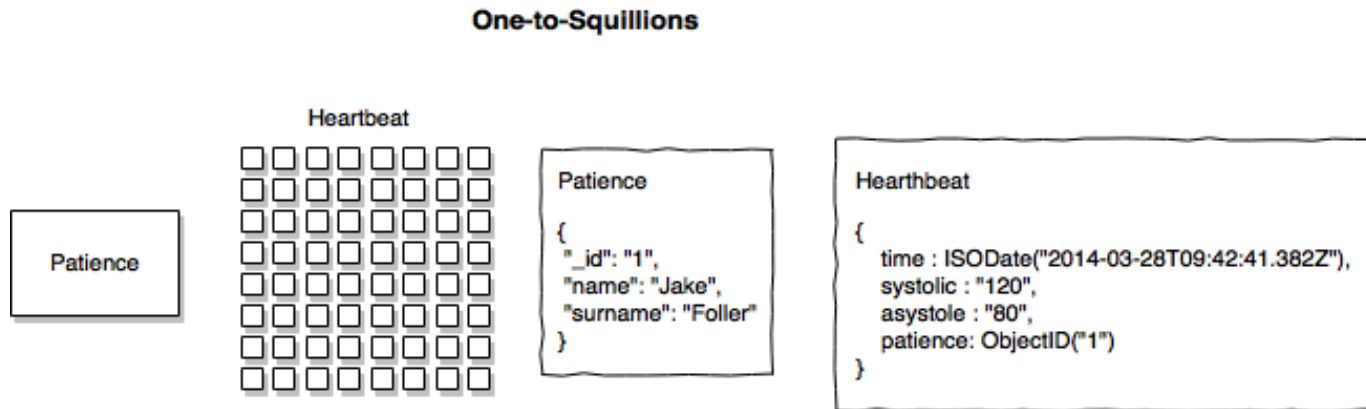
 **Pagine Bianche**

 **TuttoCitta**

  
**PgCasa.it**  
L'home service  
su misura

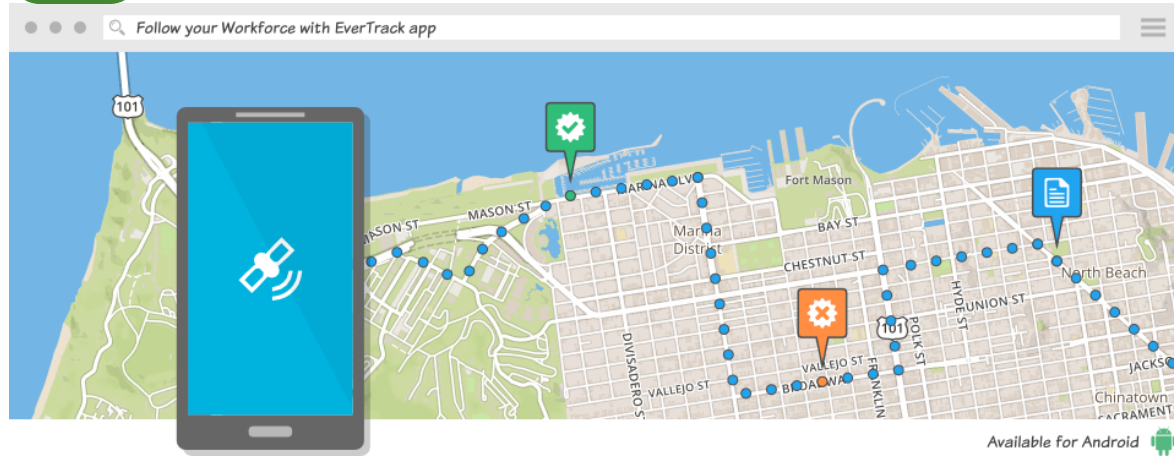


# One to squillions



*Use a reference to the One-side in the N-side objects  
if the cardinality is one-to-squillions.*

# Possible application



# Booking Flight ?

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Quando le notizie  
sono di tendenza



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 **Pagine Gialle**

 **Pagine Bianche**

 **TuttoCitta**



# Booking flight – one to many!

## Flight

```
{
  "_id": "U23211",
  "from": "London Gatwick",
  "to": "Milan Malpensa",
  "gate": "22",
  "departureTime": ISODate('2017-03-24T14:47:00.000Z'),
  "passenger": [
    {
      "_id": "A44gc",
      "name": "Bryan Richard",
      "seat": "12A"
    },
    {
      "_id": "EsVeo",
      "name": "John Smith",
      "seat": "12B"
    }
  ]
}
```

## Passenger

```
{
  "_id": "A44gc",
  "_class": "it.blog.springmongobookingflight.entity.Passenger",
  "name": "Bryan Richard",
  "seat": "12A",
  "smoker": true,
  "payment": "Check",
  "flightCode": "U23211"
}

{
  "_id": "EsVeo",
  "_class": "it.blog.springmongobookingflight.entity.Passenger",
  "name": "John Smith",
  "seat": "12B",
  "smoker": false,
  "payment": "Check",
  "flightCode": "U23211"
}
```

# Possible application

## Flight


  
American Airlines

# American Airlines Flight #11

SEAT

PASSENGER

BOEING 767



ZONE A - FIRST  
8 SEATS

ZONE B - BUSINESS  
30 SEATS

ZONE C - ECONOMY  
110 SEATS

SEAT	PASSENGER	SEAT	PASSENGER	SEAT	PASSENGER	SEAT	PASSENGER	SEAT	PASSENGER
10B	Al Supami, Satam	27J	Cucinello, Thelma	19A	Hennessey, Jr, Edward	11B	Mello, Christopher	11G	Rosenzweig, Philip
34C	Allison, Anna	10J	Cummins, Patrick	24J	Holer, John	11H	MacKenzie, Jeffrey	2J	Ross, Richard
8G	Alomari, Abdul	25J	Dale, Brian	27H	Holland, Cora	23H	Montoya, Carlos	28B	Sachs, Jessica
2A	Alshehri, Wail	27A	DiMeglio, David	22A	Humber, Jr, John N.	20	Morabito, Laura	35G	Salle, Rahma
2B	Alshehri, Waleed	23B	DiTullo, Donald	31A	Iskander, Waleed	24B	Naiman, Mildred	38B	Snyder, Heather
8A	Angeli, David	11J	Dominguez, Alberto	30J	Jenkins, John	28B	Neira, Laurie	38A	Snyder, Heather
8B	Angell, Lynn Edwards	7A	Farley-Hackett, Paige	31G	Jones, Charles	34	Newell, Renee	25E	Stone, Douglas
29C	Aoyama, Seima	22J	Filipow, Alexander	22H	Kaplan, Robin	34J	Nicossia, Kathleen	34J	Suarez, Xavier
	Arestegui, Barbara	3H	Flyzik, Carol	19B	Koeling, Barbara	27B	Norton, Jacqueline		Sweeney, Madeline
28C	Aranson, Myra	29H	Friedman, Paul	28B	Kowalik, David	27C	Norton, Robert	38C	Theodorakis, Michael
8D	Atia, Mohamed	20J	Fyfe, Karleton	26J	Larocque, Judith C.		Ogonowski, John	38A	Trentini, James
29C	Barbuto, Christine	9H	Gay, Peter	23A	Landen, Natalie Janis		Ortiz, Betty	38B	Trentini, Mary Barbara
11D	Beug, Carolyn	28J	George, Linda	31J	Lee, Daniel	31B	Ortiz, Jane	23J	Valdes, Antonio Montoya
26B	Booms, Kelly	9A	Glazer, Edmund	9B	Levin, Daniel	25J	Pecorelli, Thomas	36H	Varela-Ribeiro, Pencydela
38	Bouchard, Carol	29H	Gordenstein, Lisa		Low, Sara	19A	Perkins, Bernthia	10J	Wahlstrom, Mary
33H	Cassey, Nielle	11A	Green, Andrew	32J	MacKay, Susan	3J	Puskas, Sonia	27G	Waldie, Kenneth
20H	Collins, Jeffrey	20A	Hashem, Peter		Martini, Karen	24	Roth, David	24H	Wendus, John
33J	Coombs, Jeffrey	5J	Hayes, Robert		McGuinness, Jr, Thomas	24	Rogier, Jean	24A	Williams, Candace
	Creamer, Tara					24A	Williams, Candace	29A	Zarba, Jr, Christopher

11 Crew

170 Passenger

5 Hijacker

11 Crew 10 Passenger 5 Hijacker

## Passenger

**BOARDING PASS**

**PASSENGER NAME**  
FRANKLIN CHARLOTTE P

**ADVANTAGE®**  
AA72312A54F

**RECORD LOCATOR**  
GQ\*AJL4C

**FROM**  
NEW YORK JFK

**CLASS**  
D

**FLIGHT**  
AA8402

**DATE**  
08 JUN

**DEPARTS**  
12:15

**TO**  
TOKYO

**GROUP**  
GROUP 2

**GATE**  
6

**BOARDING TIME**  
11.20

**SEAT**  
3C

**BOARDING PASS**

008564435456G01450...

AA.COM

**BOARDING PASS**

**PASSENGER NAME**  
FRANKLIN CHARLOTTE P

**FROM**  
NEW YORK JFK

**TO**  
TOKYO

**FLIGHT**  
AA8402

**CLASS**  
D

**DATE**  
08 JUN

**DEPARTS**  
12:15

**GROUP**  
GROUP 2

**SEAT**  
3C

AA.COM

# Keep in mind



Tutto ciò di cui hai  
bisogno, da sempre



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# Keep in mind

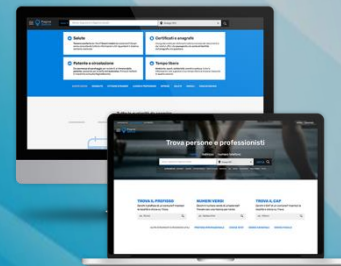


- Keep in mind that a single MongoDB row has the maximum size of 16Mb;
- The model choice should depend on how we're going to access the data;
- Denormalization of collections is not a bad practice;
- The schema can change dynamically when the application changes;
- Constraint checking is an unknown activity for NoSQL database;

# References



Un tesoro di  
10 milioni di abbonati



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 **Pagine  
Gialle**

 **Pagine  
Bianche**

 **Tutto  
Città**

# References



Francesca Krihely (former Community Marketing, MongoDB)

<https://www.linkedin.com/in/krihely/>



William Zola (former Lead Technical Support Engineer, MongoDB)

Unfortunately died ☹️

# References



- 6 Rules of Thumb for MongoDB Schema Design: Part 1  
<https://dzone.com/articles/6-rules-thumb-mongodb-schema>
- 6 Rules of Thumb for MongoDB Schema Design: Part 2  
<https://dzone.com/articles/6-rules-thumb-mongodb-schema-0>
- 6 Rules of Thumb for MongoDB Schema Design: Part 3  
<https://dzone.com/articles/6-rules-thumb-mongodb-schema-1>
- MongoDB Schema Design  
<https://techannotation.wordpress.com/2017/03/27/mongodb-schema-design/>
- Modeling for NoSQL and SQL Databases  
[http://damaio.org/wp-content/uploads/2015/02/NoSQL\\_Modeling-for-NoSQL-and-SQL-Databases.pdf](http://damaio.org/wp-content/uploads/2015/02/NoSQL_Modeling-for-NoSQL-and-SQL-Databases.pdf)

# Don't miss the Survey!

<https://survey.italiaonline.it/survey/nerd-happy-hour>



## Partecipa al sondaggio

Ciao,

con questa survey ti chiediamo di darci un piccolo feedback!  
Ricordiamo che le risposte saranno raccolte in forma anonima.

Grazie per la collaborazione!

Sei a conoscenza del Nerd Happy Hour?

- ☐ Si
- ☐ No

Come sei venuto a conoscenza del Nerd Happy Hour?

- ☐ Intranet NOI
- ☐ HR Academy
- ☐ Da un collega
- ☐ Altro



# Any Question?

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## DiLei

Digitale, femminile,  
singolare

