SNS COLLEGE OF TECHNOLOGY

Re-accredited by NAAC with A+ grade, Accredited by NBA(CSE, IT, ECE, EEE & Mechanical)
Approved by AICTE, New Delhi, Recognized by UGC, Affiliated to Anna University, Chenna

mongoDB

MongoDB

COURSE : 23CAT603- Database Management System
UNIT V : Column Oriented Database
CLASS : I Semester / I MCA

MongoDB

- Open source, NoSQL database based on document model
- Highly scalable and flexible
- Uses BSON (Binary JSON) to query database
- Store data in the form of BSON documents
- Not support for
  - High transaction operation
  - No support for ACID properties
  - System in which data model is upfront

MongoDB?

Why MogoDB?

- There is no Downtime needed in the case of Application scalability
- Capable to perform the text-based search operation
- Very Economical
- Global replication
- Perform Graph processing

Good for

- Content Management
- Blogs Management
- Social Networking
- Geo-spatial data management
- Web applications
- Real-time analysis
- Product catalog management for E-commerce

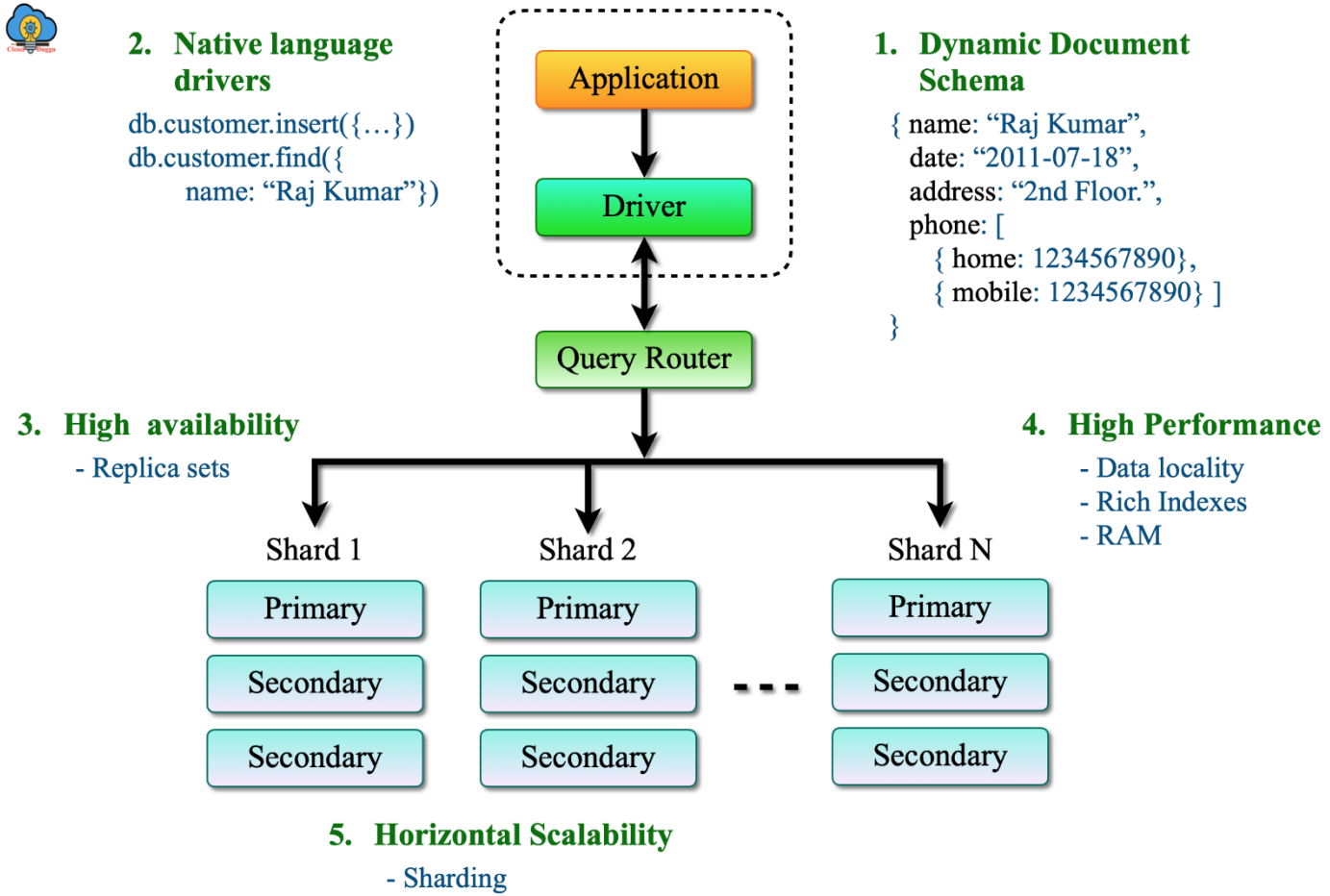
Features of Mongo DB

- Indexing: efficient searching & data processing
- Scalability: horizontal, partition data across servers
- Replication: multiple copies on different servers
- Availability: one server down, data can be accessed from other servers
- Load balancing: automatic
- Languages supported: Java, python, c, c++, Ruby, Scala, swift etc..
- Dynamic schema

Terminologies

DBMS	MongoDB
Database	Database
Table or View	Collection
Tuple or Record	Document (BSON)
Column	Field
Join	Embedded document
Foreign key	Reference
Partition	shard

MongoDB Architecture



Three core architectural principles

1. **MongoDB Query Language & The Document Data Model**

   Develop application which are transactional, operational and analysis

2. **A Global Multi-Cloud database**

   User can flexibly move its application from private to the public cloud without changing a line of code

3. **MongoDB Cloud**

   provides a unified experience to the applications

MongoDB Architecture

Application & MongoDB Drivers

Application uses drivers to connect with MongoDB for many languages

Query Router

Interface & entry point for applications. Once connections made, it accepts application query, process it and send result back

Shard

Technique to distribute the data across multinodes. It uses horizontal scaling to distribute the data

Primary replica set member

Receive all the write and read operations and process that. maintains the **oplog** for all write operations being performed on dataset

Secondary replica set member

It maintain the primary data sets. It reads the primary's **oplog** and applies the changes in its dataset asynchronously

Scale Up and Scale Out

Documents

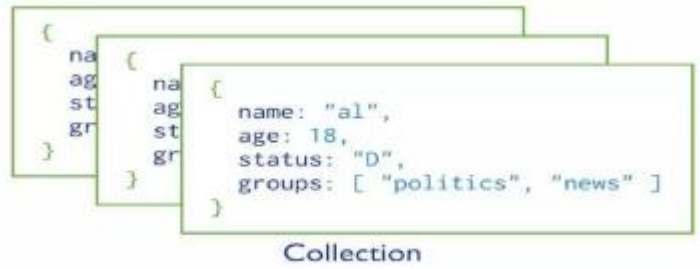
Comprise set of key-value pairs and are the basic unit of data in MongoDB

Collections

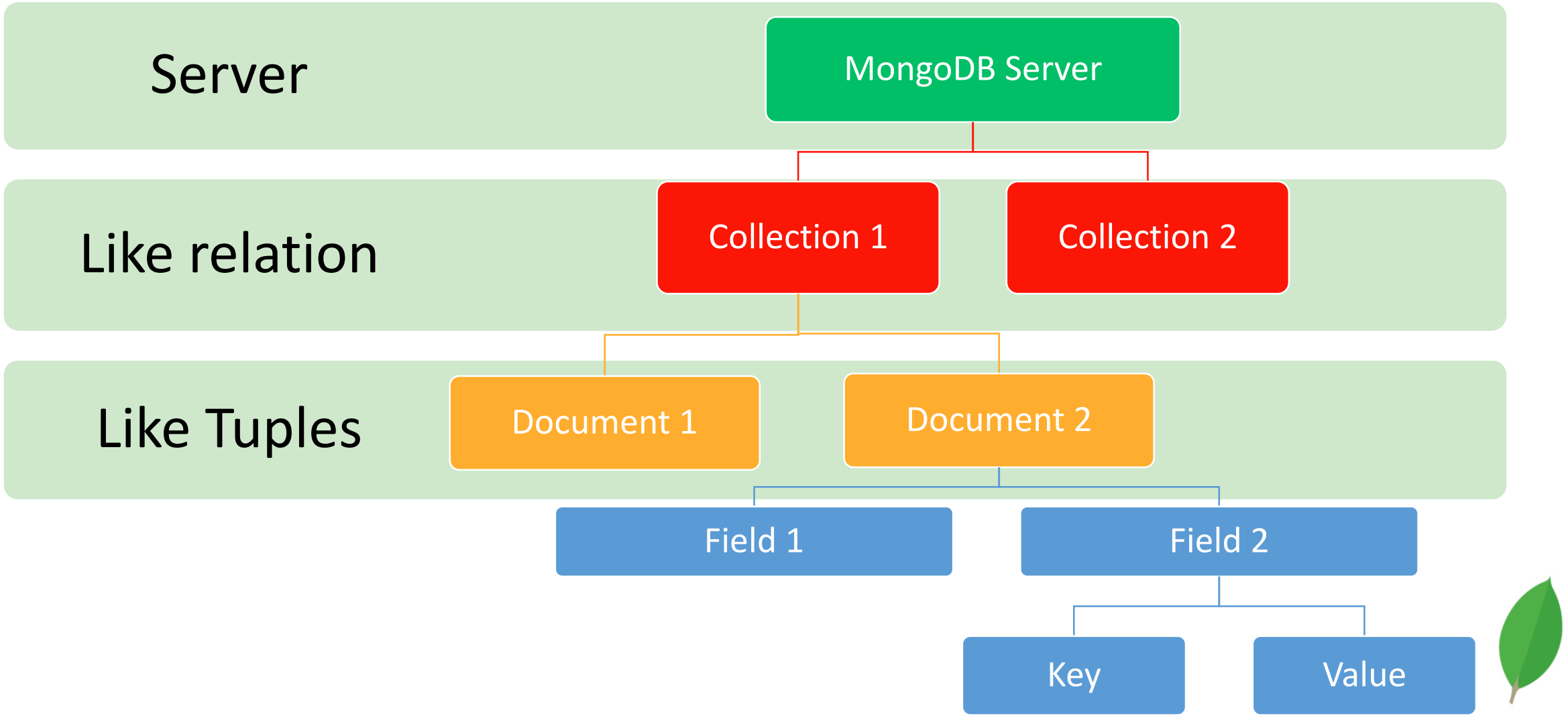
Contain set of documents and functions as like relational tab;es

Structure will be like this

```
{
  field 1: Value 1,
  field 2: Value 2,
…
 field n: ValueN ,
}
```



Data Storage Mechanism



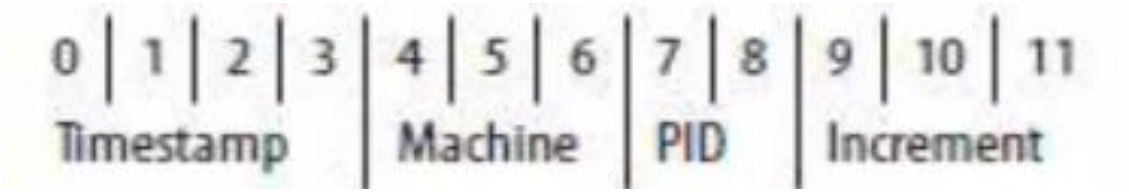
JSON

- (JSON) JavaScript Object Notation, Name-Value Pairs
- Easy to read/write by human and parse/generate by computer
- Objects can be nested
- Built on
- (BSON) Binary code Object Notation, Like JSON
- Lightweight, traversable
- Example

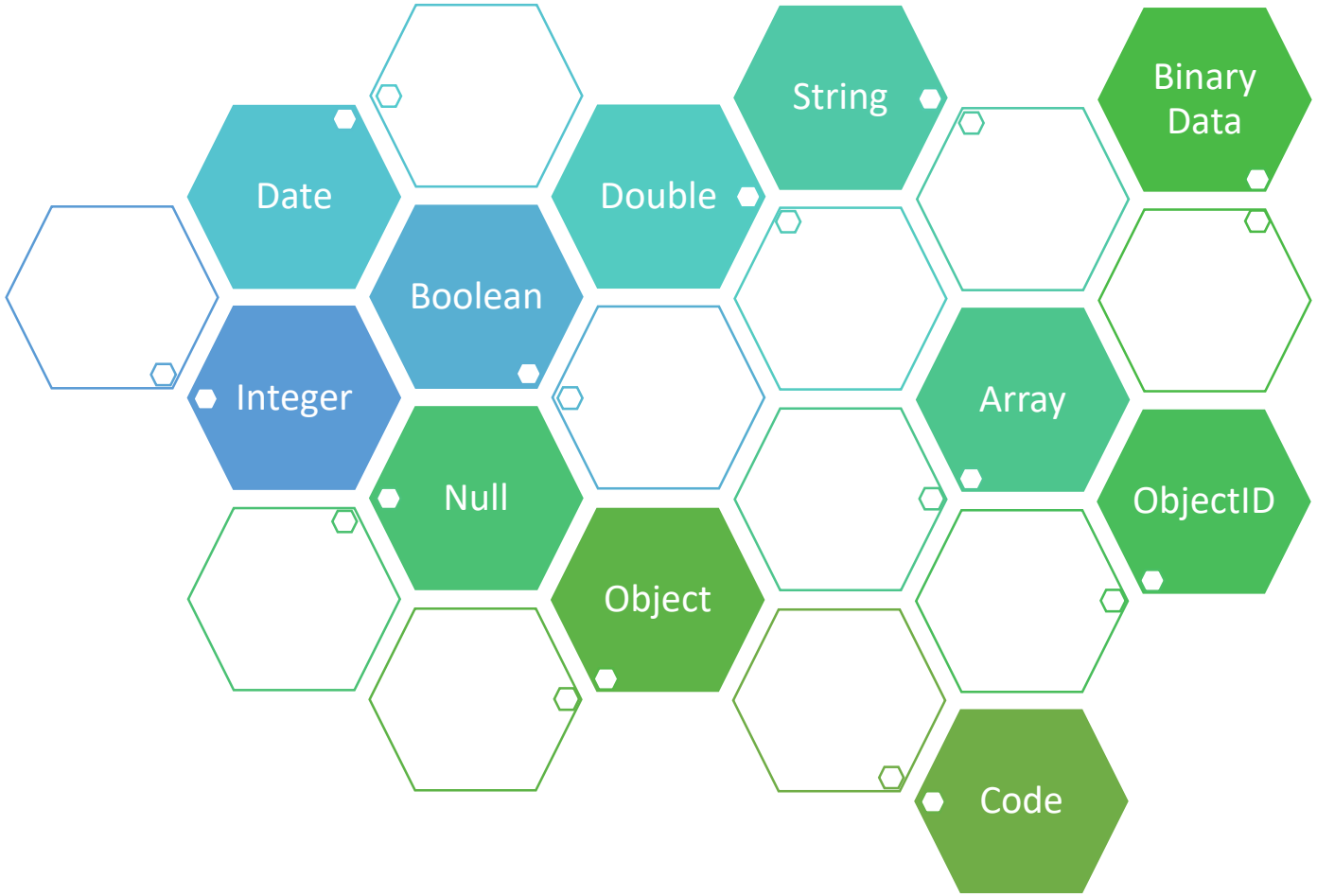
```
{
"_id" :        "37010"
“City" :       “Nashik",
“Pin" :        423201,
"state" :      “MH",
“Postman” : {
                    name: “Ramesh Jadhav”
                    address: “Panchavati”
                  }
}
```

Documents

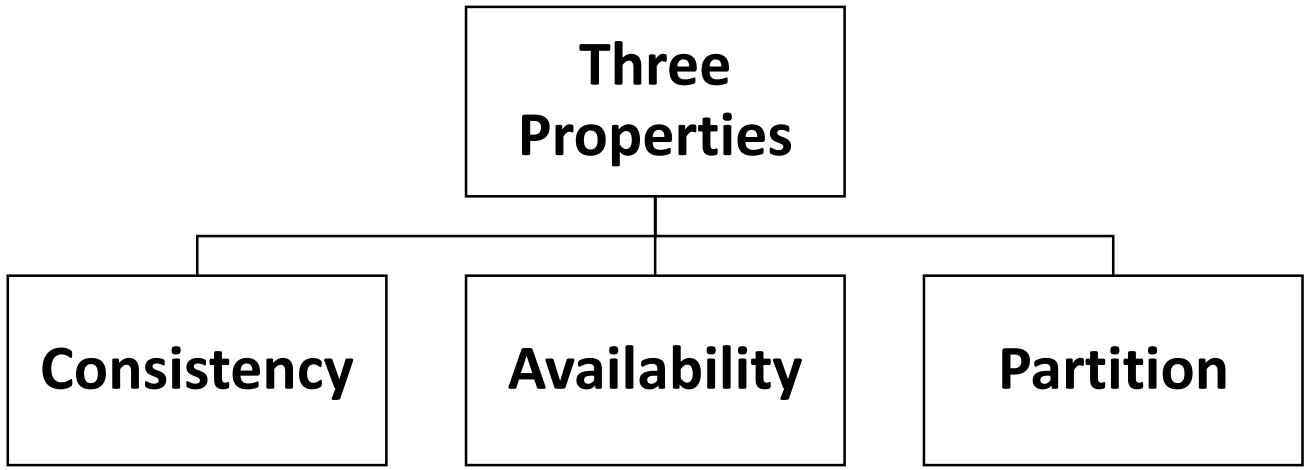
- Every document has key, **_id** has unique value act as primary key
- objectID is default type of _id
- ObjectID uses 12 bytes



Data types of MongoDB?



CAP Theorem



- Theorem says atleast 2 of 3 properties required for any system
  - Traditional DB choose consistency
  - Web apps choose availability

Key-Value Pair NoSQL Data Pattern

References

- https://www.tutorialspoint.com/NoSQL-Databases
- https://www.geeksforgeeks.org/nosql-data-architecture-patterns
- https://www.mongodb.com/nosql-explained
- Shannon Bradshaw, Eoin Brazil, and Kristina Chodorow, “MongoDB: the Definitive Guide”, O’Reilly Media, 3rd Edition


Thank
You!


SQL