



LOCUS 2025
21st National Technological Festival



SOFTWARE FELLOWSHIP

Day 6: Database and API



- Create a database in MongoDB Atlas

```
mongodb+srv://suravkshrestha:<password>@...
```

We'll use MongoDB Atlas to store our todos

Part 1

Database



- organized collection of data for efficient retrieval and storage
- controlled using a *Database Management System (DBMS)*
- we create database in DBMS
- SQL, MySQL, PostgreSQL, *MongoDB* are DBMS

1. Relational Database

- stores data in the form of tables (rows and columns)
- *SQL, MySQL, PostgreSQL* are some popular *Relational Database Management System (RDBMS)*

</> Relational Database

Todos table

id	title	status
1	Attend Software Fellowship	ongoing
2	Study HTML, CSS	completed

Fields →

Record →

Another record →

2. Non-relational database

- stores data in the form of *JSON (JavaScript Object Notation)* objects
- aka NoSQL (non-SQL or Not only SQL)
- *MongoDB* is one of the most popular NoSQL DBMS



JSON object

```
{  
  "id": 1,  
  "title": "Attend Software Fellowship",  
  "status": "ongoing"  
}
```



JSON array - array of JSON objects

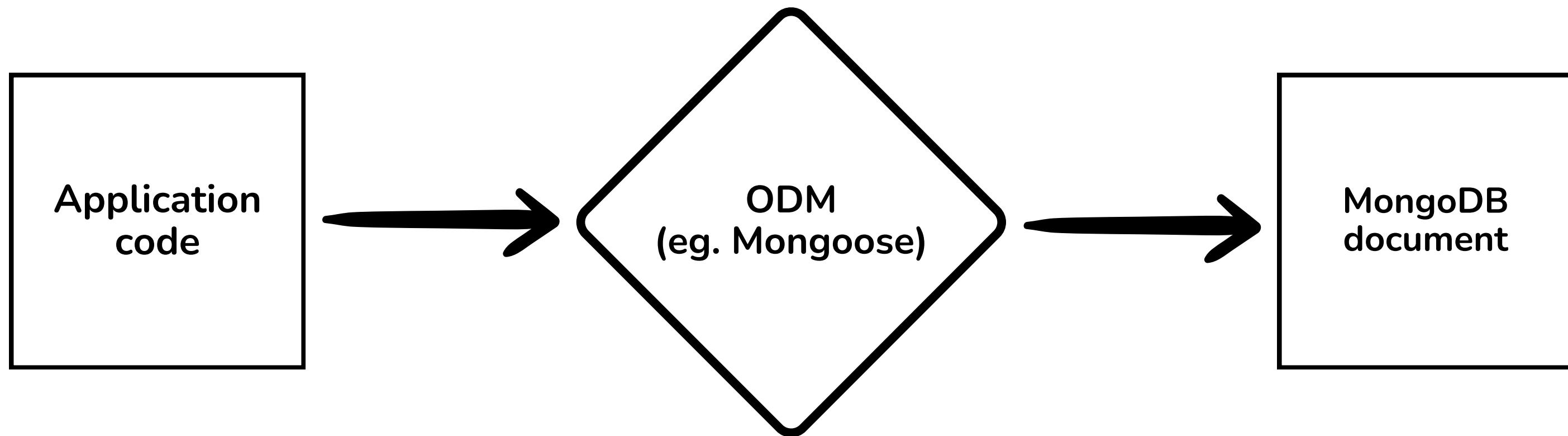
```
[  
  {  
    "id": 1,  
    "title": "Attend Software Fellowship",  
    "status": "ongoing"  
  },  
  {  
    "id": 2,  
    "title": "Study HTML, CSS",  
    "status": "completed"  
  }  
]
```

- ODM is a library that lets us query and manipulate data from a NoSQL database using an object-oriented paradigm (without having to learn the database syntax)
- Code -> Document (i.e. JSON objects)
- *Mongoose* is a widely used ODM for *MongoDB*

</> Object Document Mapper (ODM)



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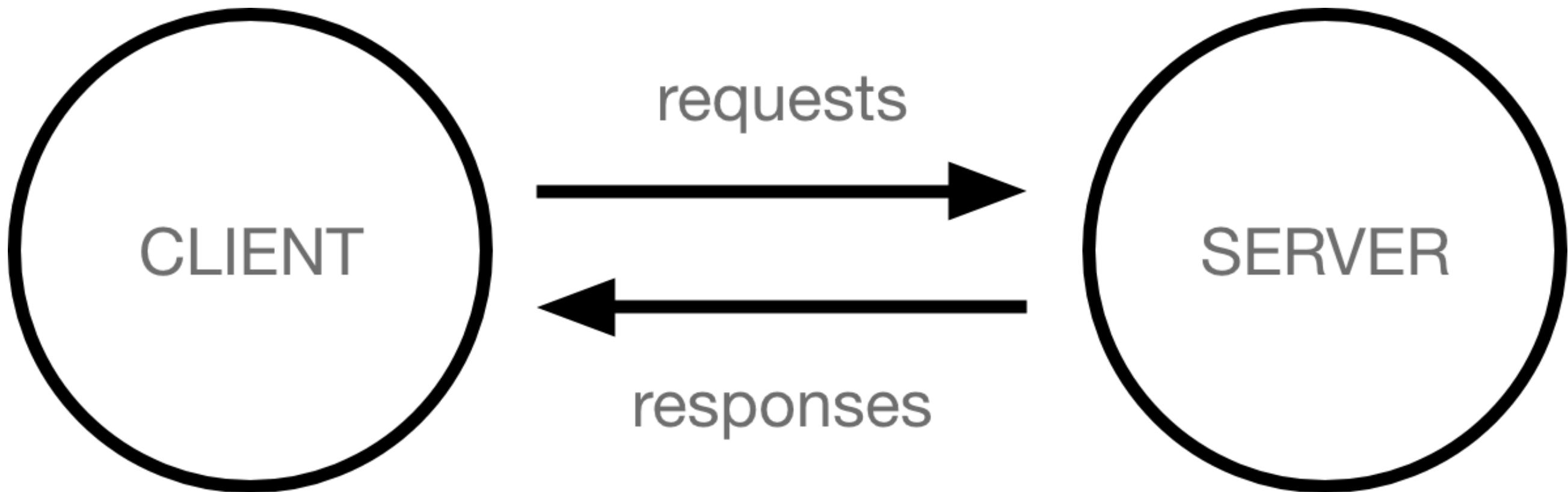
Part 2

API



- **Client:** Computer or client software (browser like Chrome, Edge or Brave) that *requests* content from the server to be displayed
- **Server:** hosts and serves the API, and gives *response* to client requests with the appropriate data (retrieving from the database)

</> How the web works?



- Application Programming Interface (API)
- An API is a way for two or more computer programs or components to communicate with each other.
- Just like our frontend is hosted at <http://localhost:5173>
- Our API (backend) Is hosted at another location (known as API endpoint) - <http://localhost:3000/api/v1/todos>

Following are the most popular architecture styles

1. **REST (REpresentational State Transfer)**
2. **SOAP (Simple Object Access Protocol)**
3. **GraphQL (Graph Query Language)**
4. **gRPC (general-purpose Remote Procedure Calls)**
5. **WebSocket**

- *Stateless* - server completes every client request independent of any previous request
- Uses *HTTP verbs* to carry out *CRUD* (*Create-Read-Update-Delete*) operations

</> HTTP Verbs

HTTP verb	CRUD Operation	Description
POST	Create	Sends data to the server to create a new resource.
GET	Read	Retrieves data from the server.
DELETE	Delete	Deletes a specified resource from the server.
PUT	Update	Updates an existing resource with the provided data.
PATCH	Update	Partially update an existing resource with provided data.

</> HTTP Status Codes



Class	Description
1xx (100 - 199)	informational response - the request was received, continuing process
2xx (200 - 299)	successful - the request was successfully received, understood, and accepted eg. 200 OK, 201 Created
3xx (300 - 399)	redirection - further action needs to be taken in order to complete the request
4xx (400 - 499)	client error - request contains incorrect syntax eg. 400 Bad Request, 404 Not Found
5xx (500 - 599)	server error - server failed to fulfill client's request 500 Internal Server Error

JSONPlaceholder - Free Fake REST API

<https://jsonplaceholder.typicode.com/todos? limit=3>

</> JavaScript Runtime Engines



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Browser	Runtime engine used
Google Chrome	Google's V8
Microsoft Edge	Chakra (Edge Legacy) / V8 (new Edge)
Mozilla Firefox	SpiderMonkey

- Ryan Dahl created Node.js
- JS runtime environment
- Allows to run JS outside of browser
- Uses Google's V8 engine
- Comes with Node Package Manager (NPM), which allows to install open-source JavaScript libraries

- Minimal and flexible Node.js web application framework.
- Simplifies API development with an easy-to-use syntax.
- Strong community and extensive documentation for support and learning.
- <https://github.com/expressjs/express>



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Questions?



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Quiz Time



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Which of the following is a RDBMS?

- A. MongoDB
- B. Cassandra
- C. SQL
- D. Redis





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Answer:

C





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Which of the following is a NoSQL database?

- A. PostgreSQL
- B. MySQL
- C. SQLite
- D. MongoDB





Answer:

D





What does API stand for?

- A. Advanced Programming Integration
- B. Application Programming Interface
- C. Application Process Integration
- D. Advanced Protocol Interface





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Answer:

B



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Which HTTP method is used to update an existing resource?

- A. GET
- B. POST
- C. PUT or PATCH
- D. DELETE





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Answer:

C





Thank you!





[Andis Paudel](#)



[and-is](#)



[Surav Shrestha](#)



[suravshrestha](#)

