YAML (YAML Ain't Markup Language) using with **Crud full-stack setup** using **React.js**, **Express.js**, and **MongoDB** to help you get started. We'll break it into parts:

YAML (YAML Ain't Markup Language) is a human-readable data serialization format that is used for data exchange, configuration files, and more. It's often considered an alternative to JSON (JavaScript Object Notation) due to its more readable structure.

Key Features of YAML:

1. **Human-Readable**: YAML's syntax is designed to be easy to read and write by humans.
2. **Hierarchical**: It supports nested structures like objects, arrays, and lists, making it perfect for representing complex data.
3. **Minimal Syntax**: Compared to JSON, YAML uses fewer symbols and is generally more compact, which improves readability.
4. **Supports Data Types**: YAML can represent common data types like strings, numbers, arrays, objects, and even custom types.
5. **Widely Used for Config Files**: YAML is commonly used in configuration files (e.g., for Docker, Kubernetes, CI/CD pipelines) because of its simplicity and readability.

Basic Syntax of YAML:

1. **Key-Value Pairs**:
    - The key-value pairs are written with a colon (`:`) separating the key from the value.

```yaml
name: John Doe
age: 30
```

2. **Nested Objects**:
    - You can represent objects (dictionaries) using indentation (spaces). This creates a hierarchical structure.

```yaml
person:
  name: John Doe
  age: 30
  address:
    street: 123 Main St
    city: Anytown
```

3. **Lists**:
    - Lists are represented by using a hyphen (`-`) followed by a space.

```yaml
fruits:
```

```
  - Apple
  - Banana
 - Orange
```

4. **Multi-line Strings**:
   - YAML supports multi-line strings, which are written in a few ways:
     - **Literal Block**: Preserves newlines.

       ```
       description: |
         This is a
         multi-line string
         that preserves line breaks.
       ```

       Folded Block: Folds newlines into spaces.

       ```
       description: >
         This is a multi-line
         string that gets folded into
         a single line of text.
       ```

5. **Comments**:
   - You can add comments to your YAML file using the `#` symbol.

```
name: John Doe  # This is a comment
```

6. **Boolean Values**:
   - YAML supports `true`/`false`, as well as shorthand forms like `y/n` and `yes/no`.

```
isActive: true
```

7. **Special Data Types**:
   - YAML also supports special data types like dates and null values.

```
createdAt: 2023-10-01
isVerified: null
```

Example of a Complex YAML File:

```
# YAML Example
person:
  name: John Doe
  age: 30
  isEmployed: true
  address:
    street: 123 Main St
    city: Anytown
    postalCode: 12345
  hobbies:
    - Reading
    - Traveling
    - Photography
  contactDetails:
    phone: "+1234567890"
    email: johndoe@example.com
    social:
      twitter: "@johndoe"
      facebook: "johndoe.fb"
```

Comparison with JSON:

Feature	YAML	JSON
Readability	More human-readable, less verbose	Less human-readable, more compact
Data Structure	Supports complex structures easily	Similar structures (objects, arrays)
Comments	Supports comments using `#`	No comments allowed
Syntax	No quotes needed for strings or numbers	Requires quotes for strings
Whitespace	Sensitive to indentation (spaces)	Uses braces `{}` and brackets `[]`
Data Types	Supports more complex types (e.g., dates, nulls)	Limited types (strings, numbers, arrays, objects)
Use Cases	Configuration files, data exchange, documentation	Data exchange, web APIs, configurations

Common Use Cases of YAML:

- **Configuration Files**: Many tools and services use YAML for configuration files, including Docker, Kubernetes, and CI/CD tools like GitLab CI and Travis CI.
- **Data Serialization**: It’s used for exchanging data between systems or saving configurations in a readable format.
- **Infrastructure as Code**: YAML is often used in defining the infrastructure for cloud services, such as AWS CloudFormation templates or Kubernetes deployment files.

Advantages of YAML:

- **Easy to read** and **write** by humans.
- No need for quotation marks around strings.
- Supports complex data structures like nested lists and dictionaries.
- Better suited for configuration files compared to JSON because of its readability.

Disadvantages of YAML:

- **Whitespace sensitivity**: Improper indentation can break the YAML structure.
- **More complex than JSON**: For simple data, JSON can be easier to work with.

□ 1. Backend – Express + MongoDB

a. Setup

Create a new backend folder and initialize a Node.js project:

```
mkdir backend
cd backend
npm init -y
```

b. Install dependencies

```
npm install express mongoose cors
npm install js-yaml
```

c. Create basic Express server (`index.js`)

```
// backend/index.js
const express = require('express');
const mongoose = require('mongoose');
const cors = require('cors');
const yaml = require('js-yaml');
const app = express();

app.use(cors());
app.use(express.text({ type: 'application/x-yaml' })); // Parse YAML bodies
as text

// MongoDB connection
mongoose.connect('mongodb://localhost:27017/mydb', {
  useNewUrlParser: true,
  useUnifiedTopology: true,
})
```

```
  .then(() => console.log('MongoDB connected'))
  .catch(err => console.error(err));

// Simple schema
const UserSchema = new mongoose.Schema({
  name: String,
  email: String,
});
const User = mongoose.model('User', UserSchema);

// Middleware to parse YAML data into JavaScript object

app.use((req, res, next) => {
  if (req.headers['content-type'] === 'application/x-yaml') {
    try {
      req.body = yaml.load(req.body); // Parse YAML to JS object
      next();
    } catch (err) {
      res.status(400).send(yaml.dump({ error: 'Invalid YAML' }));
    }
  } else {
    next();
  }
});

// Routes
// backend/index.js
app.get('/api/users', async (req, res) => {
  try {
    const users = await User.find();

    // Clean up the data: map through users and strip unnecessary fields
    const cleanedUsers = users.map(user => ({
      _id: user._id.toString(),  // Convert buffer to string for proper
handling
      name: user.name,
      email: user.email
    }));

    const yamlResponse = yaml.dump(cleanedUsers);  // Return cleaned-up YAML
data
    res.setHeader('Content-Type', 'text/yaml');
    res.send(yamlResponse);  // Send the cleaned YAML data
  } catch (err) {
    console.error("Error fetching users:", err);
    res.status(500).send(yaml.dump({ error: 'Failed to fetch users' }));
  }
});



app.post('/api/users', async (req, res) => {
  const user = new User(req.body);
  await user.save();
  const yamlResponse = yaml.dump(user);

  // Send the YAML response directly (no HTML wrapping)
```

```
  res.setHeader('Content-Type', 'text/yaml');
  res.send(yamlResponse);
});

// Update user by ID
app.put('/api/users/:id', async (req, res) => {
  try {
    const updatedUser = await User.findByIdAndUpdate(
      req.params.id,
      req.body,
      { new: true }
    );
    const yamlResponse = yaml.dump(updatedUser);
    res.setHeader('Content-Type', 'text/yaml');
    res.send(yamlResponse);
  } catch (err) {
    res.status(500).send(yaml.dump({ error: 'Failed to update user' }));
  }
});

// Delete user by ID
app.delete('/api/users/:id', async (req, res) => {
  try {
    await User.findByIdAndDelete(req.params.id);
    const yamlResponse = yaml.dump({ message: 'User deleted successfully' });
    res.setHeader('Content-Type', 'text/yaml');
    res.send(yamlResponse);
  } catch (err) {
    res.status(500).send(yaml.dump({ error: 'Failed to delete user' }));
  }
});

// Start server
app.listen(5000, () => {
  console.log('Server running on http://localhost:5000');
});
```

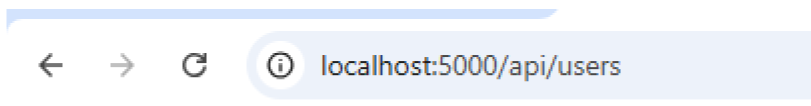
□ Final Steps

- Run backend:

  ```
  node index.js
  ```

For Output Open Browser:-

http://localhost:5000/api/users




```
- _id: 68b2a3b3ba128b80e3b75ef1
  name: om maurya sir
  email: omsir@gmail.com
- _id: 68b2eb91bcad1a537b6950a5
  name: om sir
  email: omsir@gmail.com
- _id: 68b2eca0c1f6be6fc42337ca
  name: anil
  email: anil@gmail.com
```


□ 2. Frontend – React

a. Setup React project

In a separate folder:

```
npx create-react-app frontend
```

```
cd frontend
npm install axios
npm install js-yaml
```

b. Create a basic Crud (form and display list, edit , delete) (`App.js`)

```
import React, { useEffect, useState } from 'react';

import axios from 'axios';

import yaml from 'js-yaml';  // Import js-yaml to parse YAML data


function App() {

  const [users, setUsers] = useState([]);

  const [form, setForm] = useState({ name: '', email: '' });

  const [editingUserId, setEditingUserId] = useState(null);


  const API_URL = 'http://localhost:5000/api/users';


  // Fetch users on mount

  useEffect(() => {

    fetchUsers();

  }, []);


  // Function to fetch users

  const fetchUsers = async () => {

    try {

      const res = await axios.get(API_URL, {
```

```
        headers: { 'Accept': 'text/yaml' },  // Expect YAML response from
server
      });

      // Log raw and parsed data for debugging
      console.log("Raw Response:", res.data);

      // Parse the YAML response into a JavaScript array
      const parsedData = yaml.load(res.data);
      console.log("Parsed Data:", parsedData);

      // Update the state with parsed user data
      setUsers(parsedData);
    } catch (err) {
      console.error('Error fetching users:', err);
    }
  };

  // Handle input changes in the form
  const handleInputChange = (e) => {
    const { name, value } = e.target;
    setForm(prev => ({ ...prev, [name]: value }));
  };

  // Function to create a new user
  const createUser = async () => {
```

```
    try {
      await axios.post(API_URL, form, {
        headers: { 'Content-Type': 'application/x-yaml', 'Accept':
'text/yaml' },  // Send YAML data
      });
      fetchUsers();  // Re-fetch users after adding a new one
    } catch (err) {
      console.error('Error creating user:', err);
    }
  };

  // Function to update an existing user
  const updateUser = async () => {
    try {
      await axios.put(`${API_URL}/${editingUserId}`, form, {
        headers: { 'Content-Type': 'application/x-yaml', 'Accept':
'text/yaml' },
      });
      fetchUsers();  // Re-fetch users after updating a user
    } catch (err) {
      console.error('Error updating user:', err);
    }
  };

  // Handle form submission (create or update)
  const handleSubmit = async (e) => {
    e.preventDefault();
```

```
    if (editingUserId) {

      await updateUser();

    } else {

      await createUser();

    }

    setForm({ name: '', email: '' });

    setEditingUserId(null);

  };



  // Function to edit a user

  const handleEdit = (user) => {

    setForm({ name: user.name, email: user.email });

    setEditingUserId(user._id);

  };



  // Function to delete a user

  const handleDelete = async (id) => {

    const confirmDelete = window.confirm('Are you sure you want to delete
this user?');

    if (!confirmDelete) return;



    try {

      await axios.delete(`${API_URL}/${id}`, {

        headers: { 'Accept': 'text/yaml' },  // Accept YAML in response

      });

      fetchUsers();
```

```
  } catch (err) {
    console.error('Error deleting user:', err);
  }
};

return (
  <div style={{ padding: 30 }}>
    <h2>Users CRUD (React + Axios)</h2>

    {/* Form to create or edit users */}
    <form onSubmit={handleSubmit}>
      <input
        type="text"
        name="name"
        placeholder="Name"
        value={form.name}
        onChange={handleInputChange}
        required
      />
      <input
        type="email"
        name="email"
        placeholder="Email"
        value={form.email}
        onChange={handleInputChange}
        required
```

```
        />
        <button type="submit">
          {editingUserId ? 'Update' : 'Add'} User
        </button>
      </form>

      <hr />

      {/* Display list of users */}
      <ul>
        {users.length === 0 ? (
          <li>No users available</li>
        ) : (
          users.map(user => (
            <li key={user._id}>
              <strong>{user.name}</strong> ({user.email})
              <button onClick={() => handleEdit(user)}>Edit</button>
              <button onClick={() => handleDelete(user._id)}>Delete</button>
            </li>
          ))
        )}
      </ul>
    </div>
  );
}
```

```
export default App;
```

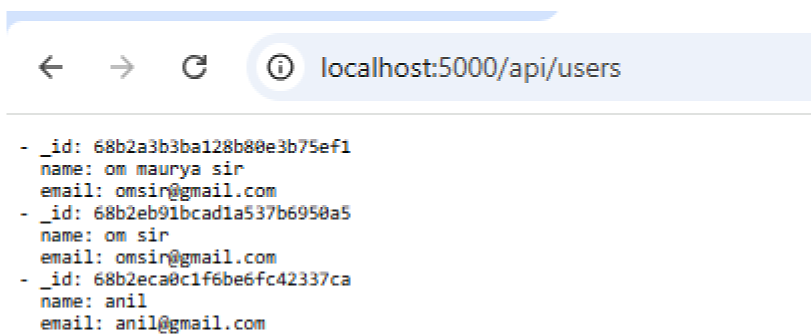
□ Final Steps

- Run backend:

```
node index.js
```

For Output Open Browser:-

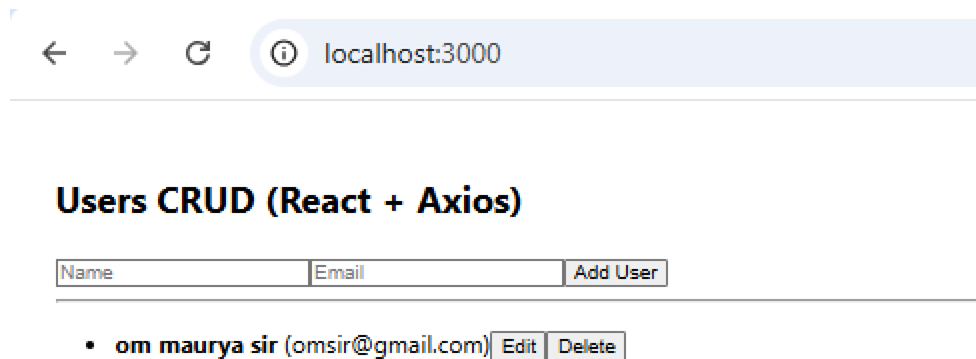
http://localhost:5000/api/users



- Run frontend:

```
npm start
```

```
output:-
```



Make sure MongoDB is running locally on port `27017`.

Result

- A simple React frontend to **create and list users**
- A Node/Express backend connected to **MongoDB**
- Communication via REST API

Absolutely! Let's break down **each line of code** from both the **backend (Express + MongoDB)** and **frontend (React)** so you can fully understand what's happening.

Here's a detailed line-by-line explanation of your **`backend/index.js`** code for an Express + MongoDB-based API:

---

1. Import Required Packages

```
const express = require('express');
const mongoose = require('mongoose');
```

```
const cors = require('cors');
```

- `express`: Web framework for Node.js. Helps define routes and handle HTTP requests/responses.
- `mongoose`: ODM (Object Data Modeling) library for MongoDB. It provides schema-based modeling for MongoDB data.
- `cors`: Middleware to allow Cross-Origin Resource Sharing. Necessary if your frontend runs on a different port (e.g., React on `localhost:3000` and backend on `localhost:5000`).

□ 2. Initialize Express App

```
const app = express();
```

Creates an Express application instance so you can define routes, middleware, etc.

□ 3. Middleware Setup

```
app.use(cors());
app.use(express.json());
```

- `app.use(cors())`: Allows requests from other domains (like React frontend).
- `app.use(express.json())`: Parses incoming JSON request bodies. Required for reading `req.body` in POST/PUT requests.

□ 4. Connect to MongoDB

```
mongoose.connect('mongodb://localhost:27017/mydb', {
 useNewUrlParser: true,
 useUnifiedTopology: true,
})
.then(() => console.log('MongoDB connected'))
.catch(err => console.error(err));
```

- Connects to a MongoDB instance running locally (`mongodb://localhost:27017/mydb`).

- `useNewUrlParser` and `useUnifiedTopology` are options to avoid warnings in Mongoose.
- `.then()` logs success; `.catch()` logs errors.

□ 5. Define a Mongoose Schema & Model

```
const UserSchema = new mongoose.Schema({
 name: String,
 email: String,
});
```

- Defines a schema (`UserSchema`) that tells MongoDB what kind of structure a user document will have.
- Here, a user has a `name` and `email`, both of type `String`.

```
const User = mongoose.model('User', UserSchema);
```

- Creates a Mongoose model (`User`) for interacting with the `users` collection in MongoDB using the defined schema.

□ 6. GET Route – Fetch All Users

```
app.get('/api/users', async (req, res) => {
 const users = await User.find();
 res.json(users);
});
```

- `GET /api/users`: Retrieves all users from the database.
- `User.find()` fetches all documents in the `users` collection.
- `res.json(users)`: Sends them back to the client as JSON.

□ 7. POST Route – Create a New User

```
app.post('/api/users', async (req, res) => {
 const user = new User(req.body);
 await user.save();
 res.json(user);
});
```

- `POST /api/users`: Creates a new user.

- `req.body` contains the JSON data sent from the client (e.g., `{ name: "Alice", email: "alice@example.com" }`).
- `new User(...)`: Creates a new user document.
- `user.save()`: Saves it to MongoDB.
- `res.json(user)`: Sends back the newly created user.

□ 8. PUT Route – Update an Existing User

```
app.put('/api/users/:id', async (req, res) => {
  try {
    const updatedUser = await User.findByIdAndUpdate(
      req.params.id,      // The user's ID from the URL
      req.body,           // Updated fields (name/email)
      { new: true }       // Option: return the updated document
    );
    res.json(updatedUser);
  } catch (err) {
    res.status(500).json({ error: 'Failed to update user' });
  }
});
```

- `PUT /api/users/:id`: Updates a user with the given `id`.
- `User.findByIdAndUpdate(...)`: Finds and updates the document.
- `{ new: true }`: Ensures the updated document is returned.
- On success, it sends the updated user back; on error, returns a 500 status.

□ 9. DELETE Route – Remove a User

```
app.delete('/api/users/:id', async (req, res) => {
  try {
    await User.findByIdAndDelete(req.params.id);
    res.json({ message: 'User deleted successfully' });
  } catch (err) {
    res.status(500).json({ error: 'Failed to delete user' });
  }
});
```

- `DELETE /api/users/:id`: Deletes a user by ID.
- `User.findByIdAndDelete(...)`: Finds and removes the user.
- On success, returns a confirmation message.

□ 10. Start the Server

```
app.listen(5000, () => {
 console.log('Server running on http://localhost:5000');
});
```

- Starts the Express server on **port 5000**.
- Logs a message to the console once it's running.

□ Summary of Routes

HTTP Method	Route	Purpose
GET	`/api/users`	Fetch all users
POST	`/api/users`	Add new user
PUT	`/api/users/:id`	Update existing user
DELETE	`/api/users/:id`	Delete user

Front End React Js Code Explanation:-

Here's a **line-by-line detailed explanation** of your React code that implements a full **CRUD interface** (Create, Read, Update, Delete) using **Axios** to connect to a backend API (`http://localhost:5000/api/users`).

□ IMPORT STATEMENTS

```
import React, { useEffect, useState } from 'react';
```

- `React`: Core React library.
- `useState`: React Hook for creating state variables.
- `useEffect`: React Hook to run side effects (like fetching data when component loads).

```
import axios from 'axios';
```

- Imports `axios`, a promise-based HTTP client to communicate with your Express backend.

□ FUNCTION COMPONENT

```
function App() {
```

- Defines a functional React component named `App`.

□ STATE VARIABLES

```
  const [users, setUsers] = useState([]);
```

- `users`: Stores an array of all user objects from the database.
- `setUsers`: Function to update the `users` state.

```
  const [form, setForm] = useState({ name: '', email: '' });
```

- `form`: Stores the form input values for creating/updating a user.
- `setForm`: Updates the `form` state.

```
  const [editingUserId, setEditingUserId] = useState(null);
```

- `editingUserId`: Holds the ID of the user being edited.
- If `null`, the form is in "Create" mode; if set, it's in "Update" mode.

□ API Endpoint

```
  const API_URL = 'http://localhost:5000/api/users';
```

- Base URL to communicate with your backend Express server's `/api/users` endpoint.

□ FETCH USERS ON COMPONENT MOUNT

```
useEffect(() => {
  fetchUsers();
}, []);
```

- `useEffect(...)`: Runs when the component mounts (only once due to the empty dependency array `[]`).
- Calls `fetchUsers()` to load all users from the backend.

□ GET USERS FROM API

```
const fetchUsers = async () => {
  try {
    const res = await axios.get(API_URL);
    setUsers(res.data);
  } catch (err) {
    console.error('Error fetching users:', err);
  }
};
```

- Sends a GET request to fetch all users.
- On success, updates the `users` state.
- On error, logs the error to the console.

□ HANDLE FORM INPUTS

```
const handleInputChange = (e) => {
  const { name, value } = e.target;
  setForm(prev => ({ ...prev, [name]: value }));
};
```

- Handles changes in the form input fields (`name`, `email`).
- Uses dynamic property names to update either field in the `form` object.

□ CREATE USER

```
const createUser = async () => {
  try {
    await axios.post(API_URL, form);
    fetchUsers();
  } catch (err) {
    console.error('Error creating user:', err);
  }
```

```
};
```

- Sends a POST request to create a new user with data from the form.
- Refreshes the user list after successful creation.

□ UPDATE USER

```
const updateUser = async () => {
  try {
    await axios.put(`${API_URL}/${editingUserId}`, form);
    fetchUsers();
  } catch (err) {
    console.error('Error updating user:', err);
  }
};
```

- Sends a PUT request to update an existing user (by ID).
- Refreshes the user list after the update.

□ HANDLE FORM SUBMISSION

```
const handleSubmit = async (e) => {
  e.preventDefault();
  if (editingUserId) {
    await updateUser();
  } else {
    await createUser();
  }
  setForm({ name: '', email: '' });
  setEditingUserId(null);
};
```

- Handles the form submit event.
- Prevents page refresh with `e.preventDefault()`.
- Decides whether to create or update a user based on `editingUserId`.
- Resets the form and editing state after submission.

✏□ HANDLE EDIT BUTTON

```
const handleEdit = (user) => {
  setForm({ name: user.name, email: user.email });
  setEditingUserId(user._id);
};
```

- Fills the form with existing user data when "Edit" is clicked.
- Sets `editingUserId` so the form goes into "Update" mode.

□ HANDLE DELETE BUTTON WITH CONFIRMATION

```
  const handleDelete = async (id) => {
    const confirmDelete = window.confirm('Are you sure you want to delete this user?');
    if (!confirmDelete) return;

    try {
      await axios.delete(`${API_URL}/${id}`);
      fetchUsers();
    } catch (err) {
      console.error('Error deleting user:', err);
    }
  };
```

- Asks the user for confirmation before deleting.
- If confirmed, sends DELETE request.
- Refreshes user list afterward.

□ RENDER JSX UI

```
  return (
    <div style={{ padding: 30 }}>
      <h2>Users CRUD (React + Axios)</h2>
```

- Starts rendering the UI.
- Adds padding and heading.

□ Form Component

```
      <form onSubmit={handleSubmit}>
        <input
          type="text"
          name="name"
          placeholder="Name"
          value={form.name}
          onChange={handleInputChange}
          required
        />
        <input
          type="email"
          name="email"
```

```
      placeholder="Email"
      value={form.email}
      onChange={handleInputChange}
      required
    />
    <button type="submit">
      {editingUserId ? 'Update' : 'Add'} User
    </button>
  </form>
```

- Shows two inputs and a button.
- Populates form with state values.
- Dynamically shows `Add User` or `Update User` depending on whether editing.

□ Display User List

```
  <hr />
  <ul>
    {users.map(user => (
      <li key={user._id}>
        <strong>{user.name}</strong> ({user.email})
        <button onClick={() => handleEdit(user)}>Edit</button>
        <button onClick={() => handleDelete(user._id)}>Delete</button>
      </li>
    ))}
  </ul>
```

- Loops through `users` array and displays each user.
- Shows **Edit** and **Delete** buttons for each.
- Buttons call corresponding handlers with user data.

□ Export the Component

```
export default App;
```

- Exports the component so it can be imported in `index.js` or other files.

□ Summary

Feature	Code Used	Purpose
Fetch users	`fetchUsers()`	GET all users from backend
Add user	`createUser()`	POST new user
Edit user	`updateUser()`	PUT request
Delete user	`handleDelete()`	DELETE request
Edit form	`handleEdit()`	Load user data into form
Form input	`handleInputChange()`	Sync form state with input
Submit form	`handleSubmit()`	Call create or update depending on context

MongoDB :-

Connection settings:-

omsir

Manage your connection settings

While connected, you may only personalize your connection's name, color or favorite status. To fully configure it, you must first disconnect. Beware that disconnecting might cause work in progress to be lost.

Disconnect

URI

mongodb://localhost:27017/

Name

omsir

Color

No Color

How do I find my connection string in Atlas?

If you have an Atlas cluster, go to the Cluster view. Click the 'Connect' button for the cluster to which you wish to connect.

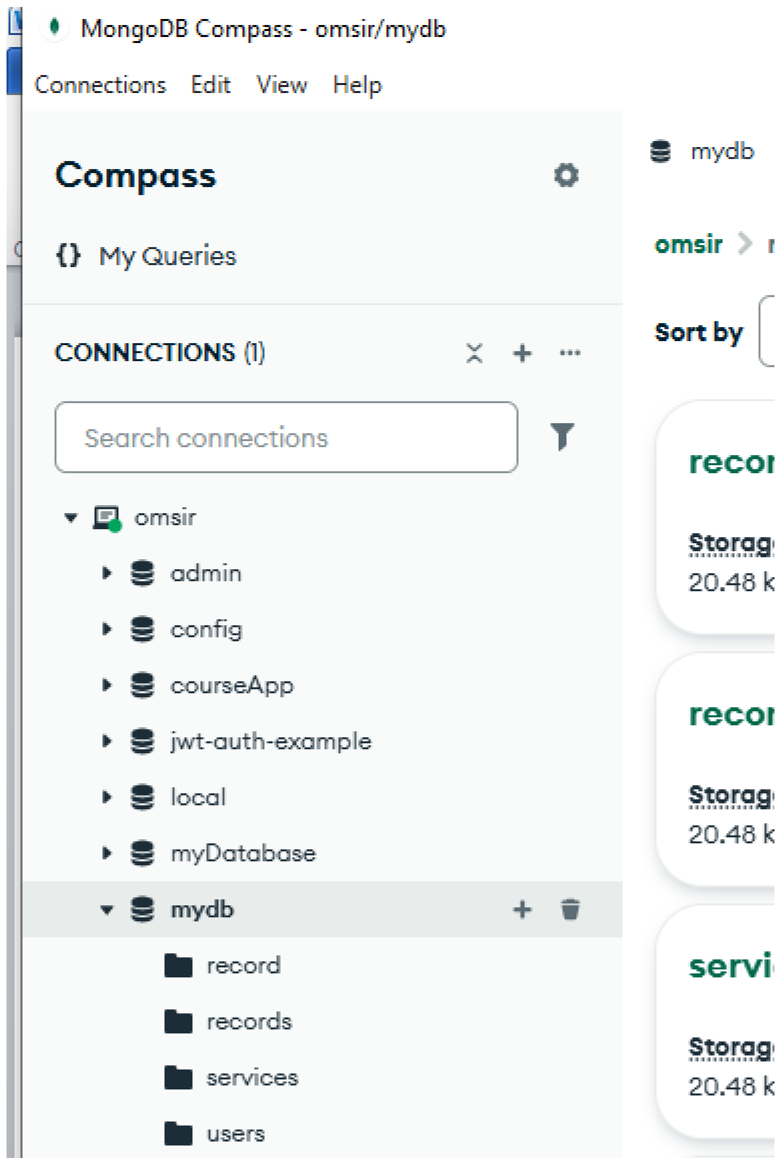
See example

How do I format my connection string?

See example

Cancel

Save



And Display data using mongoDB shell :-

>_ mongosh: omsir +

>_MONGOSH

```
> use mydb
< switched to db mydb
> db.users.find()
< {
    _id: ObjectId('68b2a3b3ba128b80e3b75ef1'),
    name: 'om sir',
    email: 'omsir@gmail.com',
    __v: 0
  }
mydb>
```