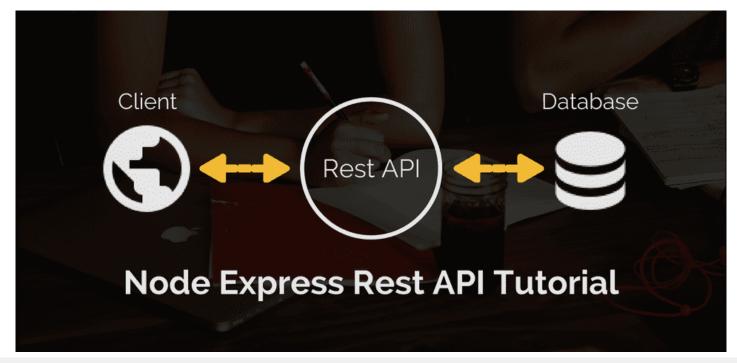
Building a Restful CRUD API with Node.js, Express and MongoDB

by RAJEEV SINGH · NODE JS · 4 MINS



In this tutorial, we'll be building a RESTful CRUD (Create, Retrieve, Update, Delete) API with Node.js, Express and MongoDB. We'll use Mongoose for interacting with the MongoDB instance.

Express is one of the most popular web frameworks for node.js. It is built on top of node.js http module, and adds support for routing, middleware, view system etc. It is very simple and minimal, unlike other frameworks that try do way to much, thereby reducing the flexibility for developers to have their own design choices.

Mongoose is an ODM (Object Document Mapping) tool for Node.js and MongoDB. It helps you convert the objects in your code to documents in the database and vice versa.

Before proceeding to the next section, Please install MongoDB in your machine if you have not done already. Checkout the official MogngoDB installation manual for any help with the installation.

Our Application

In this tutorial, We will be building a simple Note-Taking application. We will build Rest APIs for creating, listing, editing and deleting a Note.

We'll start by building a simple web server and then move on to configuring the database, building the Note model and different routes for handling all the CRUD operations.

Finally, we'll test our REST APIs using Postman.

Also, In this post, we'll heavily use ES6 features like let, const, arrow functions, promises etc. It's good to familiarize yourself with these features. I

recommend this re-introduction to Javascript to brush up these concepts.

Well! Now that we know what we are going to build, We need a cool name for our application. Let's call our application EasyNotes.

Creating the Application

1. Fire up your terminal and create a new folder for the application.

```
$ mkdir node-easy-notes-app
```

2. Initialize the application with a package.json file

Go to the root folder of your application and type npm init to initialize your app with a package.json file.

```
$ cd node-easy-notes-app
$ npm init
```

```
name: (node-easy-notes-app)
version: (1.0.0)
description: Never miss a thing in Life. Take notes quickly. Organ
entry point: (index.js) server.js
test command:
git repository:
keywords: Express RestAPI MongoDB Mongoose Notes
author: callicoder
license: (ISC) MIT
About to write to /Users/rajeevkumarsingh/node-easy-notes-app/pack
  "name": "node-easy-notes-app",
  "version": "1.0.0",
  "description": "Never miss a thing in Life. Take notes quickly.
  "main": "server.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  "keywords": [
    "Express",
```

```
"RestAPI",
   "MongoDB",
   "Mongoose",
   "Notes"

],
   "author": "callicoder",
   "license": "MIT"
}
Is this ok? (yes) yes
```

Note that I've specified a file named server.js as the entry point of our application. We'll create server.js file in the next section.

3. Install dependencies

We will need express, mongoose and body-parser modules in our application. Let's install them by typing the following command -

```
$ npm install express body-parser mongoose --save
```

I've used --save option to save all the dependencies in the package.json file.

The final package.json file looks like this -

```
"name": "node-easy-notes-app",
"version": "1.0.0",
"description": "Never miss a thing in Life. Take notes quickly.
"main": "server.js",
"scripts": {
  "test": "echo \"Error: no test specified\" && exit 1"
},
"keywords": [
  "Express",
  "RestAPI",
  "MongoDB",
  "Mongoose",
  "Notes"
"author": "callicoder",
"license": "MIT",
"dependencies": {
  "body-parser": "^1.18.3",
```

```
"express": "^4.16.3",
    "mongoose": "^5.2.8"
}
```

Our application folder now has a package.json file and a node_modules folder -

```
node-easy-notes-app
└── node_modules/
└── package.json
```

Setting up the web server

Let's now create the main entry point of our application. Create a new file named server.js in the root folder of the application with the following contents -

```
const express = require('express');
const bodyParser = require('body-parser');

// create express app
```

```
const app = express();
// parse requests of content-type - application/x-www-form-urlenco
app.use(bodyParser.urlencoded({ extended: true }))
// parse requests of content-type - application/json
app.use(bodyParser.json())
// define a simple route
app.get('/', (req, res) \Rightarrow \{
    res.json({"message": "Welcome to EasyNotes application. Take n
});
// listen for requests
app.listen(3000, () => {
    console.log("Server is listening on port 3000");
});
```

First, We import express and body-parser modules. Express, as you know, is a web framework that we'll be using for building the REST APIs, and body-parser is a

module that parses the request (of various content types) and creates a req.body object that we can access in our routes.

Then, We create an express app, and add two body-parser middlewares using express's app.use() method. A middleware is a function that has access to the request and response objects. It can execute any code, transform the request object, or return a response.

Then, We define a simple **GET** route which returns a welcome message to the clients.

Finally, We listen on port 3000 for incoming connections.

All right! Let's now run the server and go to http://localhost:3000 to access the route we just defined.

```
$ node server.js
Server is listening on port 3000

localhost:3000 ×

← → C ① localhost:3000

{"message":"Welcome to EasyNotes application. Take notes quickly. Organize and keep track of all your notes."}
```

Configuring and Connecting to the database

I like to keep all the configurations for the app in a separate folder. Let's create a new folder config in the root folder of our application for keeping all the configurations -

```
$ mkdir config
$ cd config
```

Now, Create a new file database.config.js inside config folder with the following contents -

```
module.exports = {
   url: 'mongodb://localhost:27017/easy-notes'
}
```

We'll now import the above database configuration in server.js and connect to the database using mongoose.

Add the following code to the server.js file after app.use(bodyParser.json()) line-

```
// Configuring the database
const dbConfig = require('./config/database.config.js');
const mongoose = require('mongoose');
mongoose.Promise = global.Promise;
// Connecting to the database
mongoose.connect(dbConfig.url, {
    useNewUrlParser: true
}).then(() => {
    console.log("Successfully connected to the database");
}).catch(err => {
    console.log('Could not connect to the database. Exiting now...
    process.exit();
});
```

Please run the server and make sure that you're able to connect to the database -

\$ node server.js
Server is listening on port 3000
Successfully connected to the database

Defining the Note model in Mongoose

Next, We will define the Note model. Create a new folder called app inside the root folder of the application, then create another folder called models inside the app folder -

```
$ mkdir -p app/models
$ cd app/models
```

Now, create a file called note.model.js inside app/models folder with the following contents -

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

const NoteSchema = mongoose.Schema({
    title: String,
    content: String
}, {
    timestamps: true
});

module.exports = mongoose.model('Note', NoteSchema);
```

The Note model is very simple. It contains a title and a content field. I have also added a timestamps option to the schema.

Mongoose uses this option to automatically add two new fields - createdAt and updatedAt to the schema.

Defining Routes using Express

Next up is the routes for the Notes APIs. Create a new folder called **routes** inside the app folder.

```
$ mkdir app/routes
$ cd app/routes
```

Now, create a new file called note.routes.js inside app/routes folder with the following contents -

```
module.exports = (app) => {
    const notes = require('../controllers/note.controller.js');

// Create a new Note
    app.post('/notes', notes.create);

// Retrieve all Notes
```

```
app.get('/notes', notes.findAll);

// Retrieve a single Note with noteId
app.get('/notes/:noteId', notes.findOne);

// Update a Note with noteId
app.put('/notes/:noteId', notes.update);

// Delete a Note with noteId
app.delete('/notes/:noteId', notes.delete);
}
```

Note that We have added a require statement for note.controller.js file. We'll define the controller file in the next section. The controller will contain methods for handling all the CRUD operations.

Before defining the controller, let's first include the routes in server.js. Add the following require statement before app.listen() line inside server.js file.

```
// .....
```

```
// Require Notes routes
require('./app/routes/note.routes.js')(app);
// .....
```

If you run the server now, you'll get the following error -

```
$ node server.js
module.js:472
    throw err;
    ^

Error: Cannot find module '../controllers/note.controller.js'
```

This is because we haven't defined the controller yet. Let's do that now.

Writing the Controller functions

Create a new folder called controllers inside the app folder, then create a new file called note.controller.js inside app/controllers folder with the following contents -

```
const Note = require('../models/note.model.js');
// Create and Save a new Note
exports.create = (req, res) => {
};
// Retrieve and return all notes from the database.
exports.findAll = (req, res) => {
};
// Find a single note with a noteId
exports.findOne = (req, res) => {
};
// Update a note identified by the noteId in the request
exports.update = (req, res) => {
};
```

```
// Delete a note with the specified noteId in the request
exports.delete = (req, res) => {
};
```

Let's now look at the implementation of the above controller functions one by one

Creating a new Note

```
// Create and Save a new Note
exports.create = (req, res) => {
    // Validate request
    if(!req.body.content) {
        return res.status(400).send({
            message: "Note content can not be empty"
            });
    }

// Create a Note
const note = new Note({
```

```
title: req.body.title || "Untitled Note",
        content: reg.body.content
    });
    // Save Note in the database
    note.save()
    .then(data => {
        res.send(data);
    }).catch(err => {
        res.status(500).send({
            message: err.message || "Some error occurred while cre
        });
   });
};
```

Retrieving all Notes

```
// Retrieve and return all notes from the database.
exports.findAll = (req, res) => {
   Note.find()
   .then(notes => {
```

```
res.send(notes);
}).catch(err => {
    res.status(500).send({
        message: err.message || "Some error occurred while ret
     });
});
```

Retrieving a single Note

```
if(err.kind === 'ObjectId') {
    return res.status(404).send({
        message: "Note not found with id " + req.params.no
     });
}

return res.status(500).send({
    message: "Error retrieving note with id " + req.params
});
});
};
```

Updating a Note

```
// Update a note identified by the noteId in the request
exports.update = (req, res) => {
    // Validate Request
    if(!req.body.content) {
        return res.status(400).send({
            message: "Note content can not be empty"
        });
    }
}
```

```
// Find note and update it with the request body
Note.findByIdAndUpdate(req.params.noteId, {
    title: req.body.title || "Untitled Note",
    content: req.body.content
}, {new: true})
.then(note => {
    if(!note) {
        return res.status(404).send({
            message: "Note not found with id " + reg.params.no
       });
    res.send(note);
}).catch(err => {
    if(err.kind === 'ObjectId') {
        return res.status(404).send({
            message: "Note not found with id " + req.params.no
       });
    return res.status(500).send({
        message: "Error updating note with id " + req.params.n
   });
```

```
});
};
```

The {new: true} option in the findByIdAndUpdate() method is used to return the modified document to the then() function instead of the original.

Deleting a Note

```
// Delete a note with the specified noteId in the request
exports.delete = (req, res) => {
    Note.findByIdAndRemove(req.params.noteId)
    .then(note => {
        if(!note) {
            return res.status(404).send({
                message: "Note not found with id " + req.params.no
            });
        res.send({message: "Note deleted successfully!"});
    }).catch(err => {
        if(err.kind === 'ObjectId' || err.name === 'NotFound') {
            return res.status(404).send({
```

```
message: "Note not found with id " + req.params.no
});

return res.status(500).send({
    message: "Could not delete note with id " + req.params
});
});
};
```

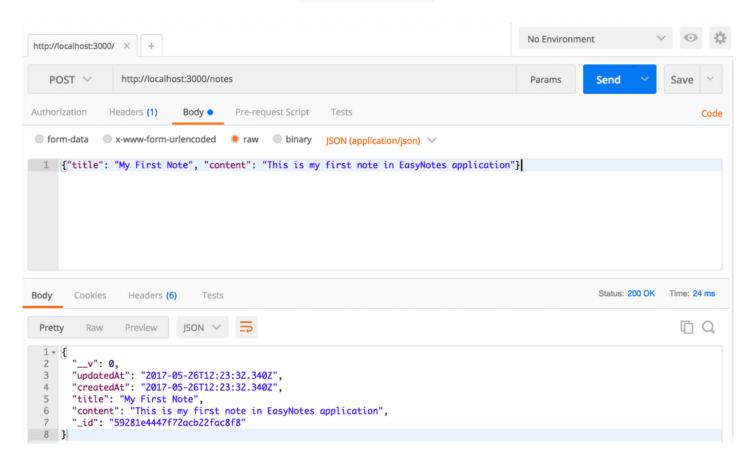
You can check out the documentation of all the methods that we used in the above APIs on Mongoose's official documentation -

- Mongoose save()
- Mongoose find()
- Mongoose findById()
- Mongoose findByIdAndUpdate()
- Mongoose findByIdAndRemove()

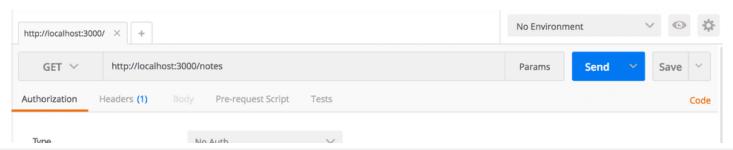
Testing our APIs

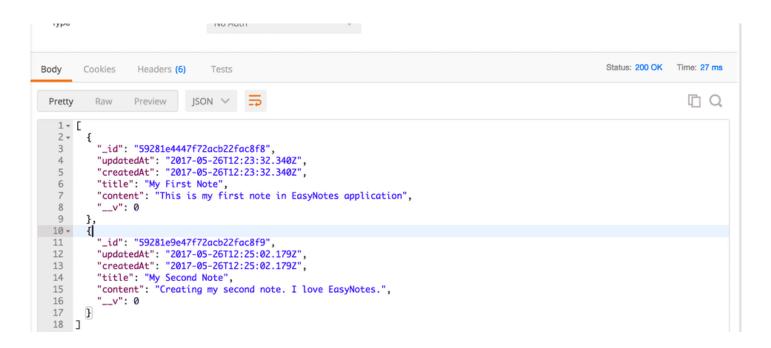
Let's now test all the APIs one by one using postman.

Creating a new Note using POST /notes API

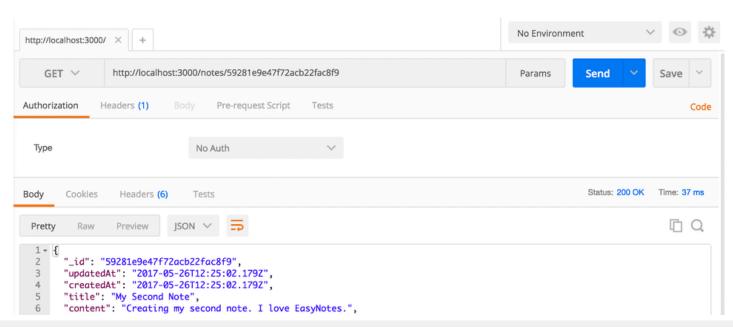


Retrieving all Notes using **GET** /notes API



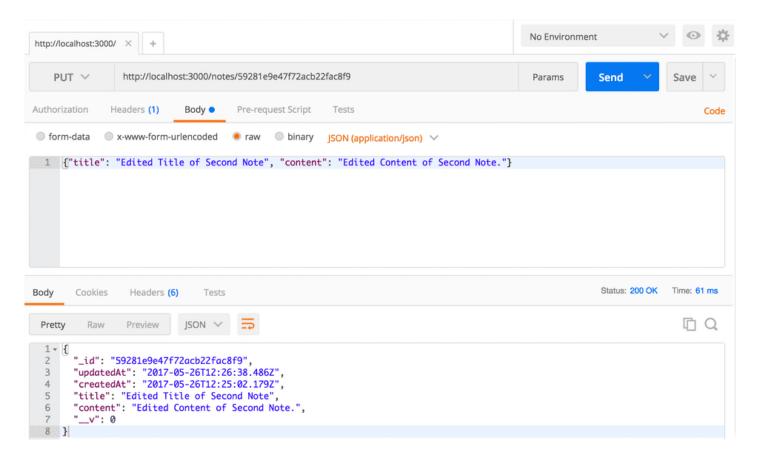


Retrieving a single Note using **GET** /notes/:noteId API



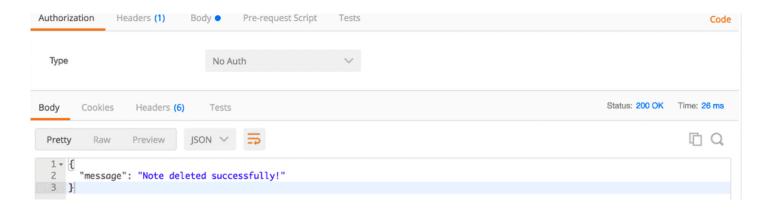


Updating a Note using PUT /notes/:noteId API



Deleting a Note using **DELETE** /notes/:noteId API





Conclusion

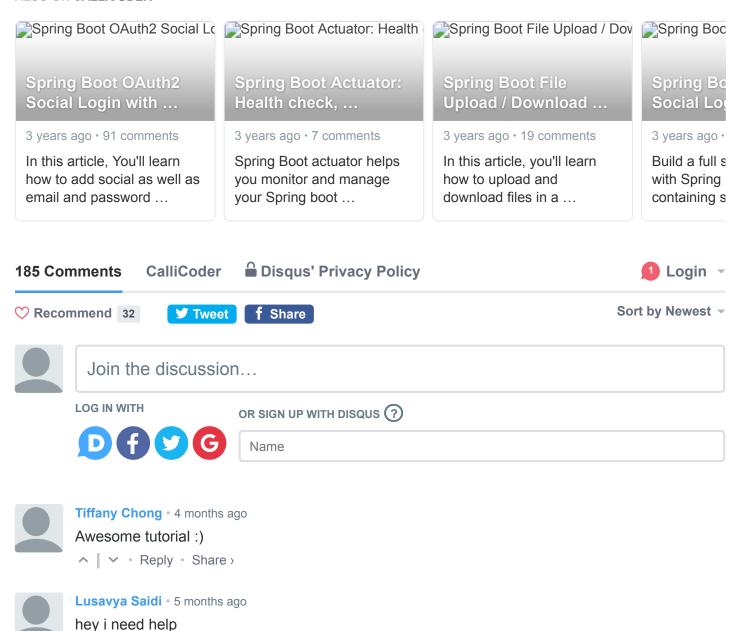
In this tutorial, We learned how to build rest apis in node.js using express framework and mongodb.

You can find the code for this tutorial in my github repository. Please ask any questions that you might have in the comment section below.

Thanks for reading. See you in the next tutorial!

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\$@k!ndu • 7 months ago

Thanks, so Helpful!!!



ALRVD • 9 months ago

Why you use 2 error handers, one with 500 err code and one with 404 err code, when the noteld note found?



Pasha Kolesnyk • a year ago

Really easy.. Ulike java with spring boot



ALRVD → Pasha Kolesnyk • 9 months ago

Java is headache



Sameer Karmacharya • a year ago

Thank you very very much. It was very helpful.



Curryandketchup Norway • a year ago

Thank u so much! Such a good explanation, useful for begineers..



nasir kiyani • a year ago • edited

Thank u so much sir!

if any one faced empty array issue when he call list method. Than please also add third parameter "collection name" in the last line of your model class.

module.exports = mongoose.model(Note , NoteSchemam, your collection name);

Thank u.



deepak verma • a year ago

nice tutorial sir



Aman Gupta • a year ago

Please also provide us signup and login also



Aman Gupta • a year ago

Can we see mongo Database where my query execute...



Rajnikant Chaudhary • a year ago

Very usefull



Mohamed Afzal Mulla • a year ago

Great post! Thanks Callicode! I'mm subscribe to your newsletter. PS. Anyone trying this, you must have mongodb working on localhost. Callicoder, will be great if you had a part 2 that showed connect this to a form on Create-react-app



Mufiq Patoni • 2 years ago

wow its nice tutorial..

TQ



ajay konda • 2 years ago

Sir please tell me how to debug, I am new to nodejs and very well aware of .net api and postman, please reply as quick as can



Сафонов из Назарета → ajay konda • 2 years ago

VS Code has built-in node debugger



∧ | ✓ • Reply • Share >



Aruljothy sundaramoorthy • 2 years ago

Awasama lust pailed it



1 ^ Reply • Share >



Abdur Rahim • 2 years ago

Where do they save when we create a new note.

1 ^ | V • Reply • Share >



Ferdinand von Schirach • 2 years ago

One of the best tutorials I've seen so far about this topic. I would really like to see how to build a React front end to this API.



Anshuman • 2 years ago

Hi

a little tip was working on new server and wasted 15 mins as db wasn't connecting to the node app before i realised its not running systemctl status mongod

∧ | ∨ • Reply • Share ›



aishwarya bhosale • 2 years ago

Hii I am getting this following error:

throw new Error(msg);

۸

Error: Route.get() requires a callback function but got a [object Undefined]

at Route.(anonymous function) [as get] (/home/gslab/Desktop/user-

app/node_modules/express/lib/router/route.js:202:15)

at Function.app.(anonymous function) [as get] (/home/gslab/Desktop/user-

app/node modules/express/lib/application.js:482:19)

at module.exports (/home/gslab/Desktop/user-app/app/routes/user.routes.js:8:9)

at Object.<anonymous> (/home/gslab/Desktop/user-app/server.js:35:39)

at Module. compile (module.js:652:30)

at Object Madula automations to (madula tarces)

at Object.iviodule._extensions..js (module.js:003:10)

at Module.load (module.js:565:32)

at tryModuleLoad (module.js:505:12)

at Function.Module._load (module.js:497:3)

at Function.Module.runMain (module.js:693:10)

at startup (bootstrap_node.js:188:16)

at bootstrap_node.js:609:3

Please help me out here



Hem Chavda → aishwarya bhosale • 2 years ago

Have you got solution above erro? if then share me please.



Dương Hải Quân • 2 years ago

my nodejs server allway connected mongdb with any url database in database.config.js . How it doesn't connected ?



Irfan Razzaq → Dương Hải Quân • 2 years ago

If you specify any url that is not in mongodb it will create an empty db for you with the name you have specified in url, but it will be empty.



Hubert Kanyamahanga • 2 years ago

Nice Tutorials!



Eric Bruno Nz • 2 years ago

Hello I am trying to test the API unfortunately I get 400 error. my DB is connected I am not sure what I am doing wrong.







ciao ciao → Eric Bruno Nz • 2 years ago • edited

You need to add headers Content-Type = application/json



Anshuman → ciao ciao • 2 years ago

wow thanks!



Bruno Muniz • 2 years ago

Awesome!



Dmitriy Svirin • 2 years ago

This is really helpful! Than you so much!



Ashwin • 2 years ago

This is one of the best tutorials I have ever used. Fantastic. Thanks!!



DMongo • 2 years ago

The tutorial is great. Do you know how you could pass in a parameter to the api such as 'name' or 'serial number' to return a specific record instead of filtering by the MongoDB ':id'?



Sarvdip • 2 years ago

Thanks for tutorial. I have query that - How automatically created collection name notes?



Mubarak Show • 2 years ago • edited

I see lots of people struggling to run this project successfully.

Steps to run project

- 1. open new terminal and startup mongodb server: mongod
- 2. run the project: npm start

Please upvote if this helped so other may find it easily:)



bikash shah • 2 years ago

thanks rajeev, loved your tutorial. Its really great to begin with:)



Kushagra Kiran • 2 years ago

TypeError: Note is not a constructor

at exports.create (/opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-app/app/controllers/note.controller.js:13:18)

at Layer.handle [as handle_request] (/opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-app/node_modules/express/lib/router/layer.js:95:5)

at next (/opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-app/node_modules/express/lib/router/route.js:137:13)

at Route.dispatch (/opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-

app/node_modules/express/lib/router/route.js:112:3)
at Layer.handle [as handle_request] (/opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-app/node_modules/express/lib/router/layer.js:95:5)
at /opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-app/node_modules/express/lib/router/index.js:281:22
at Function.process_params (/opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-app/node_modules/express/lib/router/index.js:335:12)
at next (/opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-app/node_modules/express/lib/router/index.js:275:10)
at /opt/lampp/htdocs/bitbucketworkspace/nodelearnings/node-easy-notes-

see more



Enes Varcan → Kushagra Kiran • 2 years ago

You should add this line to the end of note.model.js file.

module.exports = mongoose.model('Note', NoteSchema);



Pankaj Patel • 2 years ago

It's an amazing and easy example to understand, it's saved lots of time of mine.



Rajeev Singh Mod Pankaj Patel • 2 years ago

Thank you:)



Abhishek Kumar • 2 years ago

How to secure these APIs?

How can we restrict other users to access these apis?



Jerry Sunny • 2 years ago

great stuff really helped a lot to start with



Salma Zaghloul • 2 years ago

thank you for the great tutorial i would like to know how can i document this api please using openApi. that would be really really helpful



lockwear • 2 years ago

Nice man! Great tutorial Helped me a lot



RamzanAli Momin • 2 years ago • edited

Thanks! Very useful article for beginner



gaurav • 3 years ago

Please help me how can i create signin and signup api?



Dev Aggrwal • 3 years ago • edited

api



Saravanan Chinnadurai • 3 years ago

Hi Master,

I am getting this error though i pass the values as you shown

Note content can not be empty



Moulder_B → Saravanan Chinnadurai • 2 years ago

You need to ensure that Postman is running the Body and selecting the JSON(application/json) drop down item, not plain text--this is what fixed the error for me.



Salma Zaghloul → Saravanan Chinnadurai • 2 years ago

i keep getting the same problem

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