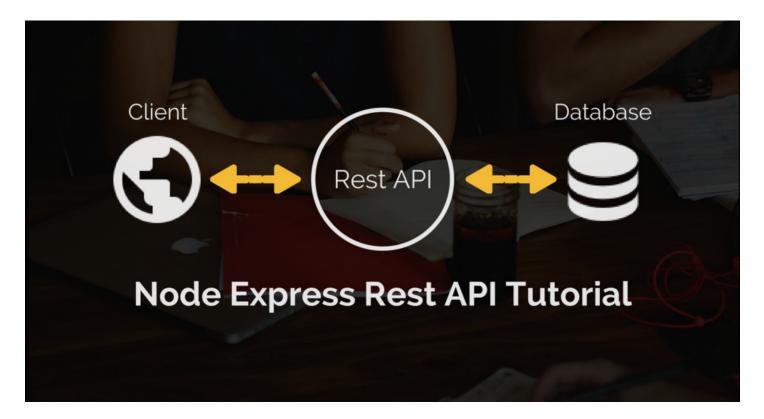


Building a Restful CRUD API with Node.js, Express and MongoDB

Rajeev Kumar Singh • Node.js • Jun 13, 2017 • 10 mins read



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.



MSI

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 <code>npm init</code> to initialize your app with a <code>package.json</code> file.

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

```
name: (node-easy-notes-app)
version: (1.0.0)
```



```
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/package.json:
{
  "name": "node-easy-notes-app",
  "version": "1.0.0",
  "description": "Never miss a thing in Life. Take notes quickly. Organize and keep track of a
  "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 -



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. Organize and keep track of a
  "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": "^1.18.2",
    "express": "^4.16.3",
    "mongoose": "^5.0.11"
  }
}
```

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

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



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-urlencoded
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) => {
    res.json({"message": "Welcome to EasyNotes application. Take notes quickly. Organize and k
});
// 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.



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

```
C i 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');
```



```
// Connecting to the database
mongoose.connect(dbConfig.url)
.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
```



```
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);
```



```
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



```
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) {
```



```
});
    }
    // Create a Note
    const note = new Note({
        title: req.body.title || "Untitled Note",
        content: req.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 creating the Note."
        });
    });
};
```

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 retrieving notes."
        });
    });
};
```



```
// Find a single note with a noteId
exports.findOne = (req, res) => {
    Note.findById(req.params.noteId)
    .then(note => {
        if(!note) {
            return res.status(404).send({
                message: "Note not found with id " + req.params.noteId
            });
        }
        res.send(note);
    }).catch(err => {
        if(err.kind === 'ObjectId') {
            return res.status(404).send({
                message: "Note not found with id " + req.params.noteId
            });
        }
        return res.status(500).send({
            message: "Error retrieving note with id " + req.params.noteId
        });
    });
};
```

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, {
```



```
}, {new: true})
    .then(note => {
        if(!note) {
            return res.status(404).send({
                message: "Note not found with id " + req.params.noteId
            });
        }
        res.send(note);
    }).catch(err => {
        if(err.kind === 'ObjectId') {
            return res.status(404).send({
                message: "Note not found with id " + req.params.noteId
            });
        }
        return res.status(500).send({
            message: "Error updating note with id " + req.params.noteId
        });
    });
};
```

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



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

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

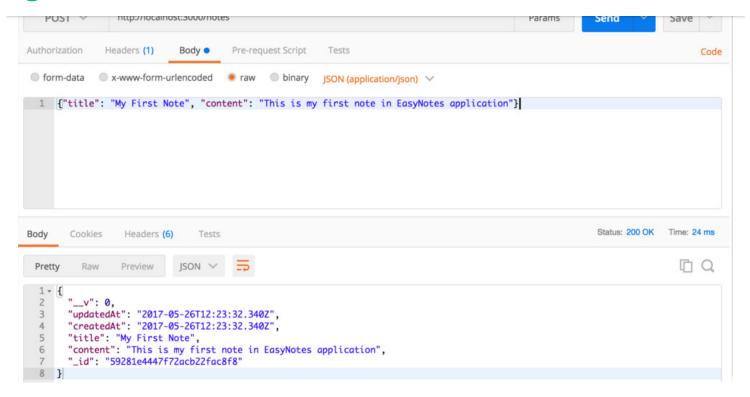
- Mongoose save()
- Mongoose find()
- Mongoose findById()
- Mongoose findByIdAndUpdate()
- Mongoose findByIdAndRemove()

Testing our APIs

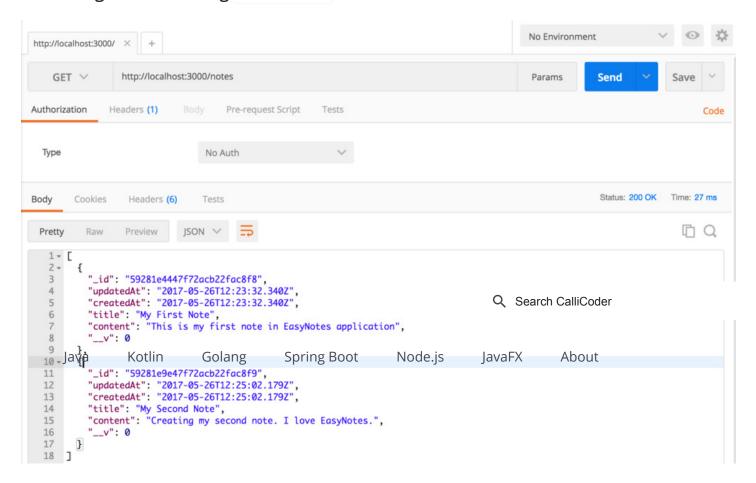
Let's now test all the APIs one by one using postman.

Creating a new Note using POST /notes API

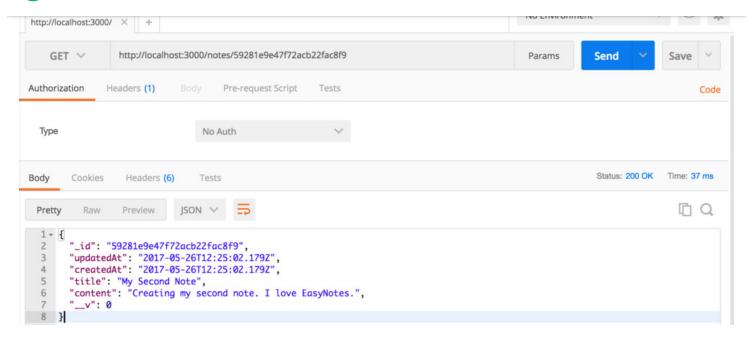




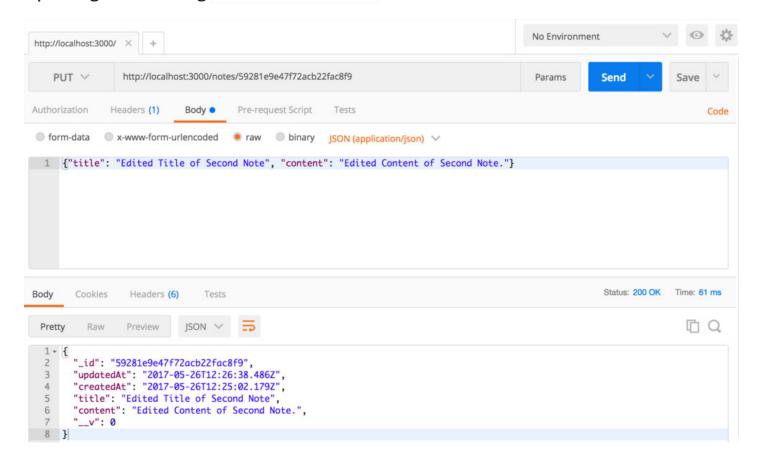
Retrieving all Notes using GET /notes API



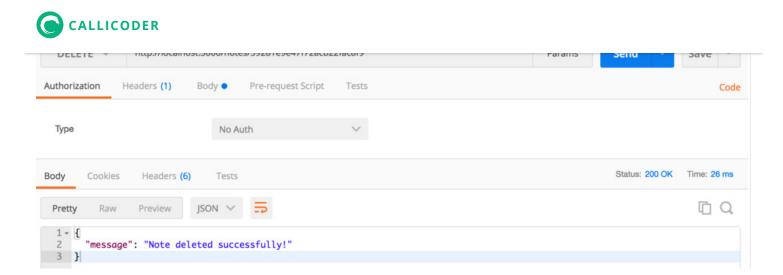




Updating a Note using PUT /notes/:noteId API



Deleting a Note using DELETE /notes/:noteId API

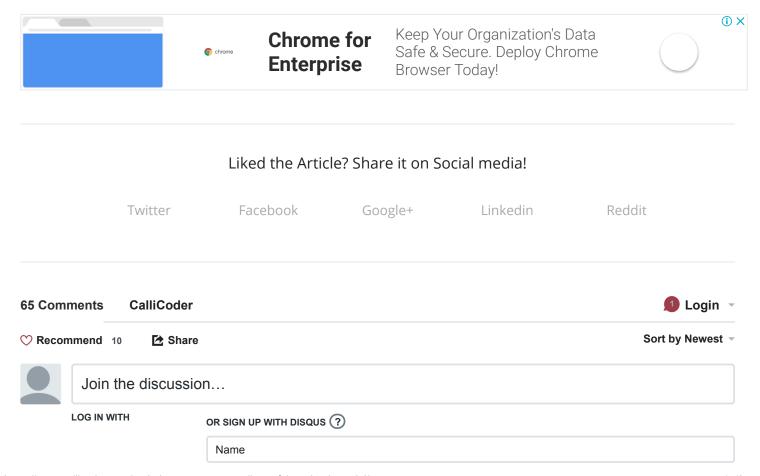


Conclusion

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!







Your article is very nice and helpful.i m using node.js with SQL database .all are working fine and now i want to deploy on IIS , i went through many article but doesn't work for me . please help me.

Thanks in advance !!

Meena Damwani



This comment is awaiting moderation. Show comment.



Shahbaz Mancho → Shahbaz Mancho • 2 months ago

here is config

url: 'mongodb://localhost:27017/easy-notes'

∧ V • Reply • Share >



Rajeev Kumar Singh Mod → Shahbaz Mancho • 2 months ago

Hi,

Can you check if MongoDB running in your system?



Shahbaz Mancho → Rajeev Kumar Singh • 2 months ago

Hi Kumar

yeah i just check MongoDb, i made a stupid mistake, i thought mongo will run itself: P



Rajeev Kumar Singh Mod → Shahbaz Mancho • 2 months ago

Cool. I've also updated the post, and removed useMongoClient from mongoose.connect() function.

This will remove the warning that you're getting.



Shahbaz Mancho → Rajeev Kumar Singh • 2 months ago

thankyou. yeah i see that warning and removed useMongoClient

∧ V • Reply • Share >



LobsterYu • 11 days ago

Thanks for sharing, this helped me a lot:)



Md. Amanul Huque Ony • 17 days ago

Thanks for sharing this awesome tutorial. :)



harsha kushal • 18 days ago

Thanks Rajeev, but now I am facing Schema not defined problem.



Rajeev Kumar Singh Mod → harsha kushal • 18 days ago

Can you post the error stacktrace here?



∧ | ∨ • Reply • Share >



Rajeev Kumar Singh Mod Aharsha kushal • 18 days ago

Hey Harsha,

Please check that MongoDB running in your system and you're able to connect to it using mongo client.



sheheryar nisar • a month ago

Note does not get deleted, its just showing message "Note Deleted successfully" After that when I get Notes, its showing me all notes included one I just deleted.



Rajeev Kumar Singh Mod → sheheryar nisar • a month ago

Hi.

I can't reproduce what you said. The delete API is working fine for me. Can you provide more details, like your Node version, Mongoose version. And can you cross check your delete API with the one in this article.

Regards,

Rajeev



Monika • a month ago

HI

I m getting the below error. Please help me to solve this error

TypeError: Cannot read property 'content' of undefined

- at exports.create.note.save.then.data.catch (D:\npm\app\controller\noteController.js:4:16)
- at Layer.handle [as handle request] (D:\npm\node modules\express\lib\router\layer.js:95:5)
- at next (D:\npm\node modules\express\lib\router\route.is:137:13)
- at Route.dispatch (D:\npm\node_modules\express\lib\router\route.js:112:3)
- at Layer.handle [as handle request] (D:\npm\node modules\express\lib\router\layer.js:95:5)
- at D:\npm\node modules\express\lib\router\index.js:281:22
- at Function.process_params (D:\npm\node_modules\express\lib\router\index.js:335:12)
- at next (D:\npm\node modules\express\lib\router\index.js:275:10)
- at expressInit (D:\npm\node modules\express\lib\middleware\init.js:40:5)
- at Layer.handle [as handle_request] (D:\npm\node_modules\express\lib\router\layer.js:95:5)
- at trim_prefix (D:\npm\node_modules\express\lib\router\index.js:317:13)
- at D:\npm\node_modules\express\lib\router\index.js:284:7
- at Function.process_params (D:\npm\node_modules\express\lib\router\index.js:335:12)
- at next (D:\npm\node modules\express\lib\router\index.js:275:10)
- at query (D:\npm\node modules\express\lib\middleware\query.js:45:5)
- at Layer.handle [as handle_request] (D:\npm\node_modules\express\lib\router\layer.js:95:5)
- Reply Share >



Rajeev Kumar Singh Mod → Monika • a month ago

That error means that req.body is undefined in the exports.create method. Can you check the routes and verify that this method is being referred like this -

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





praneeth teja • a month ago

require('./app/routes/note.routes.js')(app); .Hi everyone. I have a doubt.

Should we not store this module in any var. Its giving error by writing this way.



Rajeev Kumar Singh Mod → praneeth teja • a month ago

What error are you getting? We can store the module in a var, but there is not point storing it when we're not gonna use that var.

∧ V • Reply • Share >



Akshaya Saravanan • a month ago



Whenever I create a note and send it to the server through postman, I get an error saying the message content cannot be empty. I have attached the screenshots of the output. Please let me know the error.



Rajeev Kumar Singh Mod Akshaya Saravanan • a month ago

Request Content-Type should be application/json. Click on the Text drop down in Postman and select JSON. It should work after that.



Winlight Solutions • a month ago

The best and simplest tutorial for node, express mongo with ReSTful APIs! Wish that you could add " Create Angular Frontend" tutorial as a second part for this best tutorial and get "MEAN" completed. Thanks a million!

1 ^ Reply • Share >



Srinivasarao chintala • a month ago

Excellent tutorial, nicely explained. Thank you!!!!



Seorang Kapiten • 2 months ago

I get this error after configuring and connecting database section.

module.js:549

throw err;

٨

Error: Cannot find module '/home/putrapc/webproject/node-easy-notes-app/config/server.js'



```
at startup (bootstrap node.js:188:16)
at bootstrap node.js:609:3
how it could be?
∧ | ∨ • Reply • Share ›
       Seorang Kapiten → Seorang Kapiten • 2 months ago
      Sorry my fault its solved now
       Robert • 2 months ago
```



Hi. Great tutorial. Any ideas why my update function creates a new object instead of updating one?

```
// Find note and update it with request body
Note.findByIdAndUpdate(
req.params.noteld,
title: req.body.title | "Untitled Note",
content: req.body.content
},
{ new: true }

✓ • Reply • Share ›
```



Robert → Robert • 2 months ago

nevermind:) I had create function in routes instead of update



carlita • 2 months ago

Hi! I am getting "ReferenceError: Note is not defined" when trying to retrieve all (verb get with no id). Like it cannot find the model. Do you know what this could be? Thanks!



carlita - carlita - 2 months ago

solved it, sorry! A case sensitive problem xD

```
3 ^ V • Reply • Share >
```



marcus nixon • 2 months ago

okay so i finished it all now im getting this when i try to run at the end



```
✓ • Reply • Share ›
```



Kleurbleur → marcus nixon • 2 months ago

Be sure to actually start Mongo as well. It's not written in the tutorial but you have to start it yourself.

```
∧ V • Reply • Share >
```



marcus nixon → Kleurbleur • 2 months ago





Olanrewaju Olayinka Ahmed → marcus nixon • 2 months ago

Also have the same issue on my machine. I have MongoDB installed. Please what can i do to solve this. Am using windows 10 OS.



marcus nixon → Olanrewaju Olayinka Ahmed • 2 months ago

Need to keep mongodb runing in another cmd



Dan Phelps → marcus nixon • 2 months ago

how do I keep monggodb running? thanks



marcus nixon → Dan Phelps • 2 months ago

just gotta keep it going in another cmd i think . have one open running that and the other for everything else



Rajeev Kumar Singh Mod A Olanrewaju Olayinka Ahmed • 2 months ago

Hi,

Can you check if you're able to connect to mongodb using mongo command?

```
∧ V • Reply • Share >
```



Rajeev Kumar Singh Mod → marcus nixon • 2 months ago

Hi,

Do you have MongoDB installed and running in your system?



marcus nixon → Rajeev Kumar Singh • 2 months ago

Ahh yeh that was the problem didn't keep it running



Avatar This comment was deleted.



Rajeev Kumar Singh Mod → Guest • 2 months ago

Remove the parentheses from database.config.js. Here is the content of the config file -

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

✓ • Reply • Share ›
```



marcus nixon → Rajeev Kumar Singh • 2 months ago

yeh was my bad missed the bottom bracket



Kleurbleur • 2 months ago

I followed the tut and ran into a problem while testing at the put and delete phases. So I downloaded your source



```
<ntml lang="en">
<head>
<meta charset="utf-8">
<title>Error</title>
</head>
<body>
  Cannot POST /notes/5ac3cb6cd378474738b947fd
</body>
</html>
Rajeev Kumar Singh Mod → Kleurbleur • 2 months ago
       You're using POST method for updating a note. You should use PUT:
         PUT /notes/:noteId
       And for deleting a note, you should use DELETE:
         DELETE /notes/:noteId

✓ • Reply • Share ›

              Kleurbleur → Rajeev Kumar Singh • 2 months ago
              God... guess I'm staring too long at the screen today. Works now as well in my code. Thanks!
              Roby Huzwandar • 2 months ago
[nodemon] starting `node index.js`
/var/www/html/API2/app/models/pengurus.model.js:3
nama: string,
ReferenceError: string is not defined
at Object.<anonymous> (/var/www/html/API2/app/models/pengurus.model.js:3:11)
at Module. compile (module.js:652:30)
at Object.Module. extensions..js (module.js:663:10)
at Module.load (module.js:565:32)
at tryModuleLoad (module.js:505:12)
at Function. Module. load (module. js: 497:3)
at Module.require (module.js:596:17)
at require (internal/module.js:11:18)
at Object.<anonymous> (/var/www/html/API2/app/controllers/pengurus.controller.js:1:78)
at Module._compile (module.js:652:30)
at Object.Module._extensions..js (module.js:663:10)
at Module.load (module.js:565:32)
at tryModulel oad (module is:505:12)
```



[nodemon] app crashed - waiting for file changes before starting...

I have error

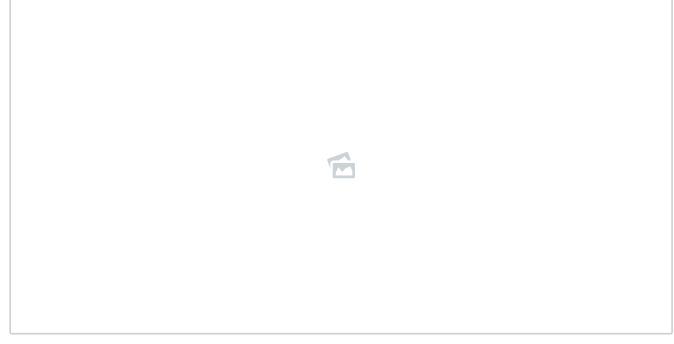


Immanuel Kant • 2 months ago

I have to say, this is the best tutorial I have learned to building Restful API. Thank you! 2 ^ | V • Reply • Share >



Nilesh • 3 months ago



I am not getting any data after hitting my URL. Also its not throwing error.

Could you please elaborate do I need to create collection in MongoDB.



Loïs Botta • 3 months ago

Thank you for this tuto, it was very instructive and easy!



prabha • 3 months ago

Superb! clearly explained

∧ | ∨ • Reply • Share ›

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11 comments • 6 months ago

Raieev Kumar Singh — Hi .losenh To add extra columns to https://www.callicoder.com/node-js-express-mongodb-restful-crud-api-tutorial/

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16 comments • 3 months ago

Raieev Kumar Singh — Hi Follow these stens to use



Java ArrayList: The Complete Reference

2 comments • a month ago

Rajeev Kumar Singh — Thanks man! I'm glad that you Avatafound the article helpful.

Notin inneritance, Overriding wethous, and

Properties

2 comments • 6 months ago

Rajeev Kumar Singh — Yes! Thanks for pointing it out. I've Avatarcorrected the code now.



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