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Create HTTPS Server with Node.js [Simple Steps]

WRITTEN BY - STEVE ALILA

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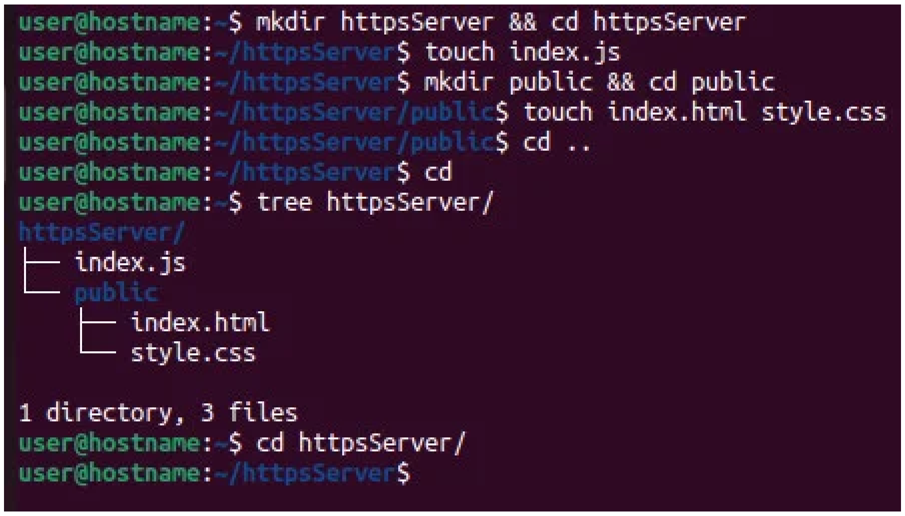
This tutorial shows you how to create HTTPS Server with Node.js using a self-signed SSL certificate. You will generate an SSL certificate, then use it to create a simple express server that receives user details from a form.

Here are the steps:

Step~1: Create the project structure

```
$ mkdir httpsServer && cd httpsServer
$ touch index.js
$ mkdir public && cd public
$ touch index.html style.css
$ cd ..
```

We create the project directory called `httpsServer` ; main script file called `index.js` ; public folder to store static assets: index.html and style.css.

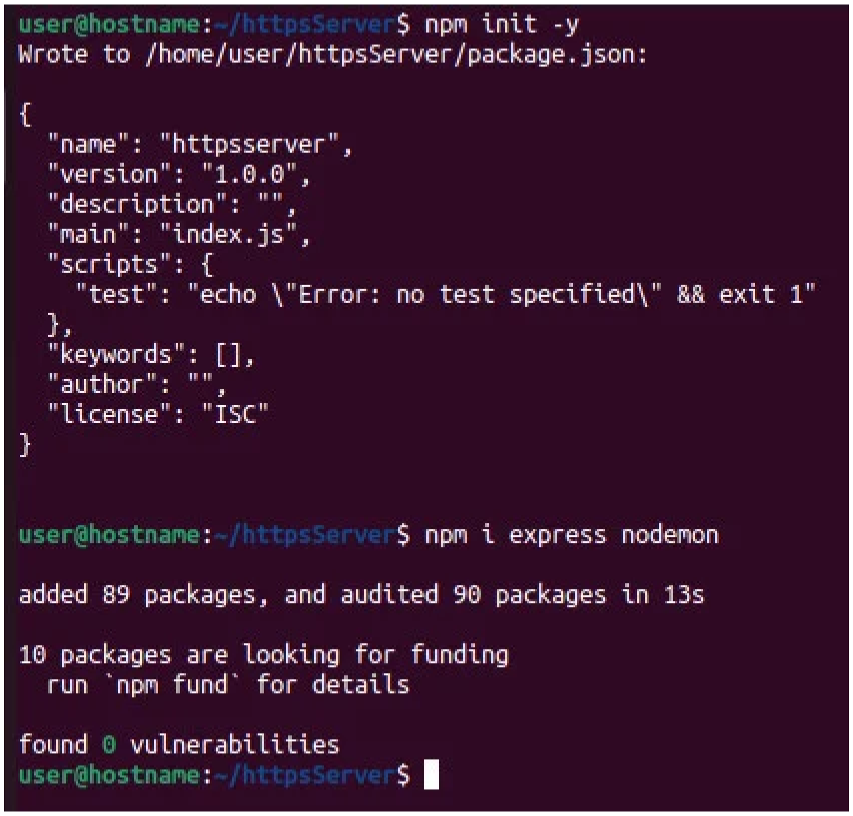


```
user@hostname:~$ mkdir httpsServer && cd httpsServer
user@hostname:~/httpsServer$ touch index.js
user@hostname:~/httpsServer$ mkdir public && cd public
user@hostname:~/httpsServer/public$ touch index.html style.css
user@hostname:~/httpsServer/public$ cd ..
user@hostname:~/httpsServer$ cd
user@hostname:~$ tree httpsServer/
httpsServer/
├── index.js
└── public
    ├── index.html
    └── style.css

1 directory, 3 files
user@hostname:~$ cd httpsServer/
user@hostname:~/httpsServer$
```

Step~2: Initialize an NPM package

```
$ npm init -y
$ npm i express nodemon
```

We initialize an NPM package and install `express` and `nodemon` modules. We will use the `express` module to create the server routes; `nodemon` to watch the server for changes during development, so we don't have to keep restarting the server manually.

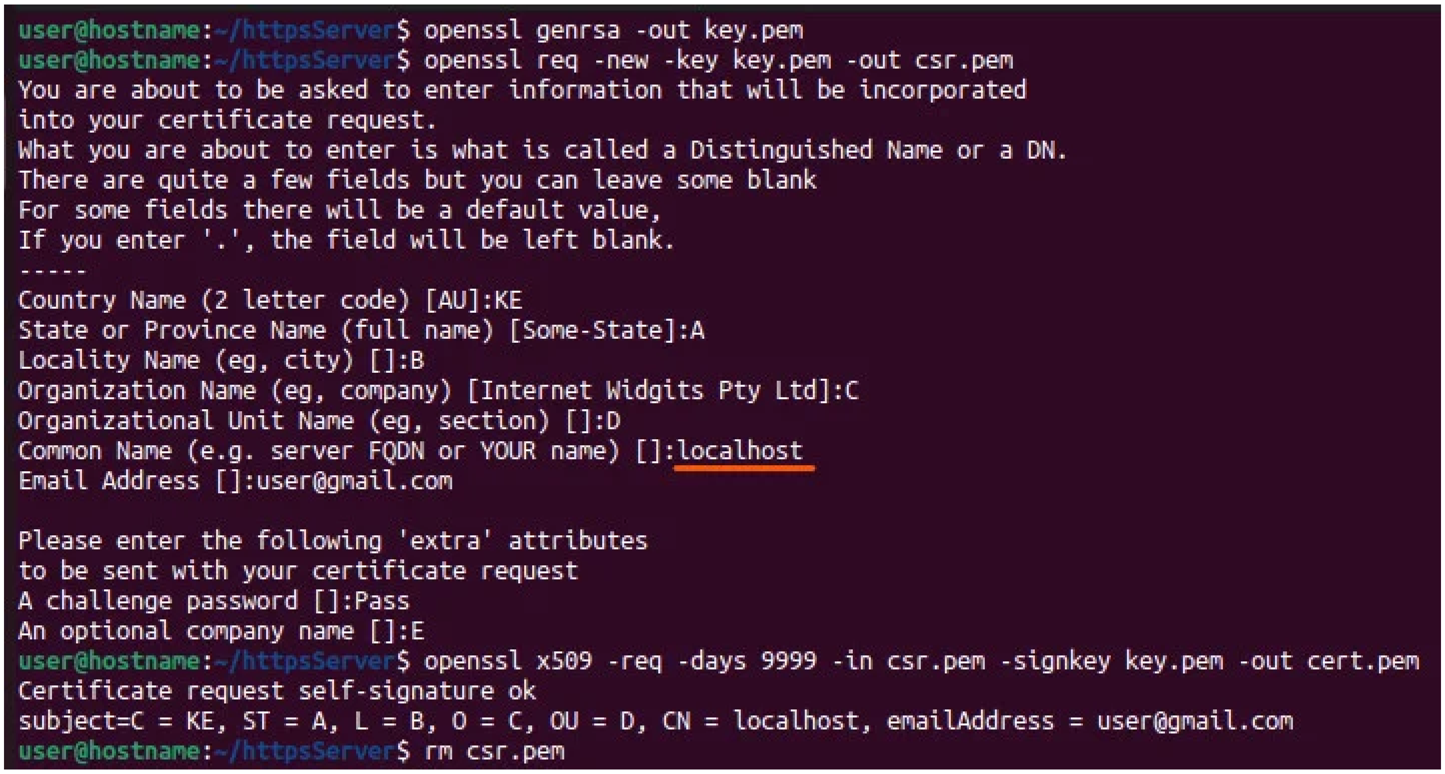


```
user@hostname:~/httpsServer$ npm init -y
Wrote to /home/user/httpsServer/package.json:

{
  "name": "httpsserver",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC"
}


user@hostname:~/httpsServer$ npm i express nodemon

added 89 packages, and audited 90 packages in 13s

10 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
user@hostname:~/httpsServer$
```

Step~3: Generate an SSL certificate

Run each of the lines. Then, answer prompts, filling the server FQDN to *localhost* because the certificate is self-signed on the local machine. You can check our extensive tutorial on openssl to learn more about working with certificates.

```
$ openssl genrsa -out key.pem
$ openssl req -new -key key.pem -out csr.pem
$ openssl x509 -req -days 9999 -in csr.pem -signkey key.pem -out cert.pem
$ rm csr.pem
```



```
user@hostname:~/httpsServer$ openssl genrsa -out key.pem
user@hostname:~/httpsServer$ openssl req -new -key key.pem -out csr.pem
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:KE
State or Province Name (full name) [Some-State]:A
Locality Name (eg, city) []:B
Organization Name (eg, company) [Internet Widgits Pty Ltd]:C
Organizational Unit Name (eg, section) []:D
Common Name (e.g. server FQDN or YOUR name) []:localhost
Email Address []:user@gmail.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:Pass
An optional company name []:E
user@hostname:~/httpsServer$ openssl x509 -req -days 9999 -in csr.pem -signkey key.pem -out cert.pem
Certificate request self-signature ok
subject=C = KE, ST = A, L = B, O = C, OU = D, CN = localhost, emailAddress = user@gmail.com
user@hostname:~/httpsServer$ rm csr.pem
```

We get two files:

ALSO READ:

Install Node.js on Ubuntu 20.04 [3 Different Methods]

`cert.pem` : the certificate.

`key.pem` : the private key.

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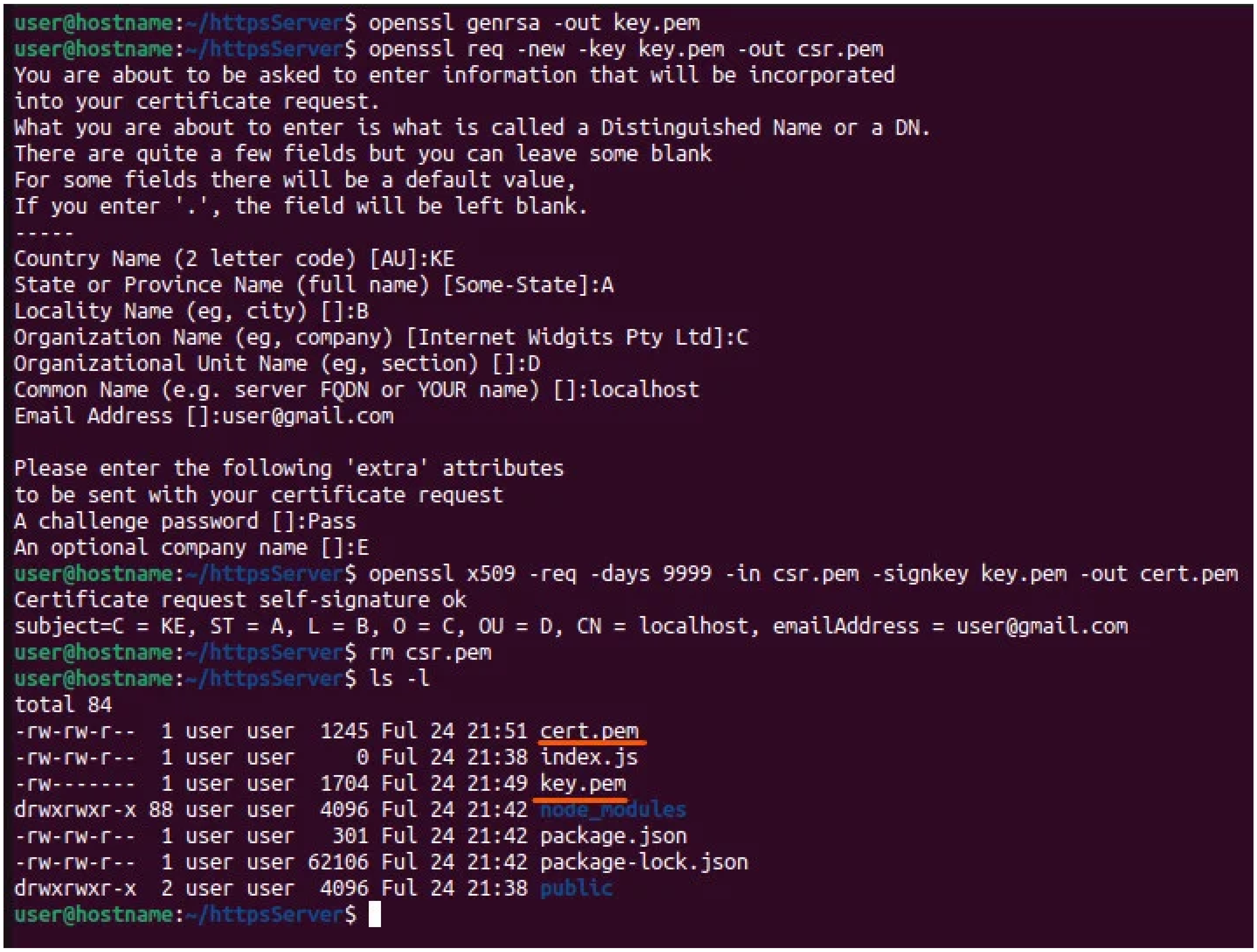

```
user@hostname:~/httpsServer$ openssl genrsa -out key.pem
user@hostname:~/httpsServer$ openssl req -new -key key.pem -out csr.pem
You are about to be asked to enter information that will be incorporated
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For some fields there will be a default value,
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-----
Country Name (2 letter code) [AU]:KE
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Organizational Unit Name (eg, section) []:D
Common Name (e.g. server FQDN or YOUR name) []:localhost
Email Address []:user@gmail.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:Pass
An optional company name []:E
user@hostname:~/httpsServer$ openssl x509 -req -days 9999 -in csr.pem -signkey key.pem -out cert.pem
Certificate request self-signature ok
subject=C = KE, ST = A, L = B, O = C, OU = D, CN = localhost, emailAddress = user@gmail.com
user@hostname:~/httpsServer$ rm csr.pem
user@hostname:~/httpsServer$ ls -l
total 84
-rw-rw-r--  1 user user  1245 Ful 24 21:51 cert.pem
-rw-rw-r--  1 user user     0 Ful 24 21:38 index.js
-rw-------  1 user user  1704 Ful 24 21:49 key.pem
drwxrwxr-x 88 user user  4096 Ful 24 21:42 node_modules
-rw-rw-r--  1 user user   301 Ful 24 21:42 package.json
-rw-rw-r--  1 user user 62106 Ful 24 21:42 package-lock.json
drwxrwxr-x  2 user user  4096 Ful 24 21:38 public
user@hostname:~/httpsServer$
```

Step~4: Create an HTTPS server

Open the project, modify the `package.json` file to accommodate ES modules and run `nodemon`.

Package.json

```
{
  "name": "httpsserver",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "type": "module",
  "scripts": {
    "dev": "nodemon index"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "dependencies": {
    "express": "^4.18.1",
    "nodemon": "^2.0.20"
  }
}
```

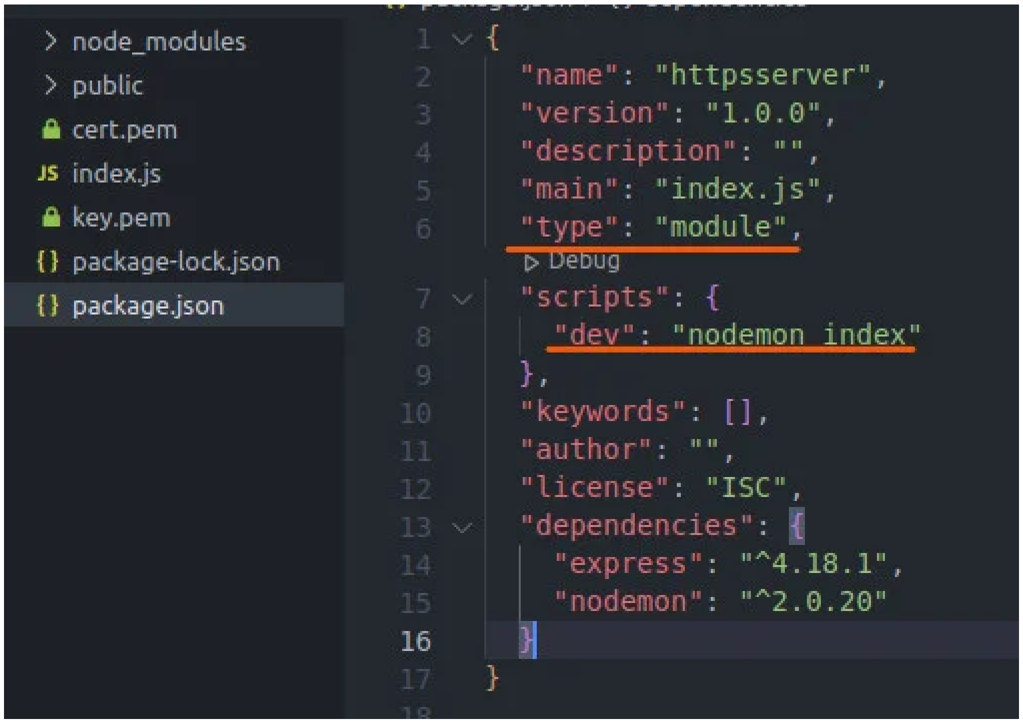
The line `"type": "module"` switches the syntax from `require` function

```
const https = require("https")
```

to ES 6's `import` keyword.

```
import https from "https"
```

The line `"dev": "nodemon index"` activates `nodemon` to watch the web server.

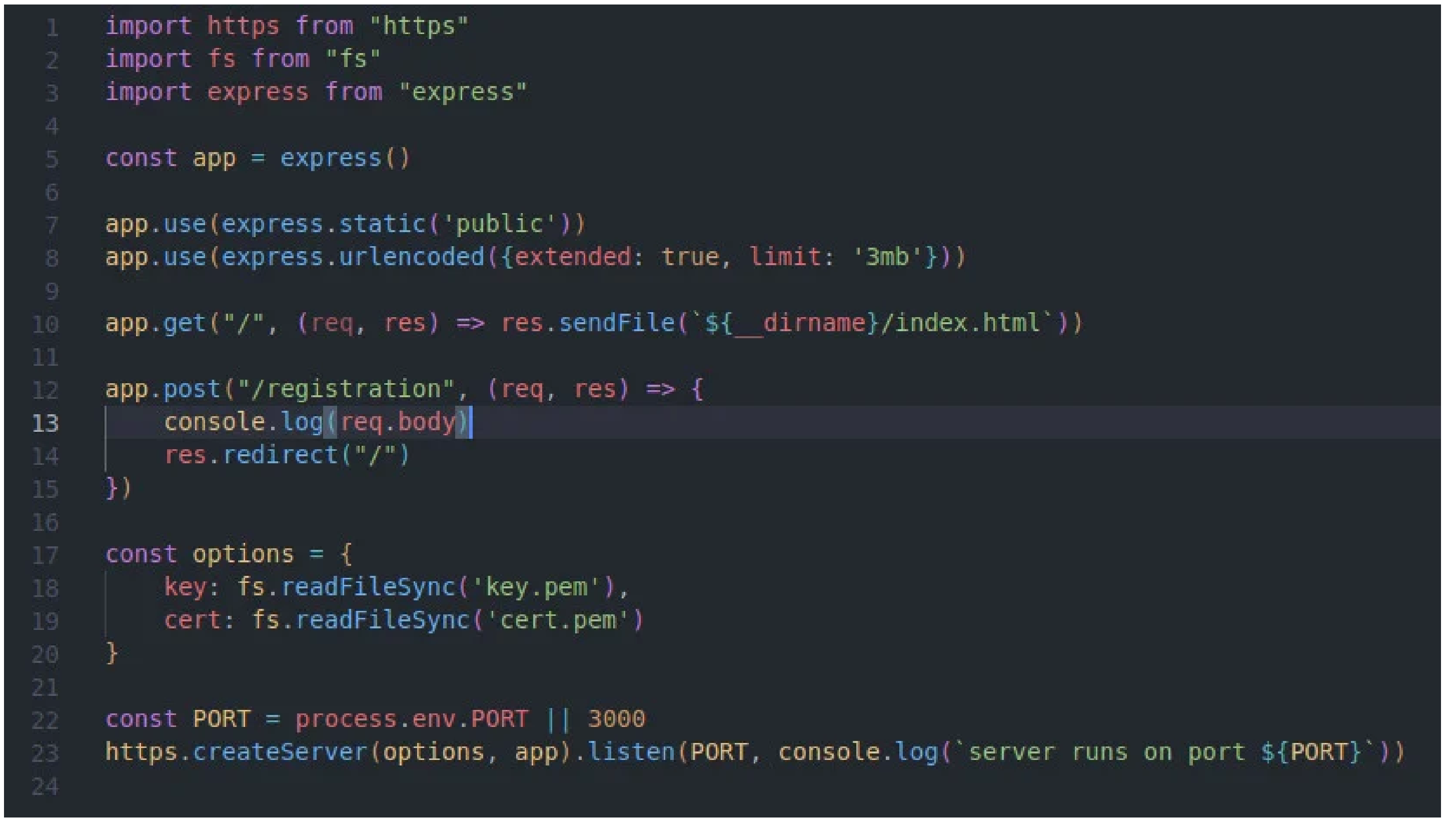


```
{
  "name": "httpsserver",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "type": "module",
  "scripts": {
    "dev": "nodemon index"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "dependencies": {
    "express": "^4.18.1",
    "nodemon": "^2.0.20"
  }
}
```

index.js

```
import https from "https"
import fs from "fs"
import express from "express"
```

```
const app = express()

app.use(express.static('public'))
app.use(express.urlencoded({extended: true, limit: '3mb'}))

app.get("/", (req, res) => res.sendFile(`${__dirname}/index.html`))

app.post("/registration", (req, res) => {
    console.log(req.body)
    res.redirect("/")
})

const options = {
    key: fs.readFileSync('key.pem'),
    cert: fs.readFileSync('cert.pem')
}

const PORT = process.env.PORT || 3000
https.createServer(options, app).listen(PORT, console.log(`server runs on port ${PORT}`))
```



```
import https from "https"
import fs from "fs"
import express from "express"

const app = express()

app.use(express.static('public'))
app.use(express.urlencoded({extended: true, limit: '3mb'}))

app.get("/", (req, res) => res.sendFile(`${__dirname}/index.html`))

app.post("/registration", (req, res) => {
    console.log(req.body)
    res.redirect("/")
})

const options = {
    key: fs.readFileSync('key.pem'),
    cert: fs.readFileSync('cert.pem')
}

const PORT = process.env.PORT || 3000
https.createServer(options, app).listen(PORT, console.log(`server runs on port ${PORT}`))
```

We import the modules.

```
import https from "https"
import fs from "fs"
import express from "express"
```

https

Advertisement

The `https` module is an improved version of the `http` module. We use it to accommodate the SSL certificate through an `options` parameter.

fs

The file system (fs) module allows reading from and writing to the disk. It gives asynchronous and synchronous (ending in Sync) control of the code execution during the respective operations. For example, the` `readFileSync()` ` method halts the execution of other code portions until the file reading process completes.

ALSO READ:

How to use JavaScript Optional Parameters? [SOLVED]

express

The `express` module is a pool of middleware. It has multiple methods that intercept requests and cc
the response. We mainly use the `express` function to create a web server and route requests to vari
destinations.

After importing the modules, we call the `express()` function.

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```
const app = express()

app.use(express.static('public'))
app.use(express.urlencoded({extended: true, limit: '3mb'}))

app.get("/", (req, res) => res.sendFile(`${__dirname}/index.html`))

app.post("/registration", (req, res) => {
    console.log(req.body)
    res.redirect("/")
})
```

We store the returned value of the function in the `app` variable. Using `express.static()` method, we let express read our static files in the `public` directory. And receive form data from index.html using the `urlencoded()` method.

We then create a route for the landing page `/` and the registration `/registration` endpoint. Upon receiving the express form body, we console-log the details before redirecting the user to the landing page.

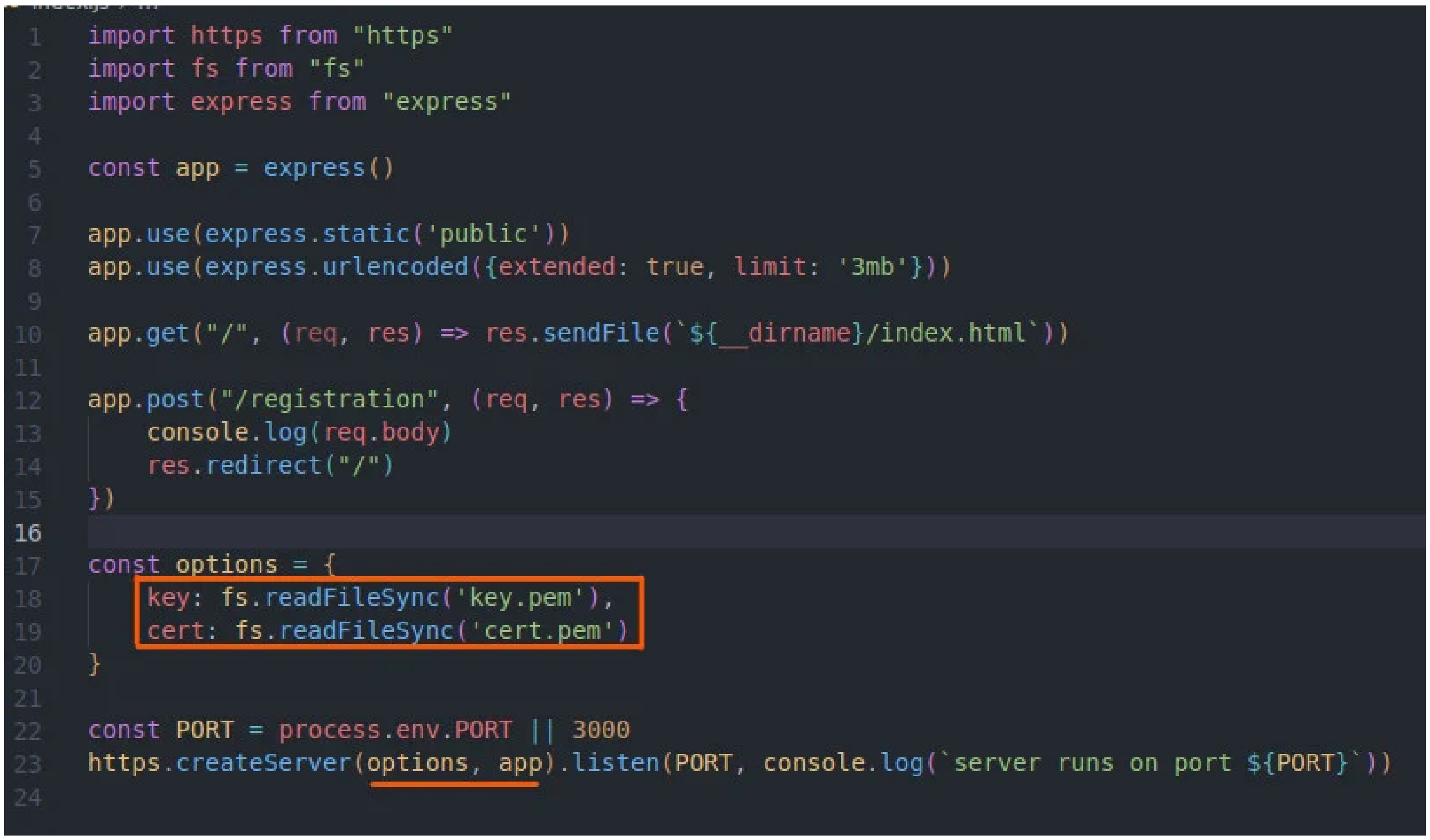
After we are done with routing, we implement the reading of the certificate information from the filesystem.

```
const options = {
    key: fs.readFileSync('key.pem'),
    cert: fs.readFileSync('cert.pem')
}
```

And use them in the HTTPS server.

```
const PORT = process.env.PORT || 3000
https.createServer(options, app).listen(PORT, console.log(`server runs on port ${PORT}`))
```

We pass the `app` and certificate details to the HTTPS server. That converts the `express` routes from running on the default HTTP server to the encrypted HTTPS server.



```
import https from "https"
import fs from "fs"
import express from "express"

const app = express()

app.use(express.static('public'))
app.use(express.urlencoded({extended: true, limit: '3mb'}))

app.get("/", (req, res) => res.sendFile(`${__dirname}/index.html`))

app.post("/registration", (req, res) => {
    console.log(req.body)
    res.redirect("/")
})

const options = {
    key: fs.readFileSync('key.pem'),
    cert: fs.readFileSync('cert.pem')
}

const PORT = process.env.PORT || 3000
https.createServer(options, app).listen(PORT, console.log(`server runs on port ${PORT}`))
```

That is all we need to create and run an HTTPS server with self-signed certificates. Now that you know how to create HTTPS Server with Node.js, let's implement the frontend to send the form data to the `/registration` endpoint.

ALSO READ:

[Getting started with NodeJS [Beginners Tutorial]]

Step~5: Send requests to the HTTPS server

index.html

Open the index.html file in the public directory and create two inputs: `text` for username and `email` for user email.

```
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <link rel="stylesheet" href="style.css">
    <title>HTTPS Server</title>
</head>
<body>

<main>

    <h2>Register</h2>

    <form action="/registration" method="POST">
        <div>
            <input type="text" name="username" placeholder="Username" required>
        </div>
        <div>
            <input type="email" name="email" placeholder="Email" required>
        </div>
        <button>Send</button>
    </form>

</main>

</body>
</html>
```

style.css

```
    color:rgb(51, 22, 51);
}
h2 {
    text-align: center;
    margin-top: 3rem;
}
main {
    text-align: center;
}
form {
    width: 50%;
    margin: 3rem auto;
}
input, button {
    height: 3rem;
    width: 80%;
    padding: 0.5rem;
    margin: .5rem 0;
    border-radius: 3px;
```

With the frontend out of the way, we can start sending requests on the HTTPS server.

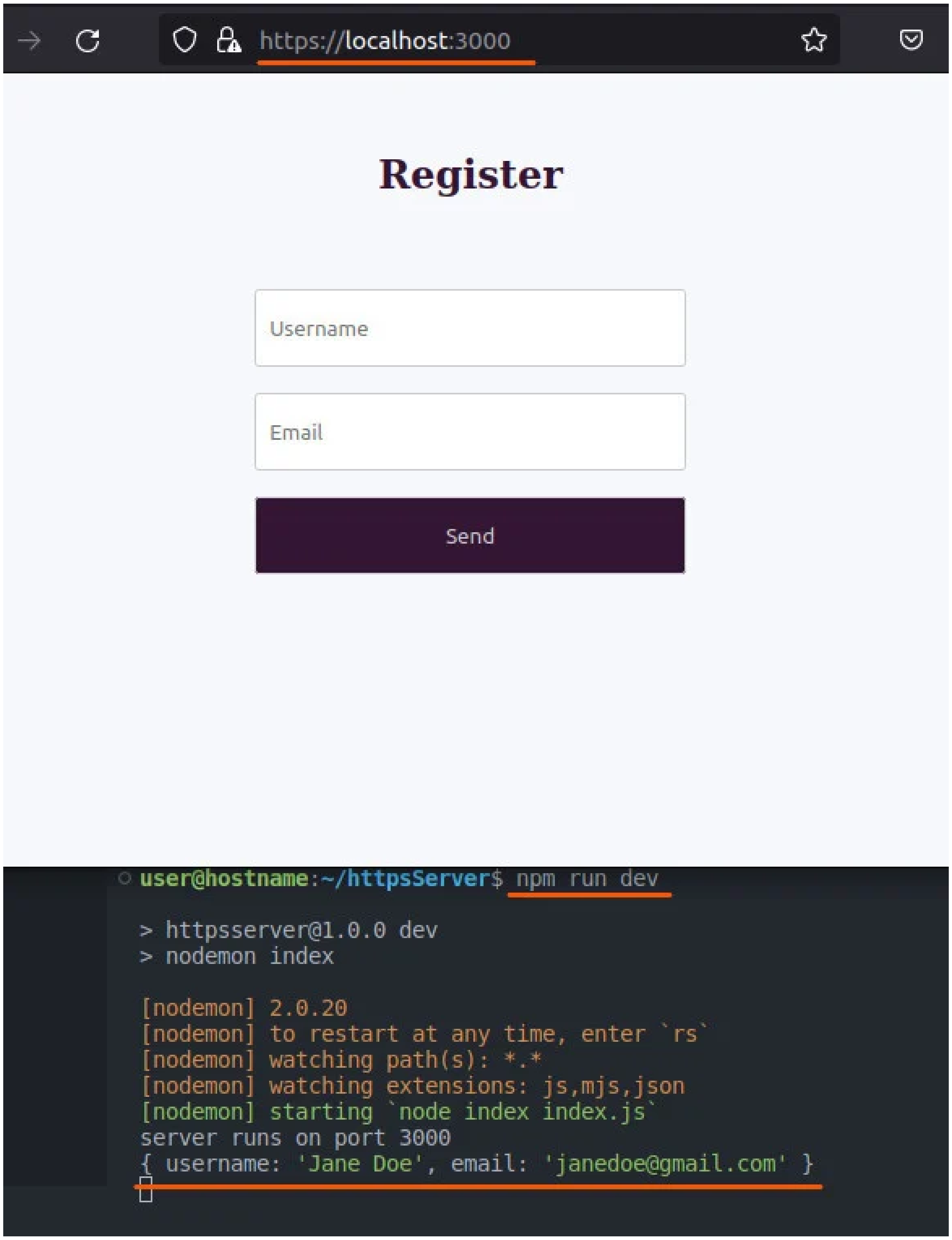
Advertisement

Start the server.

```
npm run dev
```

Open the browser through the `https://localhost:3000` URL.

Note: *The default localhost:3000 that uses HTTP won't work because our server runs on HTTPS instead.*



```
user@hostname:~/httpsServer$ npm run dev

> httpsserver@1.0.0 dev
> nodemon index

[nodemon] 2.0.20
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): *.*
[nodemon] watching extensions: js,mjs,json
[nodemon] starting `node index index.js`
server runs on port 3000
{ username: 'Jane Doe', email: 'janedoe@gmail.com' }
```

Although we use the encrypted channel, most browsers may warn that the site is unsafe because the SSL certificate is self-signed, not signed by a Certificate Authority (CA) like Let's Encrypt. That calls for using a CA-signed certificate in production, often sold by the domain provider.

ALSO READ:

How to use JavaScript toFixed() Method? [SOLVED]

Conclusion

This tutorial showed you how to create HTTPS Server with Node.js in 5 straightforward steps. You generated a self-signed SSL certificate and used it in an HTTPS server built with the `https` , `fs` , and `express` modules.

NodeJS

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