Build A Group-Chat App in 30 Lines Using Node.js

A simple and (hopefully) to-the-point tutorial to build your first group-chat application using Node.js in less than 30 lines of code.

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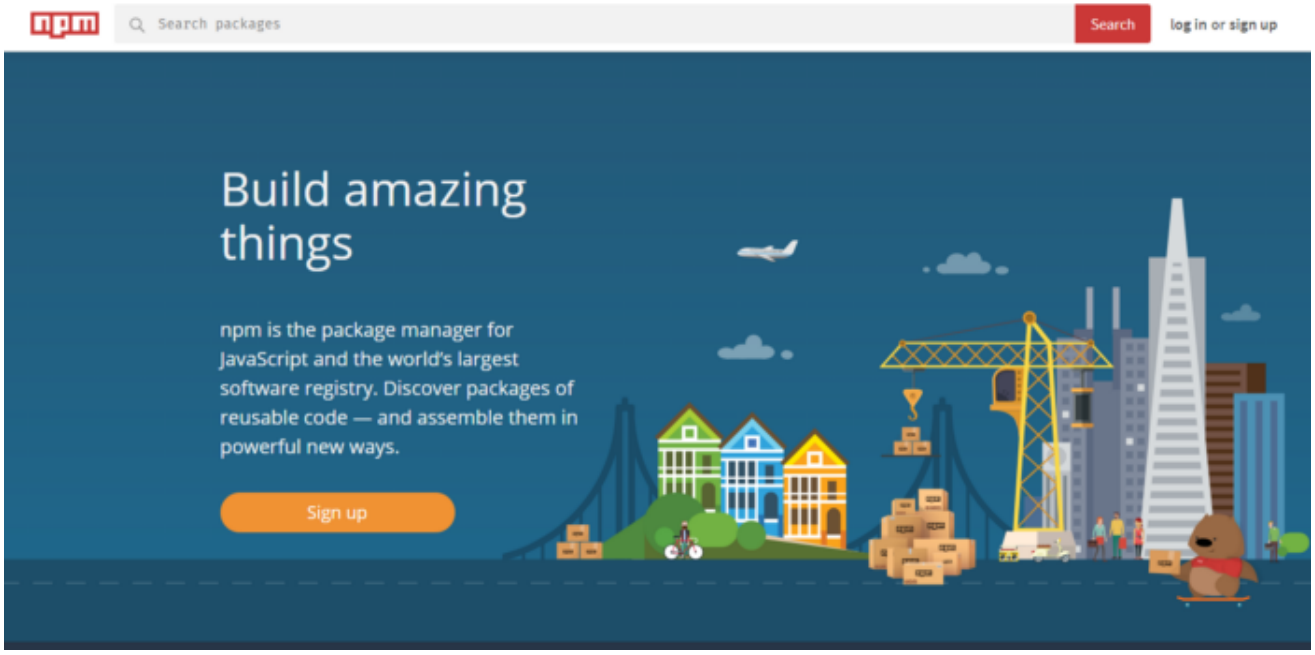
Node.js is arguably one of the most powerful JavaScript runtime environment that most people use nowadays to build server-side applications. Node.js is built on Google V8 JavaScript Engine, an open source high-performance JavaScript and WebAssembly engine. The V8 implements ECMAScript and WebAssembly, and runs on Windows 7 or later, macOS 10.12+, and Linux systems that use x64, IA-32, ARM, or MIPS processors. V8 can run standalone, or can be embedded into any C++ application.

Thank's to the community, there are a lot of Node.js modules we can use freely that will help (of not speed-up) you to get the things done. You can use the mighty `npm install` to install all your needed modules, where you can browse them here. This article will not cover on how to install Node.js and NPM on your local machine, there are already millions of tutorials in the wild, go find one that suits you.



NPM official website

In this article, I am going to show to how to build your first simple group chat using Node.js and Socket.io module. Socket.io is a Node.js module that enables real-time, bidirectional and event-based communication. It works on every platform, browser or device, focusing equally on reliability and speed. Some Socket.io usage examples:

- Real-time analytics
- Binary streaming
- Instant messaging and chat
- Document collaboration (think about Google Docs)

Let's get started!

Note: all these code is available on my GitHub, you can clone them here: https://github.com/dkhd/node-group-chat

Before we begin, I assume you are already understand and familiar with *command line interface (CLI)* since we are going to use it in this tutorial. If you do not feel comfortable to be around it, I tell you, it is worth learning.

1. Create the working directory

At first, let's create our working directory, where we will put all of our codes and assets. Use this command to create our working directory:

```
$ mkdir node-group-chat
```

.. and then change our directory to our newly created working directory:

```
$ cd node-group-chat
```

2. Initiate the project

By using `npm` command, we can initiate our project easily to create a file called `package.json`. If you wonder what a `package.json` is, it is a manifest file for the project that will store the project-related information e.g. author name, version, etc.

You can initiate the project by typing:

```
$ npm init
```

.. and follow the guidance that appears in your terminal.

3. Install modules

In this project, we are going to use at least two Node.js modules that we can easily install using NPM.

- ***Express*** — Express is lightweight web application framework for Node.js. For this simple group chat, it is not necessary to use Express, but if you are planning to continue the development, this is nice to have.
- ***Socket.io*** — Socket.io is the key module in this tutorial which enables the realtime communication between the clients and the server.
- ***EJS*** — EJS (Embedded JavaScript) is a simple templating language that lets you generate HTML markup for your front-end.

You can install those modules using these command:

```
$ npm install express
```

and

```
$ npm install socket.io
```

and

```
$ npm install ejs
```

After all those process finished, your modules will be located under `node_modules/` directory.

4. Do the code

Let's get our hand dirty.

Create a file named `index.js` (or whatever you defined in the `package.json`), and start importing the needed modules: `express`, `http`, and `socket.io`.

```
1  const express = require('express');
2  const app = express();
3  const http = require('http').Server(app);
4  const io = require('socket.io')(http);
```

import modules hosted with ❤ by **GitHub** **view raw**

After you are done importing the modules, the next step is serving the front-end code and make sure the Node.js is running and we can access it from our browser (in this case

I will use port `8080`).

```
const express = require('express');
const app = express();
const http = require('http').Server(app);
const io = require('socket.io')(http);

app.get('/', function(req, res) {
    res.send('Hello world!');
});

const server = http.listen(8080, function() {
    console.log('listening on *:8080');
});
```

basic index.js hosted with ❤ by **GitHub** **view raw**

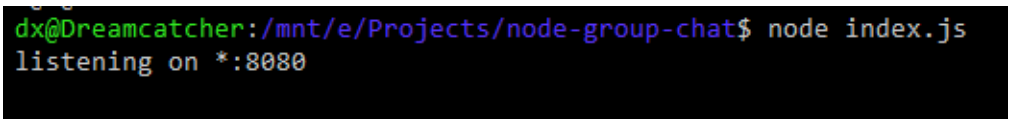
This function..

```
app.get('/', function(req, res) {
    res.send('Hello world!');
});
```

..is being used to serve the users every time they access our application, and shows `Hello world!` in their browser.

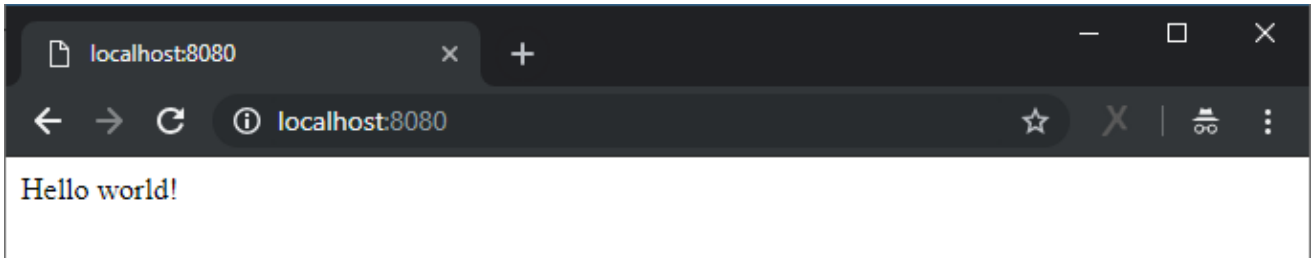
To start the application, you can type this in your terminal and hit the enter button:

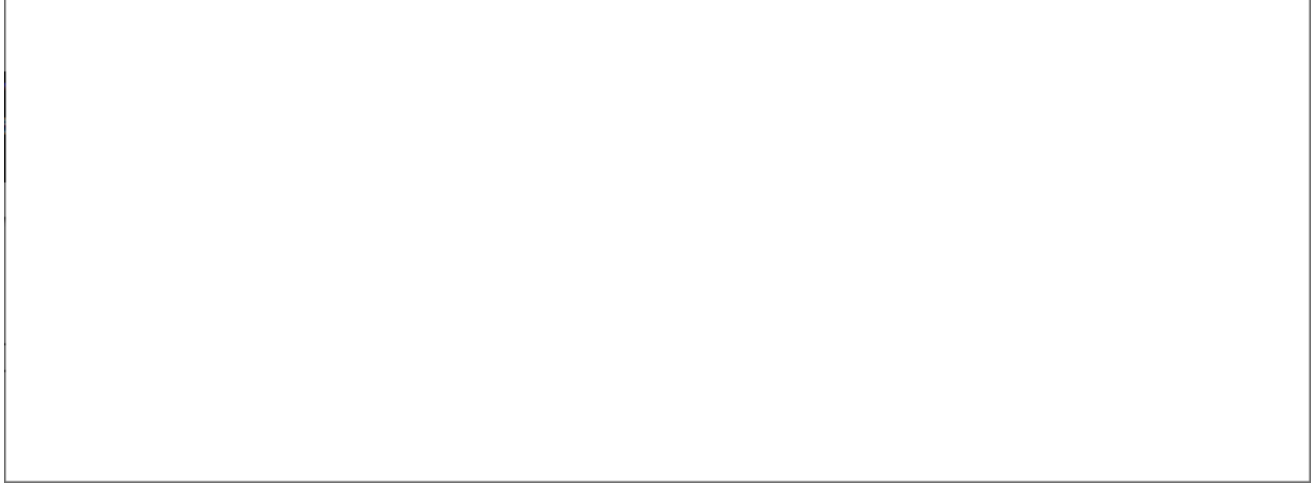
```
$ node index.js
```



This is what we see in the terminal when we run the application

And we can access our application through the web browser on this URL:
`http://localhost:8080`





Accessing our application from the browser

But in the next line of code, instead of using `res.send('Hello World!');`, we will replace it with something like `res.render('index.ejs');` and we are going to use EJS to build our front-end view

Now, create a new directory called `views/` and create an empty file called `index.ejs` inside the `views/` directory. You can now put these lines of code into your new `index.ejs` file.

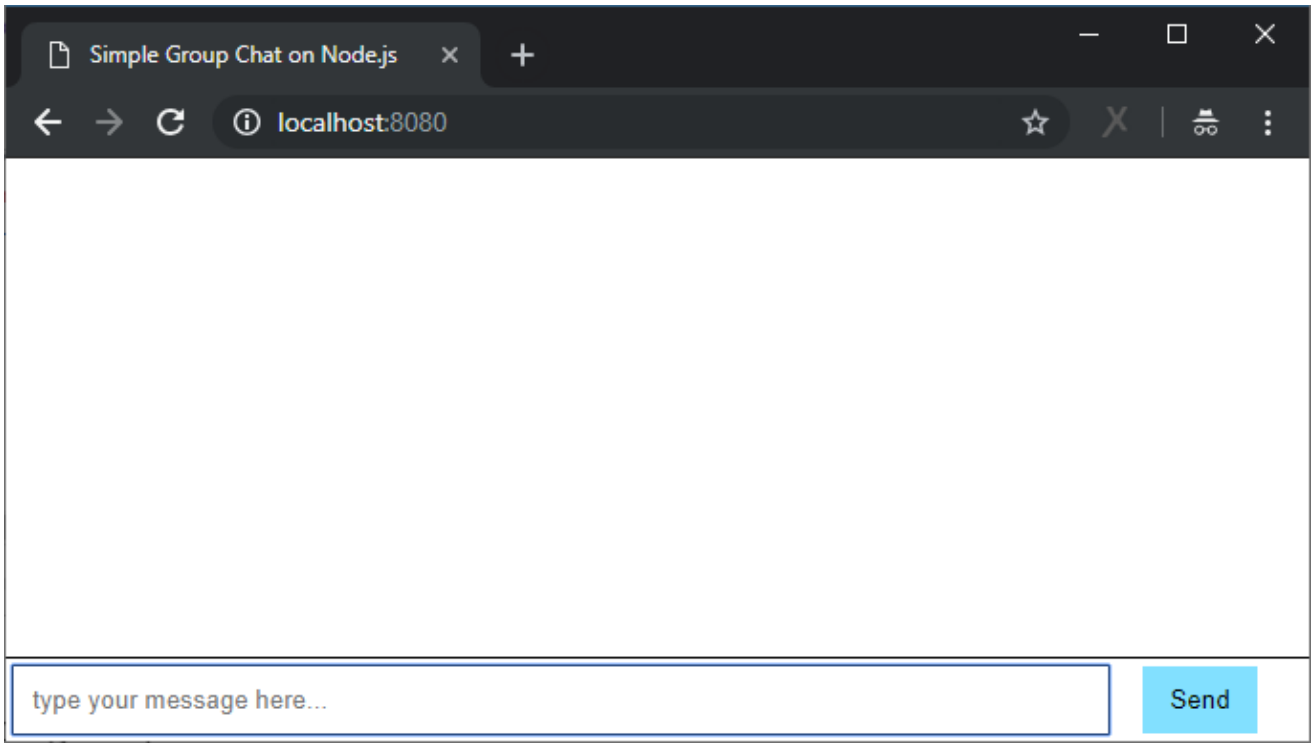
> *Do not forget to change your `res.send('Hello World!');` line in `index.js` into `res.render('index.ejs');` or your code would not work.*

```
<!DOCTYPE html>
<html>
  <head>
    <title>Simple Group Chat on Node.js</title>
    <style>
        * { margin: 0; padding: 0; box-sizing: border-box; }
        body { font: 13px Helvetica, Arial; }
        form { background: #fff; padding: 3px; position: fixed; bottom: 0; width: 100%;
        form input { border-style: solid; border-width: 1px; padding: 10px; width: 85%;
        form button { width: 9%; background: rgb(130, 224, 255); border: none; padding:
        #messages { list-style-type: none; margin: 0; padding: 0; }
        #messages li { padding: 5px 10px; }
        #messages li:nth-child(odd) { background: #eee; }
    </style>
    <script src="http://code.jquery.com/jquery-1.10.1.min.js"></script>
  </head>
  <body>
    <ul id="messages"></ul>
    <form action="/" method="POST" id="chatForm">
      <input id="txt" autocomplete="off" autofocus="on" placeholder="type your message h
    </form>
    <script>
```

```
        // submit text message without reload/refresh the page
        $('form').submit(function(e){
            e.preventDefault(); // prevents page reloading
            $('#txt').val('');
            return false;
        });
    </script>
  </body>
</html>
```

basic index.ejs hosted with ❤ by GitHub view raw

The code above does nothing but provides us with the basic chat user interface like this.



Our chat user interface that still doesn't work

While working on Socket.io, we are dealing with two files at the same time:

- The server app file (e.g. index.js)
- The client front-end file (e.g. index.ejs)

By using Socket.io, basically we are creating a "tunnel" between the server and client with continuous real-time connection. In the server file, simply put this code:

```
io.sockets.on('connection', function(socket) {
    // write all the realtime communication functions here
});
```

so our full `index.js` looks like this:

```
const express = require('express');
const app = express();
const http = require('http').Server(app);
const io = require('socket.io')(http);

app.get('/', function(req, res) {
    res.render('index.ejs');
});

io.sockets.on('connection', function(socket) {
    socket.on('username', function(username) {
        socket.username = username;
        io.emit('is_online', '🔵 <i>' + socket.username + ' join the chat..</i>');
    });

    socket.on('disconnect', function(username) {
        io.emit('is_online', '🔴 <i>' + socket.username + ' left the chat..</i>');
    })

    socket.on('chat_message', function(message) {
        io.emit('chat_message', '<strong>' + socket.username + '</strong>: ' + message);
    });

});

const server = http.listen(8080, function() {
    console.log('listening on *:8080');
});
```

index.js hosted with ❤ by **GitHub** **view raw**

The server-side Node.js code is not more than 30 lines, isn't it? 😉

And now, we are going to modify our front-end file, so it will ask the username when users open the page, and open the communication socket with the server app.

So our `index.ejs` looks like this:

```
<!DOCTYPE html>
<html>
  <head>
    <title>Simple Group Chat on Node.js</title>
    <style>
```

```
        * { margin: 0; padding: 0; box-sizing: border-box; }
        body { font: 13px Helvetica, Arial; }
        form { background: #fff; padding: 3px; position: fixed; bottom: 0; width: 100%;
        form input { border-style: solid; border-width: 1px; padding: 10px; width: 85%;
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        #messages { list-style-type: none; margin: 0; padding: 0; }
        #messages li { padding: 5px 10px; }
        #messages li:nth-child(odd) { background: #eee; }
    </style>
    <script src="../../socket.io/socket.io.js"></script>
    <script src="http://code.jquery.com/jquery-1.10.1.min.js"></script>
  </head>
  <body>
    <ul id="messages"></ul>
    <form action="/" method="POST" id="chatForm">
      <input id="txt" autocomplete="off" autofocus="on" oninput="isTyping()" placeholder
    </form>
    <script>
            var socket = io.connect('http://localhost:8080');

            // submit text message without reload/refresh the page
            $('form').submit(function(e){
                e.preventDefault(); // prevents page reloading
                socket.emit('chat_message', $('#txt').val());
                $('#txt').val('');
                return false;
            });

            // append the chat text message
            socket.on('chat_message', function(msg){
                $('#messages').append($('<li>').html(msg));
            });

            // append text if someone is online
            socket.on('is_online', function(username) {
                $('#messages').append($('<li>').html(username));
            });

            // ask username
            var username = prompt('Please tell me your name');
            socket.emit('username', username);

    </script>
  </body>
</html>
```

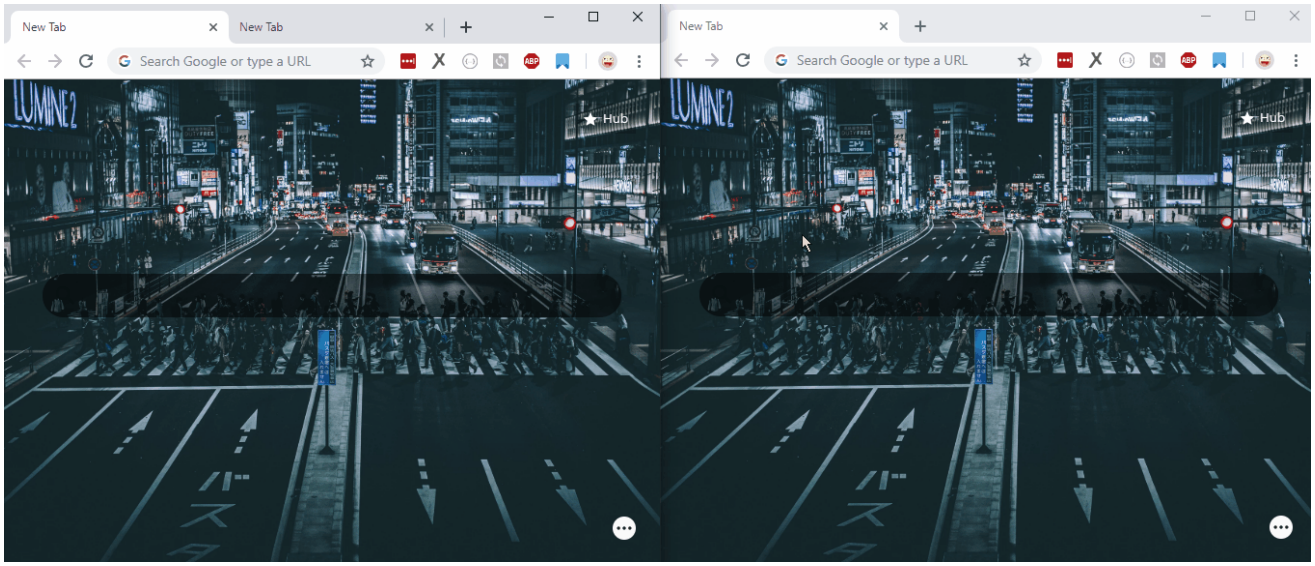
index.ejs hosted with ❤ by **GitHub** **view raw**

5. The Result

If you are done with the code, try to run your code using:

```
$ node index.js
```

and head to your browser and open `http://localhost:8080`. You can open more than one tab to see how it works, or see the GIF below:



The result of group-chat app

. . .

Based on this experience, you should now understand the basic of a chat application using Node.js and Socket.io. There are a lot of things you can do to improve this code e.g.:

- Add typing notification (*someone is typing*…)
- Add emoji or emoticon
- Saving it to the database
- Etc. The limit is your imagination.

What do you think? Leave your comments below.

Full source code on GitHub: https://github.com/dkhd/node-group-chat

Nodejs Chat Socketio Backend Programming