Node js

Node.js is an open source server environment.

Node.js allows you to run JavaScript on the server.

```
var http = require('http');

http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/plain'});
  res.end('Hello World!');
}).listen(8080);
```

Output:

Hello World!

What Can Node.js Do?

- Node.js can generate dynamic page content
- Node.js can create, open, read, write, delete, and close files on the server
- Node.js can collect form data
- Node.js can add, delete, modify data in your database

Getting Started

Create a Node.js file named "myfirst.js", and add the following code:

myfirst.js

```
var http = require('http');

http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/html'});
  res.end('Hello World!');
}).listen(8080);
```

How to open the command line interface on your computer depends on the operating system. For Windows users, press the start button and look for "Command Prompt", or simply write "cmd" in the search field.

Navigate to the folder that contains the file "myfirst.js", the command line interface window should look something like this:

```
C:\Users\Your Name>_
```

Initiate "myfirst.js":

```
C:\Users\Your Name>node myfirst.js
```

If anyone tries to access your computer on port 8080, they will get a "Hello World!" message in return!

Start your internet browser, and type in the address: http://localhost:8080

Include Modules

```
var http = require('http');
```

Now your application has access to the HTTP module, and is able to create a server:

```
http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/html'});
  res.end('Hello World!');
}).listen(8080);
```

Create Your Own Modules

Example

Create a module that returns the current date and time:

```
exports.myDateTime = function () {
  return Date();
};
```

Include Your Own Module

```
var http = require('http');
var dt = require('./myfirstmodule');

http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/html'});
  res.write("The date and time is currently: " + dt.myDateTime());
  res.end();
}).listen(8080);
```

Output:

```
The date and time are currently Thu Jul 11 2024 13:36:13 GMT+0530 (India
Standard Time)
```

The Built-in HTTP Module

To include the HTTP module, use the `require()` method:

```
var http = require('http');
```

Node.js as a Web Server

Use the `createServer()` method to create an HTTP server:

```
var http = require('http');


//create a server object:
http.createServer(function (req, res) {
  res.write('Hello World!'); //write a response to the client
  res.end(); //end the response
}).listen(8080); //the server object listens on port 8080
```

Output:

```
Hello World!
```

Add an HTTP Header

```
var http = require('http');

http.createServer(function (req, res) {
  // add a HTTP header:
  res.writeHead(200, {'Content-Type': 'text/html'});
  res.write('Hello World!');
  res.end();
}).listen(8080);
```

Output:

```
Hello World!
```

Read the Query String

demo_http_url.js

```
var http = require('http');
http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/html'});
  res.write(req.url);
  res.end();
}).listen(8080);
```

Split the Query String

```
var http = require('http');
var url = require('url');

http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/html'});
  var q = url.parse(req.url, true).query;
  var txt = q.year + " " + q.month;
  res.end(txt);
}).listen(8080);
```

Node.js as a File Server

Common use for the File System module:

- Read files
- Create files
- Update files
- Delete files
- Rename files

Read Files

The `fs.readFile()` method is used to read files on your computer.

demofile1.html

```
<html>
<body>
<h1>My Header</h1>
<p>My paragraph.</p>
</body>
</html>
```

Example

```
var http = require('http');
var fs = require('fs');
http.createServer(function (req, res) {
  fs.readFile('demofile1.html', function(err, data) {
    res.writeHead(200, {'Content-Type': 'text/html'});
    res.write(data);
    return res.end();
  });
}).listen(8080)
```

Output:

My Header

My paragraph.

Create Files

- `fs.appendFile()`
- `fs.open()`
- `fs.writeFile()`

-
  ```
  var fs = require('fs');

  fs.appendFile('mynewfile1.txt', 'Hello content!', function (err) {
    if (err) throw err;
    console.log('Saved!');
  });
  ```

Output:

```
Saved!
```

Create a new, empty file using the open() method:

```
var fs = require('fs');

fs.open('mynewfile2.txt', 'w', function (err, file) {
  if (err) throw err;
  console.log('Saved!');
});
```

Create a new file using the writeFile() method:

```
var fs = require('fs');

fs.writeFile('mynewfile3.txt', 'Hello content!', function (err) {
  if (err) throw err;
  console.log('Saved!');
});
```

Update Files

- `fs.appendFile()`
- `fs.writeFile()`

Append "This is my text." to the end of the file "mynewfile1.txt":

```
var fs = require('fs');

fs.appendFile('mynewfile1.txt', ' This is my
text.', function (err) {
  if (err) throw err;
  console.log('Updated!');
});
```

Output:

```
Updated!
```

Replace the content of the file "mynewfile3.txt":

```
var fs = require('fs');

fs.writeFile('mynewfile3.txt', 'This is my text', function (err) {
  if (err) throw err;
  console.log('Replaced!');
});
```

Delete Files

Delete "mynewfile2.txt":

```
var fs = require('fs');

fs.unlink('mynewfile2.txt', function (err) {
  if (err) throw err;
  console.log('File deleted!');
});
```

Rename Files

Rename "mynewfile1.txt" to "myrenamedfile.txt":

```
var fs = require('fs');

fs.rename('mynewfile1.txt', 'myrenamedfile.txt', function (err) {
  if (err) throw err;
  console.log('File Renamed!');
});
```

The Built-in URL Module

Split a web address into readable parts:

```
var url = require('url');
var adr = 'http://localhost:8080/default.htm?year=2017&month=february';
var q = url.parse(adr, true);

console.log(q.host); //returns 'localhost:8080'
console.log(q.pathname); //returns '/default.htm'
console.log(q.search); //returns '?year=2017&month=february'

var qdata = q.query; //returns an object: { year: 2017, month:
'february' }
console.log(qdata.month); //returns 'febr
```

Output;

```
localhost:8080
/default
?year=2017&month=february
february
```

Node.js File Server

summer.html

```
<!DOCTYPE html>
<html>
<body>
<h1>Summer</h1>
<p>I love the sun!</p>
</body>
</html>
```

winter.html

```
<!DOCTYPE html>
<html>
<body>
<h1>Winter</h1>
<p>I love the snow!</p>
</body>
</html>
```

Create a Node.js file that opens the requested file and returns the content to the client. If anything goes wrong, throw a 404 error:

demo_fileserver.js:

```
var http = require('http');
var url = require('url');
var fs = require('fs');

http.createServer(function (req, res) {
  var q = url.parse(req.url, true);
  var filename = "." + q.pathname;
  fs.readFile(filename, function(err, data) {
    if (err) {
      res.writeHead(404, {'Content-Type': 'text/html'});
      return res.end("404 Not Found");
    }
    res.writeHead(200, {'Content-Type': 'text/html'});
    res.write(data);
    return res.end();
  });
}).listen(8080);
```

Remember to initiate the file:

Initiate demo_fileserver.js:

```
C:\Users\Your Name>node demo_fileserver.js
```

http://localhost:8080/summer.html

Will produce this result:

Summer

I love the sun!

http://localhost:8080/winter.html

Will produce this result:

Winter

I love the snow!

Node.js NPM

NPM is a package manager for Node.js packages, or modules if you like.

www.npmjs.com hosts thousands of free packages to download and use.

The NPM program is installed on your computer when you install Node.js

Download a Package

I want to download a package called "upper-case":

Download "upper-case":

```
C:\Users\Your Name>npm install upper-case
```

My project now has a folder structure like this:

```
C:\Users\My Name\node_modules\upper-case
```

Using a Package

```
var http = require('http');
var uc = require('upper-case');
http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/html'});
  /*Use our upper-case module to upper case a string:*/
  res.write(uc.upperCase("Hello World!"));
  res.end();
}).listen(8080);
```

Output:

```
HELLO WORLD!
```

Events in Node.js

```
var fs = require('fs');
var rs = fs.createReadStream('./demofile.txt');
rs.on('open', function () {
  console.log('The file is open');
});
```

Events Module

```
var events = require('events');
var eventEmitter = new events.EventEmitter();
```

The EventEmitter Object

```
var events = require('events');
var eventEmitter = new events.EventEmitter();

//Create an event handler:
var myEventHandler = function () {
  console.log('I hear a scream!');
}
```

```
//Assign the event handler to an event:
eventEmitter.on('scream', myEventHandler);

//Fire the 'scream' event:
eventEmitter.emit('scream');
```

Output:

```
I hear a scream!
```

Node.js Upload Files

Step 1: Create an Upload Form

This code will produce an HTML form:

```
var http = require('http');

http.createServer(function (req, res) {
  res.writeHead(200, {'Content-Type': 'text/html'});
  res.write('<form action="fileupload" method="post"
enctype="multipart/form-data">');
  res.write('<input type="file" name="filetoupload"><br>');
  res.write('<input type="submit">');
  res.write('</form>');
  return res.end();
}).listen(8080);
```

Step 2: Parse the Uploaded File

The file will be uploaded, and placed on a temporary folder:

```
var http = require('http');
var formidable = require('formidable');

http.createServer(function (req, res) {
  if (req.url == '/fileupload') {
    var form = new formidable.IncomingForm();
    form.parse(req, function (err, fields, files) {
      res.write('File uploaded');
      res.end();
    });
  } else {
    res.writeHead(200, {'Content-Type': 'text/html'});
    res.write('<form action="fileupload" method="post"
enctype="multipart/form-data">');
    res.write('<input type="file" name="filetoupload"><br>');
    res.write('<input type="submit">');
    res.write('</form>');
    return res.end();
  }
}).listen(8080);
```

Step 3: Save the File

nclude the fs module, and move the file to the current folder:

```
var http = require('http');
var formidable = require('formidable');
var fs = require('fs');

http.createServer(function (req, res) {
  if (req.url == '/fileupload') {
    var form = new formidable.IncomingForm();
    form.parse(req, function (err, fields, files) {
      var oldpath = files.filetoupload.filepath;
      var newpath = 'C:/Users/Your Name/' +
files.filetoupload.originalFilename;
      fs.rename(oldpath, newpath, function (err) {
        if (err) throw err;
        res.write('File uploaded and moved!');
        res.end();
      });
 });
  } else {
    res.writeHead(200, {'Content-Type': 'text/html'});
    res.write('<form action="fileupload" method="post"
enctype="multipart/form-data">');
    res.write('<input type="file" name="filetoupload"><br>');
    res.write('<input type="submit">');
    res.write('</form>');
    return res.end();
  }
}).listen(8080);
```

Node.js Send an Email

```
var nodemailer = require('nodemailer');

var transporter = nodemailer.createTransport({
  service: 'gmail',
  auth: {
    user: 'youremail@gmail.com',
    pass: 'yourpassword'
  }
});
```

```
var mailOptions = {
  from: 'youremail@gmail.com',
  to: 'myfriend@yahoo.com',
  subject: 'Sending Email using Node.js',
  text: 'That was easy!'
};

transporter.sendMail(mailOptions, function(error, info){
  if (error) {
    console.log(error);
  } else {
    console.log('Email sent: ' + info.response);
  }
});
```

Multiple Receivers

Send email to more than one address:

```
var mailOptions = {
  from: 'youremail@gmail.com',
  to: 'myfriend@yahoo.com, myotherfriend@yahoo.com',
  subject: 'Sending Email using Node.js',
  text: 'That was easy!'
}
```

Send HTML

Send email containing HTML:

```
var mailOptions = {
  from: 'youremail@gmail.com',
  to: 'myfriend@yahoo.com',
  subject: 'Sending Email using Node.js',
  html: '<h1>Welcome</h1><p>That was easy!</p>'
}
```