



Node

An introduction to Node

Duration: 30 minutes

Q&A: 5 minutes by the end of the lecture

Intro to Node - What We'll Cover

- An Overview of Node
- Node Modules and the CommonJS Pattern
- External Modules and npm
- Debugging Node

What is Node ?

It's just a JavaScript interpreter!

What is Node ?

Node.js is a cross-platform runtime environment and a library for running applications written in JavaScript outside the browser (for example, on the server).

It uses non-blocking I/O and asynchronous events to create a highly performant environment built on Google's V8 engine.

The Node REPL (Read, Eval, Print, Loop)

Terminal

```
~ user$ node
> console.log('This is the Node REPL')
This is the Node REPL
undefined
>
```

Running Applications with Node

hello.js

```
console.log('GREETINGS, HUMAN');  
console.log('YOU MAY ADDRESS ME AS NODE.');
```

Terminal

```
~ user$ node hello.js  
GREETINGS, HUMAN  
YOU MAY ADDRESS ME AS NODE.  
~ user$
```

Intro to Node

- An Overview of Node
- **Node Modules and the CommonJS Pattern**
- External Modules and npm
- Debugging Node

The CommonJS Pattern

- A contract for writing modular JavaScript
- Each module is created within its own file with an isolated scope
- The author of the module can specify exactly what functionality needs to be exposed

Using Node modules

require()	A method used to import another module's functionality into the focal module
exports	An object used to expose parts of the focal module's functionality to other modules

Authoring a module

Using a module

Authoring a module



Using a module

Authoring a module

phone.js

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';
```

Using a module

Authoring a module

phone.js

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};
```

Using a module

Authoring a module

phone.js

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};  
  
var dial = function(number){  
  console.log('calling ' + number);  
};
```

Using a module

Authoring a module

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};  
  
var dial = function(number){  
  console.log('calling ' + number);  
};  
  
exports.myNumber = myNumber;  
exports.answer = answer;  
exports.dial = dial;
```

phone.js

Using a module

Authoring a module

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};  
  
var dial = function(number){  
  console.log('calling ' + number);  
};  
  
exports.myNumber = myNumber;  
exports.answer = answer;  
exports.dial = dial;
```

phone.js

Using a module

app.js

Authoring a module

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};  
  
var dial = function(number){  
  console.log('calling ' + number);  
};  
  
exports.myNumber = myNumber;  
exports.answer = answer;  
exports.dial = dial;
```

phone.js

Using a module

```
var telephone = require('./phone');
```

app.js

Authoring a module

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};  
  
var dial = function(number){  
  console.log('calling ' + number);  
};  
  
exports.myNumber = myNumber;  
exports.answer = answer;  
exports.dial = dial;
```

phone.js

Using a module

```
var telephone = require('./phone');  
  
console.log(telephone.myNumber);  
telephone.answer();  
telephone.dial('634-5789');
```

app.js

Authoring a module

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};  
  
var dial = function(number){  
  console.log('calling ' + number);  
};
```

phone.js

```
exports.myNumber = myNumber;  
exports.answer = answer;  
exports.dial = dial;
```

Using a module

```
var telephone = require('./phone');  
  
console.log(telephone.myNumber);  
telephone.answer();  
telephone.dial('634-5789');
```

app.js

Exposed Functionality
available to other modules

Authoring a module

phone.js

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};  
  
var dial = function(number){  
  console.log('calling ' + number);  
};  
  
exports.myNumber = myNumber;  
exports.answer = answer;  
exports.dial = dial;
```

Authoring a module

phone.js

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){  
  console.log(greeting);  
};  
  
var dial = function(number){  
  console.log('calling ' + number);  
};  
  
module.exports.myNumber = myNumber;  
module.exports.answer = answer;  
module.exports.dial = dial;
```

Authoring a module

phone.js

```
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){...};  
  
var dial = function(number){...};  
  
module.exports.myNumber = myNumber;  
module.exports.answer = answer;  
module.exports.dial = dial;
```

Note:
answer and
dial functions
have been
collapsed

Authoring a module

```
FUNCTION (MODULE) {  
  VAR EXPORTS = MODULE.EXPORTS = { };  
  
  var greeting = 'Ahoy-hoy';  
  var myNumber = '867-5309';  
  
  var answer = function(){...};  
  
  var dial = function(number){...};  
  
  module.exports.myNumber = myNumber;  
  module.exports.answer = answer;  
  module.exports.dial = dial;  
  
  RETURN MODULE.EXPORTS;  
}
```

phone.js

Note:
answer and
dial functions
have been
collapsed

Authoring a module

```
FUNCTION (MODULE) {  
  VAR EXPORTS = MODULE.EXPORTS = { };  
  
  var greeting = 'Ahoy-hoy';  
  var myNumber = '867-5309';  
  
  var answer = function(){...};  
  
  var dial = function(number){...};  
  
  module.exports.myNumber = myNumber;  
  module.exports.answer = answer;  
  module.exports.dial = dial;  
  
  RETURN MODULE.EXPORTS;  
}
```

phone.js

Note:
answer and
dial functions
have been
collapsed

Authoring a module

```
FUNCTION (MODULE) {  
  VAR EXPORTS = MODULE.EXPORTS = { };  
  
  var greeting = 'Ahoy-hoy';  
  var myNumber = '867-5309';  
  
  var answer = function(){...};  
  
  var dial = function(number){...};  
  
  module.exports.myNumber = myNumber;  
  module.exports.answer = answer;  
  module.exports.dial = dial;  
  
  RETURN MODULE.EXPORTS;  
}
```

phone.js



```
VAR EXPORTS = (MODULE.EXPORTS = { });
```

Note:
answer and
dial functions
have been
collapsed

Authoring a module

```
FUNCTION (MODULE) {  
VAR EXPORTS = MODULE.EXPORTS = { };  
  
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){...};  
  
var dial = function(number){...};  
  
module.exports.myNumber = myNumber;  
module.exports.answer = answer;  
module.exports.dial = dial;  
  
RETURN MODULE.EXPORTS;  
}
```

phone.js

Using a module

```
FUNCTION (MODULE) {  
VAR EXPORTS = MODULE.EXPORTS = { };  
  
var greeting = 'Ahoy-hoy';  
var myNumber = '867-5309';  
  
var answer = function(){...};  
  
var dial = function(number){...};  
  
module.exports.myNumber = myNumber;  
module.exports.answer = answer;  
module.exports.dial = dial;  
  
RETURN MODULE.EXPORTS;  
}
```

phone-2.js

Authoring a module

```
FUNCTION (MODULE) {  
  VAR EXPORTS = MODULE.EXPORTS = { };  
  
  var greeting = 'Ahoy-hoy';  
  var myNumber = '867-5309';  
  
  var answer = function(){...};  
  
  var dial = function(number){...};  
  
  module.exports.myNumber = myNumber;  
  module.exports.answer = answer;  
  module.exports.dial = dial;  
  
  RETURN MODULE.EXPORTS;  
}
```

phone.js

Using a module

```
FUNCTION (MODULE) {  
  VAR EXPORTS = MODULE.EXPORTS = { };  
  
  var greeting = 'Ahoy-hoy';  
  var myNumber = '867-5309';  
  
  module.exports = function(){...};  
  
  var dial = function(number){...};  
  
  exports.myNumber = myNumber;  
  exports.dial = dial;  
  
  RETURN MODULE.EXPORTS;  
}
```

phone-2.js

Authoring a module (that's a single function)

thirteen.js

```
module.exports = function(number) {  
  return number * 13;  
};
```

Using a module (that's a single function)

index.js

```
var thirteen = require('./thirteen');  
var result = thirteen(2);
```

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Loading External Libraries

In the Browser

Loading External Libraries

In the Browser

```
<html>
<head>
  <title>Example</title>

  <script src="app.js"></script>
</head>

<body>
  ...
</body>
</html>
```

index.html

Loading External Libraries

In the Browser

```
<html>
<head>
  <title>Example</title>

  <script src="app.js"></script>
</head>
<body>
  ...
</body>
</html>
```

index.html

```
var schools = ['Hack Reactor',
  'MakerSquare', 'Telegraph Academy'];

_.each(schools, function(school){
  console.log(school + ' rules!');
});
```

app.js

Loading External Libraries

In the Browser

```
<html>
<head>
  <title>Example</title>
  <script src = "http://cdn.co/underscore.js"></script>
  <script src="app.js"></script>
</head>

<body>
  ...
</body>
</html>
```

index.html

```
var schools = ['Hack Reactor',
  'MakerSquare', 'Telegraph Academy'];

_.each(schools, function(school){
  console.log(school + ' rules!');
});
```

app.js

Loading External Libraries

In Node

Loading External Libraries

In Node

```
var schools = ['Hack Reactor', 'MakerSquare', 'Telegraph Academy'];  
  
_.each(schools, function(school){  
  console.log(school + ' rules!');  
});
```

app.js

Loading External Libraries

In Node

```
<script src = "http://cdn.co/underscore.js"></script>
```

app.js

```
var schools = ['Hack Reactor', 'MakerSquare', 'Telegraph Academy'];  
  
_.each(schools, function(school){  
  console.log(school + ' rules!');  
});
```

Loading External Libraries

In Node

```
var _ = require('underscore');  
  
var schools = ['Hack Reactor', 'MakerSquare', 'Telegraph Academy'];  
  
_.each(schools, function(school){  
  console.log(school + ' rules!');  
});
```

app.js

Loading External Libraries

In Node

```
var _ = require('underscore');  
  
var schools = ['Hack Reactor', 'MakerSquare', 'Telegraph Academy'];  
  
_.each(schools, function(school){  
  console.log(school + ' rules!');  
});
```

app.js

Loading External Libraries

In Node

```
var awesomeUtilityLibraryITotallyWroteMyself = require('underscore');  
  
var schools = ['Hack Reactor', 'MakerSquare', 'Telegraph Academy'];  
  
awesomeUtilityLibraryITotallyWroteMyself.each(schools, function(school){  
  console.log(school + ' rules!');  
});
```

app.js

Loading External Libraries

In Node

```
var _ = require('underscore');  
  
var schools = ['Hack Reactor', 'MakerSquare', 'Telegraph Academy'];  
  
_.each(schools, function(school){  
  console.log(school + ' rules!');  
});
```

app.js

Hello, npm

- Short for... well... good question
- The package manager for JavaScript
- Rescues you from dependency hell
- Comes installed with Node
- npmjs.org

Terminal

```
~ user$ npm install underscore
```

app.js

```
var _ = require('underscore');  
  
var schools = ['Hack Reactor',  
  'MakerSquare', 'Telegraph  
Academy'];  
  
_.each(schools, function(school){  
  console.log(school + ' rules!');  
});
```

Node's Core Modules

- Key functionality that comes bundled with Node
- Loaded via `require()`, like any other modules
- Includes:
 - `fs`
 - `http`
 - `url`
 - `path`
 - and many more...

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The Problem with console.log()

When you use console.log in Node, it doesn't show up in the browser - it shows up in your terminal window.

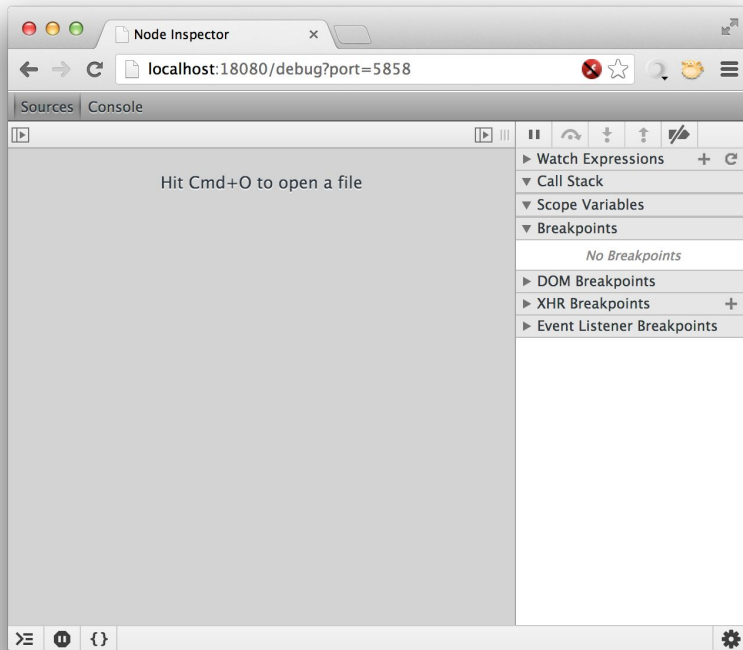
Terminal

```
~ user$ node server.js
Server is listening on http://localhost:1337
connected to db
GET / 200 OK
GET /assets/favicon.ico 200 OK
POST /users 404
-----> i think the bug is here
(more console activity...)
-----> or maybe it's over here?
```

A Better Way: node-inspector

- It's like Chrome's Dev Tools, but for your server code
- Set breakpoints, watch variables, and more
- Only works in Chrome and Opera

```
npm install -g node-inspector
```



That's it!