Emerging Technologies

COMP-308
Winter 2018

Introduction to MEAN

Objectives:

❑ Describe MEAN stack architecture.

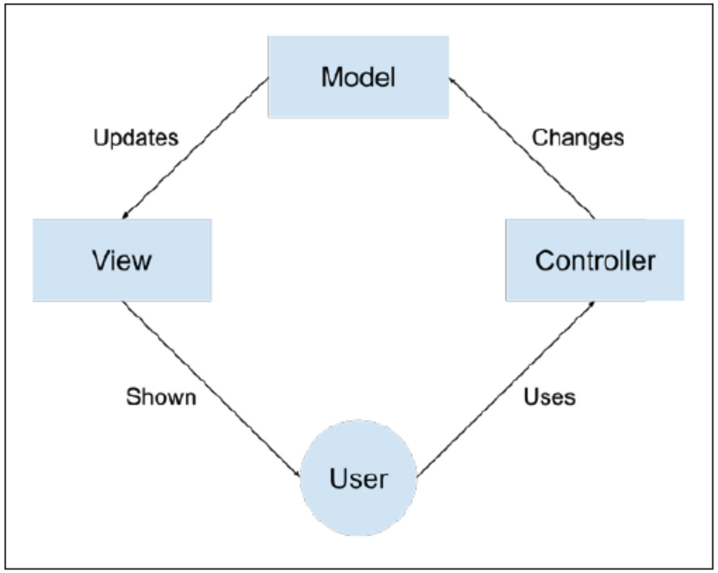
❑ Install and run MongoDB.

❑ Install and run Node.js

❑ Create simple Node.js apps in Visual Studio 2017

Three-tier web application development

- The **three-tier architecture** consists of three important layers: **data services**, **business logic**, and **presentation**.
- In the MVC paradigm, the logic, data, and visualization are separated into three types of objects:
  - **View** - handles UI
  - **Model** - handles the data manipulation
  - **Controller** - controls the model and view



Common MVC architecture communication

Web technology stacks

- **LAMP** stack:
  - Linux
  - Apache
  - MySQL
  - PHP/Python/Perl
- **.NET** stack:
  - .NET
  - IIS
  - ASP.NET
  - Web API and WCF
  - MS-SQL Server
- Other frameworks and tools
- Each layer uses a **different knowledge base**!

MEAN Stack

- ❑ MEAN is an abbreviation for **MongoDB**, **Express**, **AngularJS**, and **Node.js**.
- ❑ Uses **only JavaScript - driven solutions** to implement the different parts of a web application.
- ❑ Has the following advantages:
  - ➢ A **single language** is used throughout the application
  - ➢ All the parts of the application can **support and often enforce** the use of the **MVC architecture**
  - ➢ Serialization and deserialization of data structures is no longer needed because **data marshaling is done using JSON objects**.

serialization = turning data into stream of bytes
deserialization = turning back into an object

marshalling describes the above process of turning data into suitable format when storing as well as when moving between diff parts of system/programs

MEAN Stack

- **MongoDB** is a scalable NoSQL database that used a JSON-like data model with dynamic schemas.
- **Express** is **a lightweight node.js web application framework**, providing a robust set of features for building single and multi-page, and hybrid web application.
- **Node.js** is a **server side JavaScript execution environment** built on Google Chrome’s V8 JavaScript runtime - helps in building highly scalable and concurrent applications rapidly.
- **AngularJS** is a JavaScript framework developed by Google - a complete solution for rapid **front end development**.

LAMP versus MEAN

❑ Linux ➔ Node.js (platform)

❑ Apache ➔ Express.js (web server)

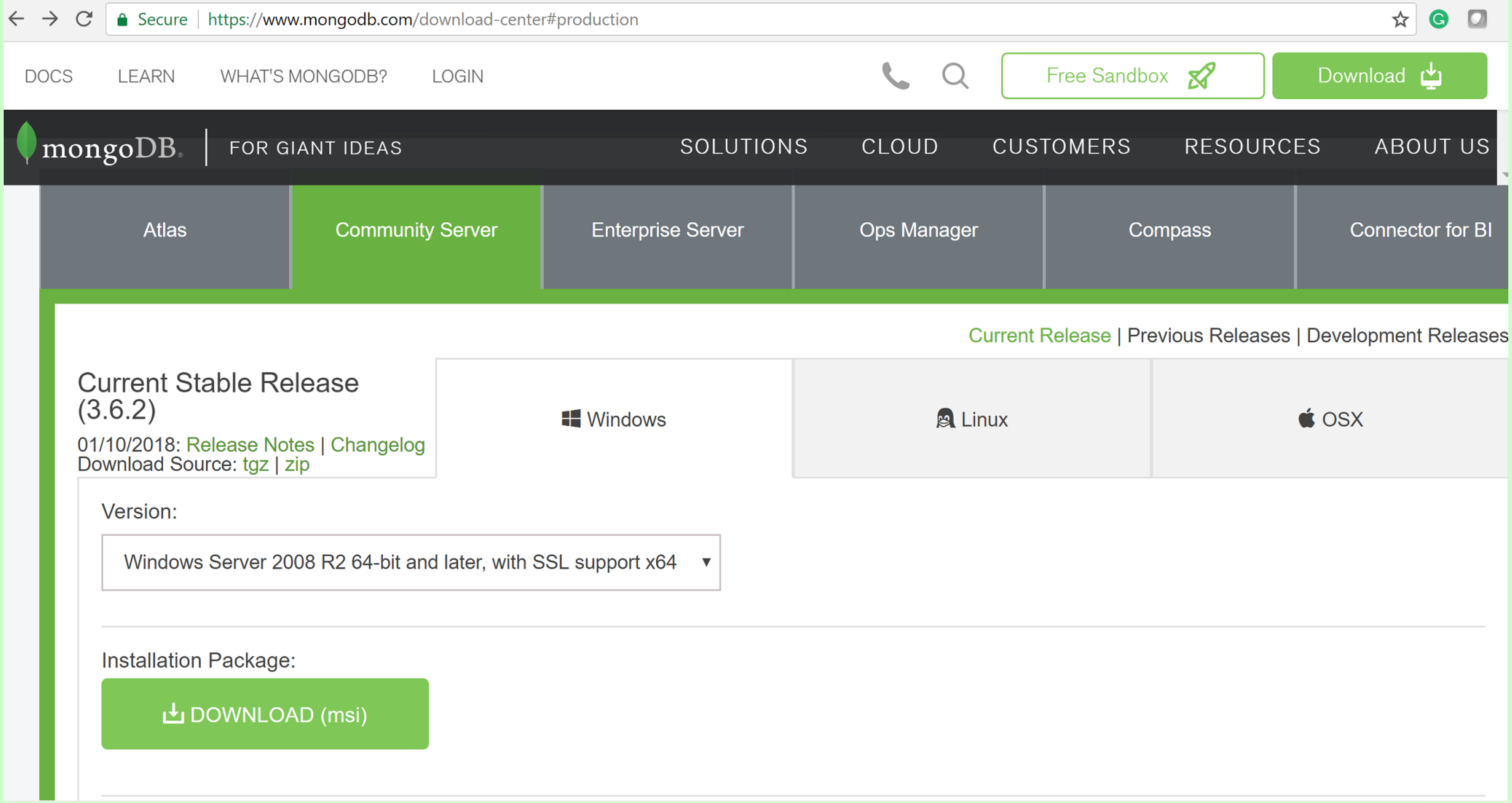
❑ MySQL ➔ MongoDB (persistence layer)

❑ PHP or Python or Perl ➔ Angular.js (User Interface)

Advantages

- High Performance
  - Increasing number of requests
  - Reducing response time
  - Non-blocking I/O - allows web server to handle more concurrent requests without requiring additional hardware or configuration
  - Cross-platform (Windows, Linux, MacOS)
  - One single programming language for the entire project

Installing MongoDB



Secure | https://www.mongodb.com/download-center#production

DOCS LEARN WHAT'S MONGODB? LOGIN

Free Sandbox Download

mongoDB. | FOR GIANT IDEAS

SOLUTIONS CLOUD CUSTOMERS RESOURCES ABOUT US

Atlas | Community Server | Enterprise Server | Ops Manager | Compass | Connector for BI

Current Release | Previous Releases | Development Releases

Current Stable Release (3.6.2)

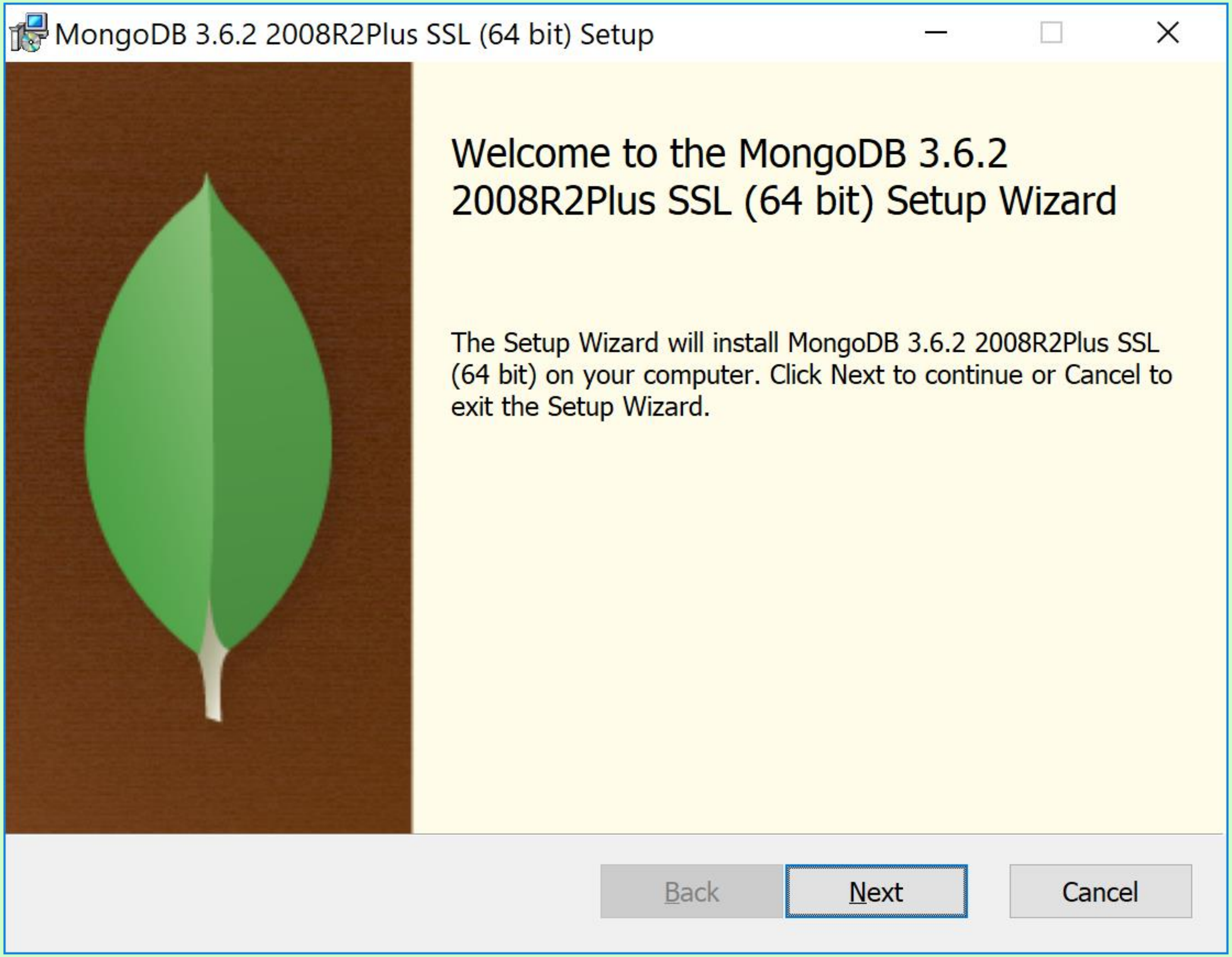
01/10/2018: Release Notes | Changelog
Download Source: tgz | zip

Windows | Linux | OSX

Version: Windows Server 2008 R2 64-bit and later, with SSL support x64

Installation Package:

DOWNLOAD (msi)

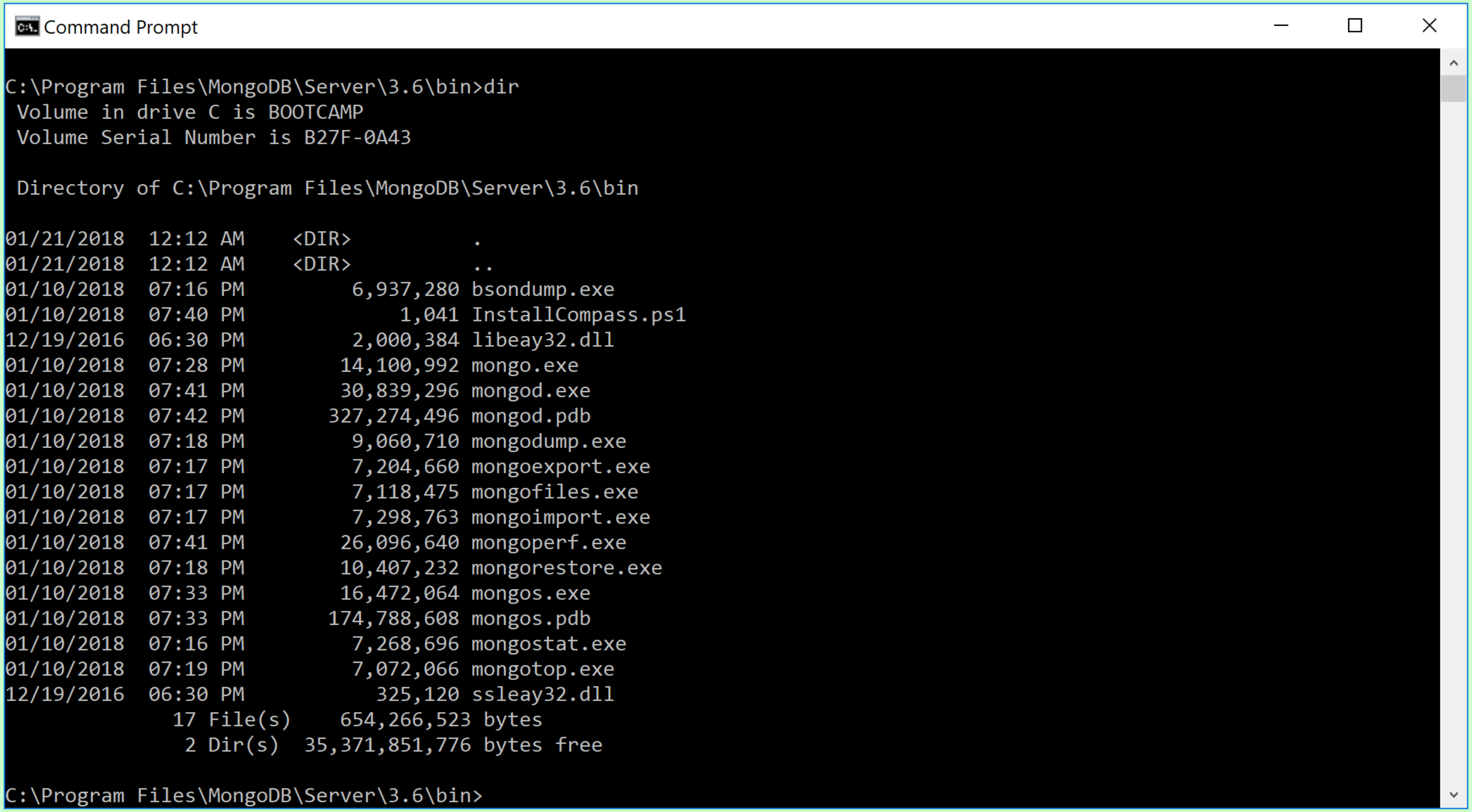


MongoDB 3.6.2 2008R2Plus SSL (64 bit) Setup

Welcome to the MongoDB 3.6.2 2008R2Plus SSL (64 bit) Setup Wizard

The Setup Wizard will install MongoDB 3.6.2 2008R2Plus SSL (64 bit) on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

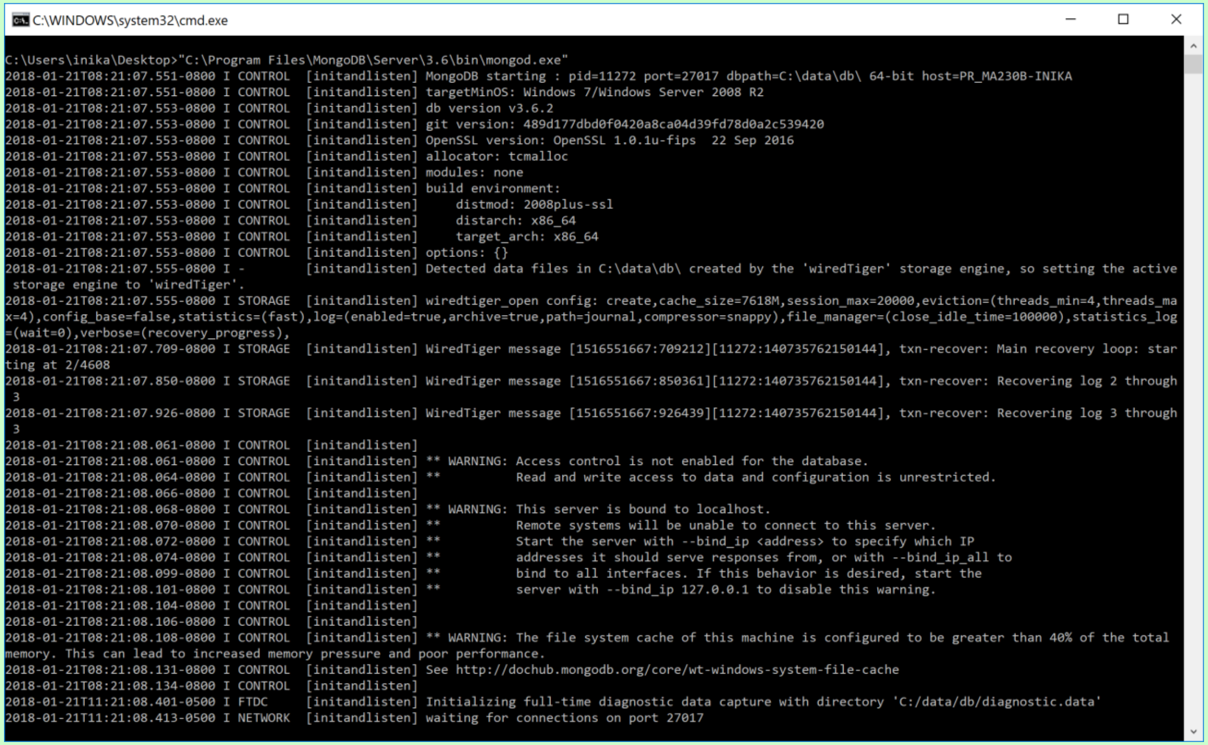
Installing MongoDB



```
C:\Program Files\MongoDB\Server\3.6\bin>dir
 Volume in drive C is BOOTCAMP
 Volume Serial Number is B27F-0A43

 Directory of C:\Program Files\MongoDB\Server\3.6\bin

01/21/2018  12:12 AM    <DIR>          .
01/21/2018  12:12 AM    <DIR>          ..
01/10/2018  07:16 PM         6,937,280 bsondump.exe
01/10/2018  07:40 PM             1,041 InstallCompass.ps1
12/19/2016  06:30 PM         2,000,384 libeay32.dll
01/10/2018  07:28 PM        14,100,992 mongo.exe
01/10/2018  07:41 PM        30,839,296 mongod.exe
01/10/2018  07:42 PM       327,274,496 mongod.pdb
01/10/2018  07:18 PM         9,060,710 mongodump.exe
01/10/2018  07:17 PM         7,204,660 mongoexport.exe
01/10/2018  07:17 PM         7,118,475 mongofiles.exe
01/10/2018  07:17 PM         7,298,763 mongoimport.exe
01/10/2018  07:41 PM        26,096,640 mongoperf.exe
01/10/2018  07:18 PM        10,407,232 mongorestore.exe
01/10/2018  07:33 PM        16,472,064 mongos.exe
01/10/2018  07:33 PM       174,788,608 mongos.pdb
01/10/2018  07:16 PM         7,268,696 mongostat.exe
01/10/2018  07:19 PM         7,072,066 mongotop.exe
12/19/2016  06:30 PM           325,120 ssleay32.dll
              17 File(s)    654,266,523 bytes
               2 Dir(s)  35,371,851,776 bytes free

C:\Program Files\MongoDB\Server\3.6\bin>
```

Running MongoDB

- ❑ **Create MongoDB default folder** to store its files - on Windows, the default location is **C:\data\db**
- ❑ Open the command prompt and execute the following command: **"C:\Program Files\MongoDB\Server\3.6\bin\mongod.exe",** or run **mongod** from the **bin** directory**:**
- ❑ The main **MongoDB service** will start listening to the default 27017 port:



```
C:\Users\inika\Desktop>"C:\Program Files\MongoDB\Server\3.6\bin\mongod.exe"
2018-01-21T08:21:07.551-0800 I CONTROL  [initandlisten] MongoDB starting : pid=11272 port=27017 dbpath=C:\data\db\ 64-bit host=PR_MA230B-INIKA
2018-01-21T08:21:07.551-0800 I CONTROL  [initandlisten] targetMinOS: Windows 7/Windows Server 2008 R2
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten] db version v3.6.2
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten] git version: 489d177dbd0f0420a8ca04d39fd78d0a2c539420
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten] OpenSSL version: OpenSSL 1.0.1u-fips  22 Sep 2016
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten] allocator: tcmalloc
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten] modules: none
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten] build environment:
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten]     distmod: 2008plus-ssl
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten]     distarch: x86_64
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten]     target_arch: x86_64
2018-01-21T08:21:07.553-0800 I CONTROL  [initandlisten] options: {}
2018-01-21T08:21:07.555-0800 I -        [initandlisten] Detected data files in C:\data\db\ created by the 'wiredTiger' storage engine, so setting the active
 storage engine to 'wiredTiger'.
2018-01-21T08:21:07.555-0800 I STORAGE  [initandlisten] wiredtiger_open config: create,cache_size=7618M,session_max=20000,eviction=(threads_min=4,threads_ma
x=4),config_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journal,compressor=snappy),file_manager=(close_idle_time=100000),statistics_log
=(wait=0),verbose=(recovery_progress),
2018-01-21T08:21:07.709-0800 I STORAGE  [initandlisten] WiredTiger message [1516551667:709212][11272:140735762150144], txn-recover: Main recovery loop: star
ting at 2/4608
2018-01-21T08:21:07.850-0800 I STORAGE  [initandlisten] WiredTiger message [1516551667:850361][11272:140735762150144], txn-recover: Recovering log 2 through
 3
2018-01-21T08:21:07.926-0800 I STORAGE  [initandlisten] WiredTiger message [1516551667:926439][11272:140735762150144], txn-recover: Recovering log 3 through
 3
2018-01-21T08:21:08.061-0800 I CONTROL  [initandlisten]
2018-01-21T08:21:08.061-0800 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
2018-01-21T08:21:08.064-0800 I CONTROL  [initandlisten] **          Read and write access to data and configuration is unrestricted.
2018-01-21T08:21:08.066-0800 I CONTROL  [initandlisten]
2018-01-21T08:21:08.068-0800 I CONTROL  [initandlisten] ** WARNING: This server is bound to localhost.
2018-01-21T08:21:08.070-0800 I CONTROL  [initandlisten] **          Remote systems will be unable to connect to this server.
2018-01-21T08:21:08.072-0800 I CONTROL  [initandlisten] **          Start the server with --bind_ip <address> to specify which IP
2018-01-21T08:21:08.074-0800 I CONTROL  [initandlisten] **          addresses it should serve responses from, or with --bind_ip_all to
2018-01-21T08:21:08.099-0800 I CONTROL  [initandlisten] **          bind to all interfaces. If this behavior is desired, start the
2018-01-21T08:21:08.101-0800 I CONTROL  [initandlisten] **          server with --bind_ip 127.0.0.1 to disable this warning.
2018-01-21T08:21:08.104-0800 I CONTROL  [initandlisten]
2018-01-21T08:21:08.106-0800 I CONTROL  [initandlisten]
2018-01-21T08:21:08.108-0800 I CONTROL  [initandlisten] ** WARNING: The file system cache of this machine is configured to be greater than 40% of the total
memory. This can lead to increased memory pressure and poor performance.
2018-01-21T08:21:08.131-0800 I CONTROL  [initandlisten] See http://dochub.mongodb.org/core/wt-windows-system-file-cache
2018-01-21T08:21:08.134-0800 I CONTROL  [initandlisten]
2018-01-21T11:21:08.401-0500 I FTDC     [initandlisten] Initializing full-time diagnostic data capture with directory 'C:/data/db/diagnostic.data'
2018-01-21T11:21:08.413-0500 I NETWORK  [initandlisten] waiting for connections on port 27017
```

Running MongoDB as a service

- Specify a path for the MongoDB log and configuration files.
  - Start by creating a folder for these files by running the following command in your command prompt:

```
> md C:\mongodb\log
```

- Then, you'll be able to create a configuration file using the --logpath command-line flag, so in the command prompt, issue the following command:

```
> echo logpath=C:\mongodb\log\mongo.log > C:\mongodb\mongod.cfg
```

- When you have your configuration file in place, open a new command prompt window with administrative privileges by right-clicking on the command prompt icon and clicking on **Run as administrator**.
- In the new command prompt window, install the MongoDB service by running the following command:
- **> sc.exe create MongoDB binPath= "\"C:\mongodb\bin\mongod.exe\" –service --config=\"C:\mongodb\mongod.cfg\"" DisplayName= "MongoDB 2.6" start="auto"**
- If the service was successfully created, you will get the following log message:

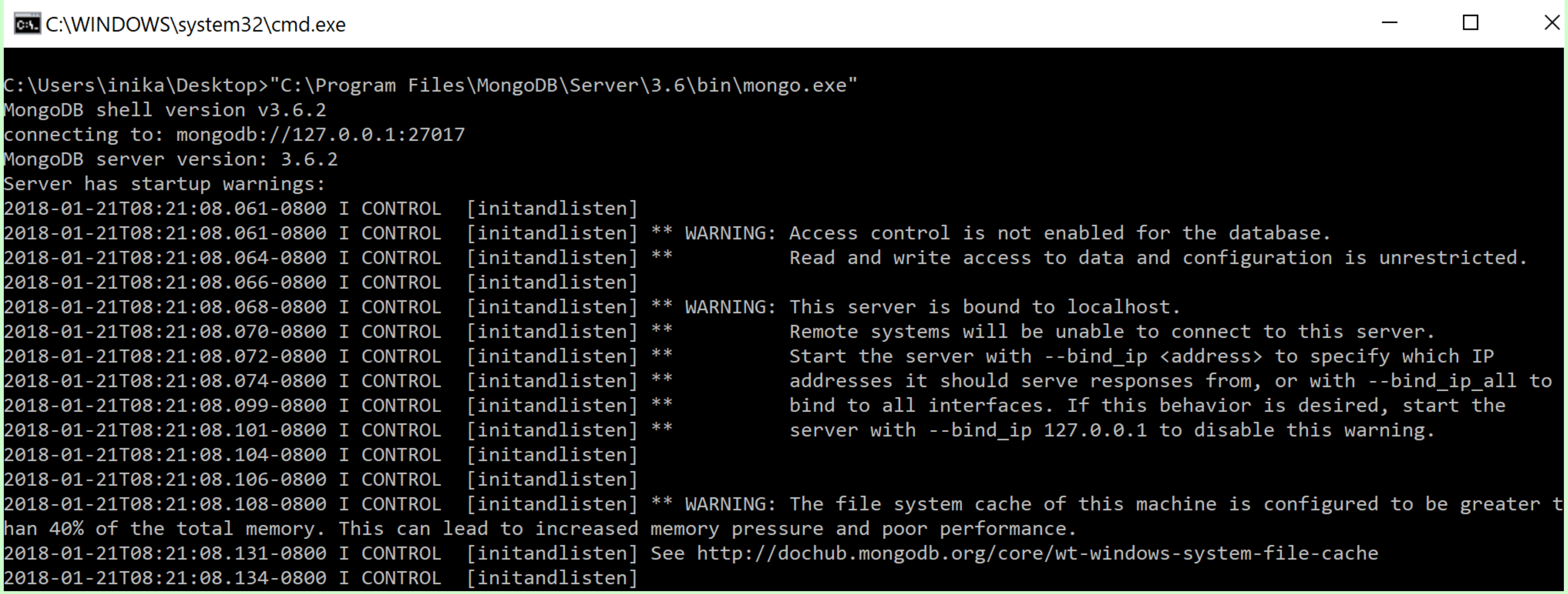
```
[SC] CreateService SUCCESS
```

- Run it from command prompt:

```
net start MongoDB
```

Using the MongoDB shell

- ❑ MongoDB shell allows to you to interact with your server instance using the command line.
- ❑ To start the shell, navigate to the MongoDB bin folder and run the mongo service as follows:



```
C:\Users\inika\Desktop>"C:\Program Files\MongoDB\Server\3.6\bin\mongo.exe"
MongoDB shell version v3.6.2
connecting to: mongodb://127.0.0.1:27017
MongoDB server version: 3.6.2
Server has startup warnings:
2018-01-21T08:21:08.061-0800 I CONTROL  [initandlisten]
2018-01-21T08:21:08.061-0800 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
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2018-01-21T08:21:08.134-0800 I CONTROL  [initandlisten]
```

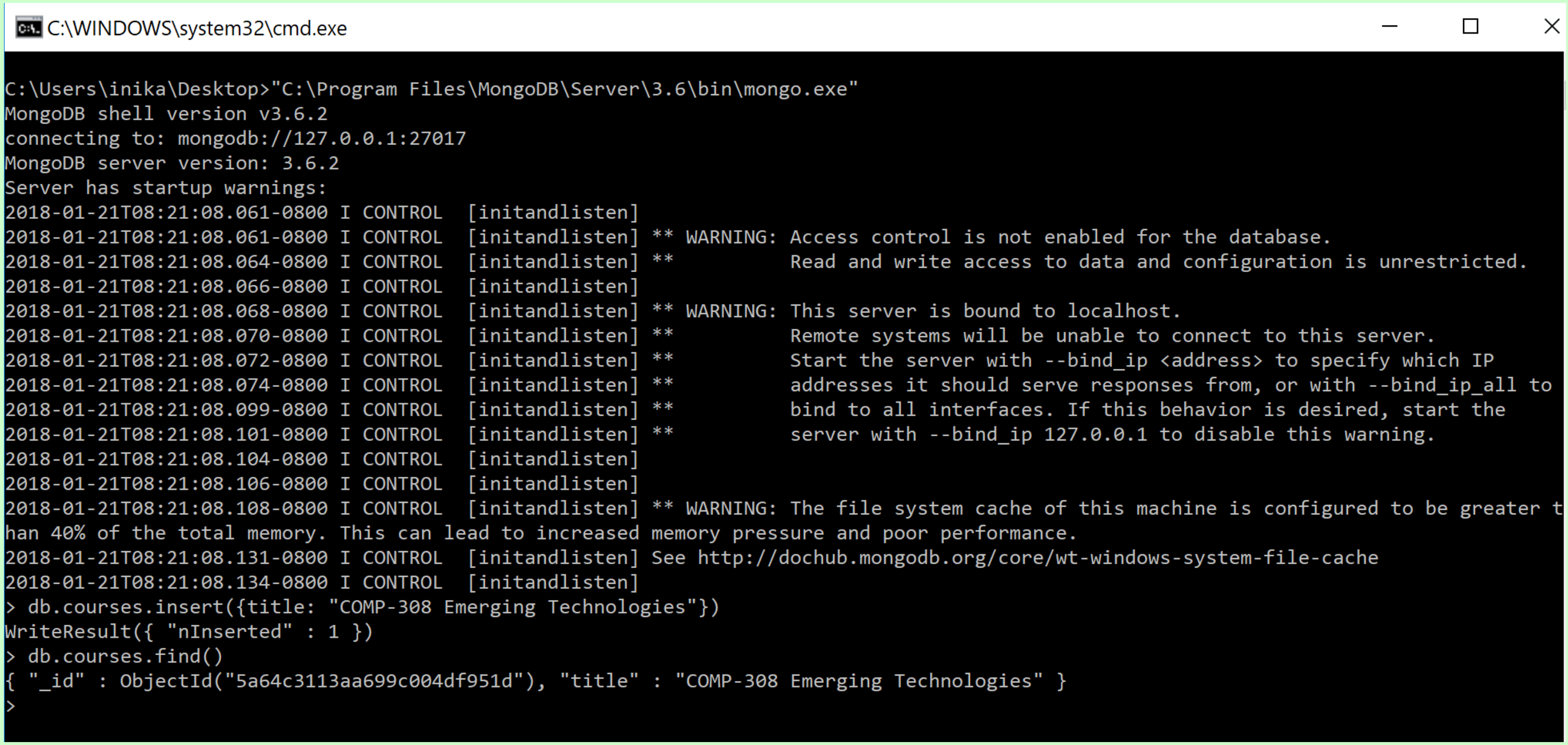
Testing the database

- To test your database, run the following command:

> db.courses.insert({title: “COMP-308 Emerging Technologies"}).

- To retrieve the course object, execute the following command:

> db.courses.find()



```
C:\Users\inika\Desktop>"C:\Program Files\MongoDB\Server\3.6\bin\mongo.exe"
MongoDB shell version v3.6.2
connecting to: mongodb://127.0.0.1:27017
MongoDB server version: 3.6.2
Server has startup warnings:
2018-01-21T08:21:08.061-0800 I CONTROL  [initandlisten]
2018-01-21T08:21:08.061-0800 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
2018-01-21T08:21:08.064-0800 I CONTROL  [initandlisten] **          Read and write access to data and configuration is unrestricted.
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2018-01-21T08:21:08.108-0800 I CONTROL  [initandlisten] ** WARNING: The file system cache of this machine is configured to be greater t
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2018-01-21T08:21:08.131-0800 I CONTROL  [initandlisten] See http://dochub.mongodb.org/core/wt-windows-system-file-cache
2018-01-21T08:21:08.134-0800 I CONTROL  [initandlisten]
> db.courses.insert({title: "COMP-308 Emerging Technologies"})
WriteResult({ "nInserted" : 1 })
> db.courses.find()
{ "_id" : ObjectId("5a64c3113aa699c004df951d"), "title" : "COMP-308 Emerging Technologies" }
>
```
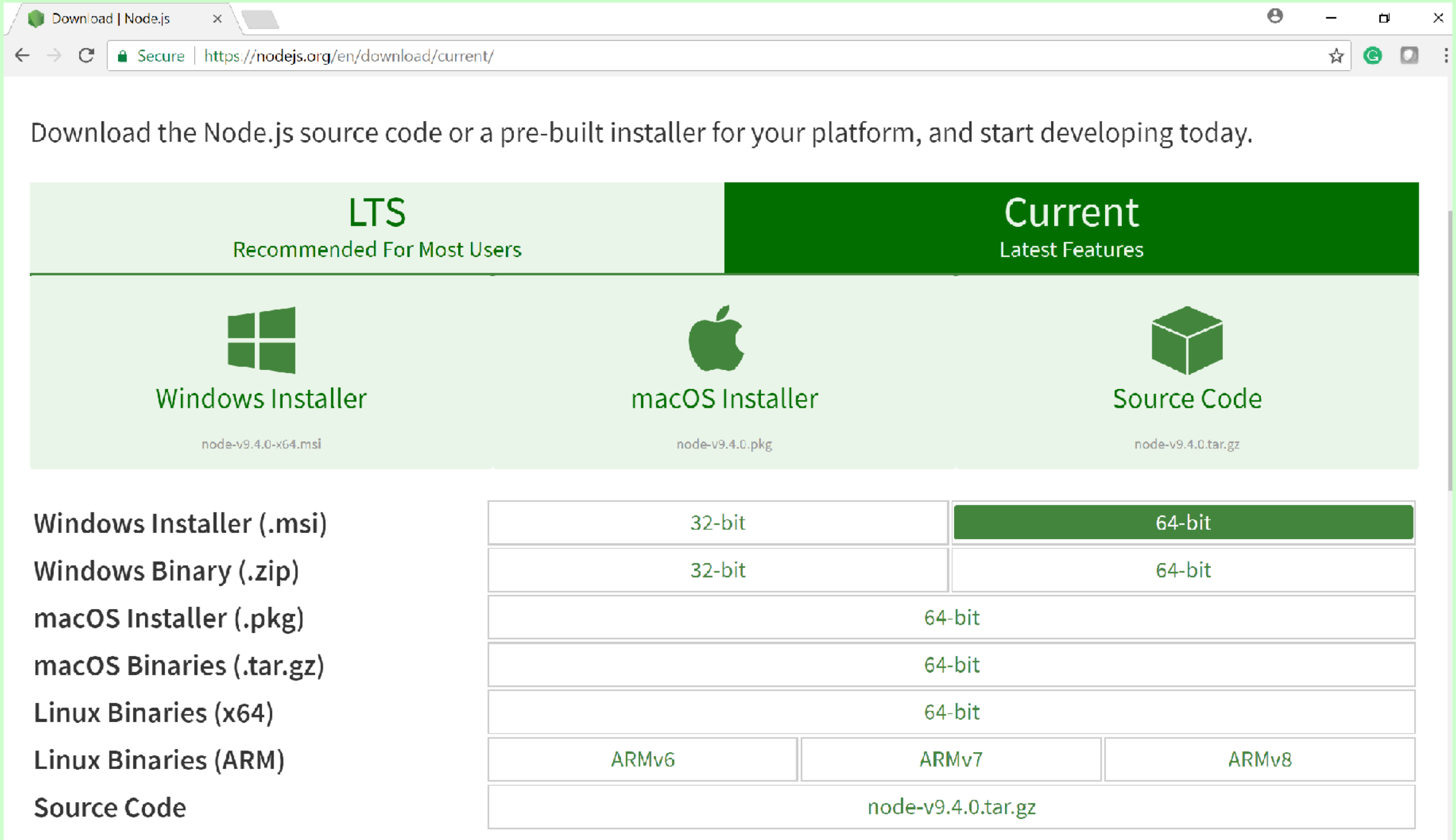

Installing Node.js



Download the Node.js source code or a pre-built installer for your platform, and start developing today.

LTS
Recommended For Most Users

Current
Latest Features

Windows Installer
node-v9.4.0-x64.msi

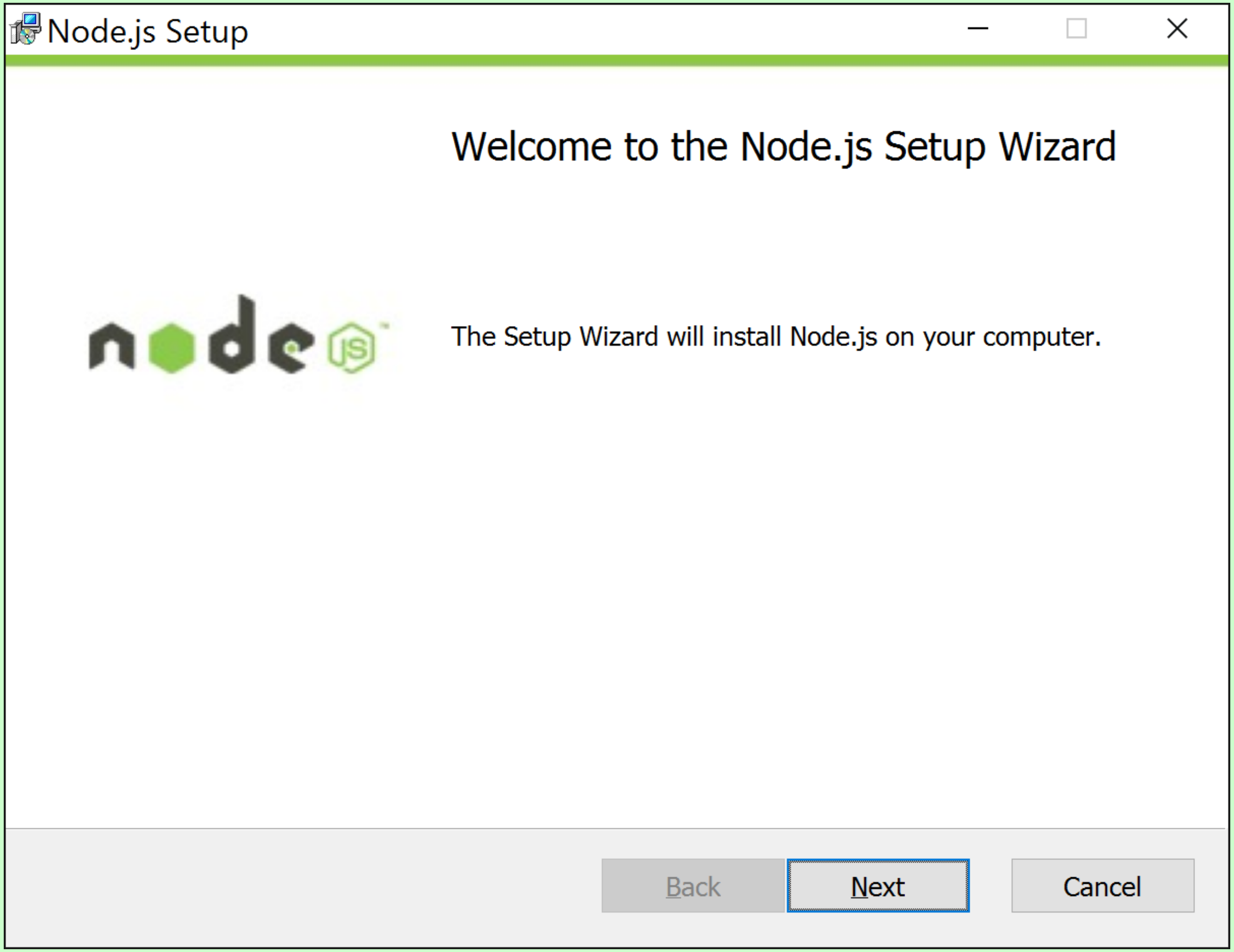
macOS Installer
node-v9.4.0.pkg

Source Code
node-v9.4.0.tar.gz

Windows Installer (.msi)	32-bit	64-bit	
Windows Binary (.zip)	32-bit	64-bit	
macOS Installer (.pkg)	64-bit		
macOS Binaries (.tar.gz)	64-bit		
Linux Binaries (x64)	64-bit		
Linux Binaries (ARM)	ARMv6	ARMv7	ARMv8
Source Code	node-v9.4.0.tar.gz		

Installing Node.js

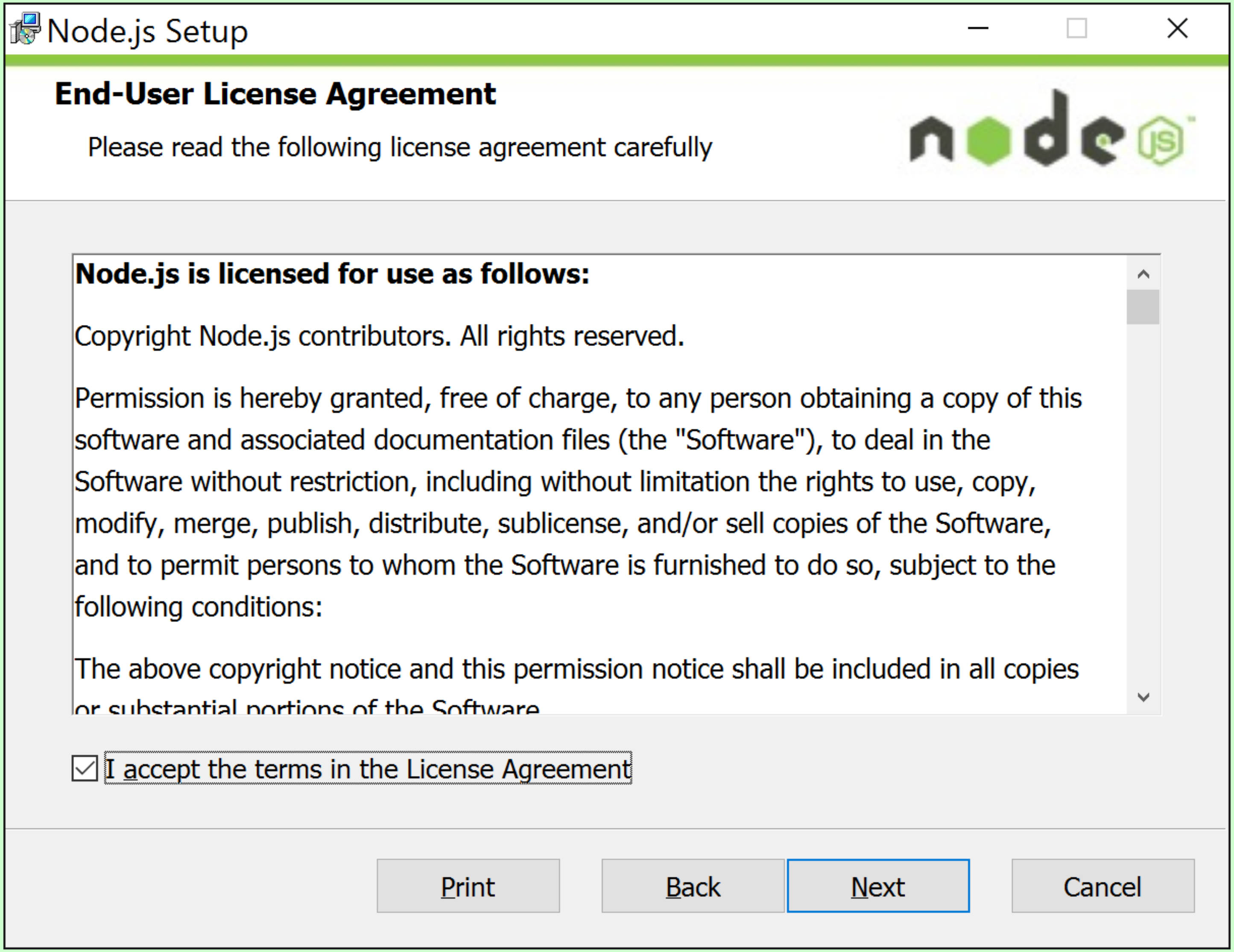
- ❑ Install 64bit node-v4.2.4-x64.msi file.



Welcome to the Node.js Setup Wizard

The Setup Wizard will install Node.js on your computer.

Installing Node.js



Node.js Setup

End-User License Agreement

Please read the following license agreement carefully

Node.js is licensed for use as follows:

Copyright Node.js contributors. All rights reserved.

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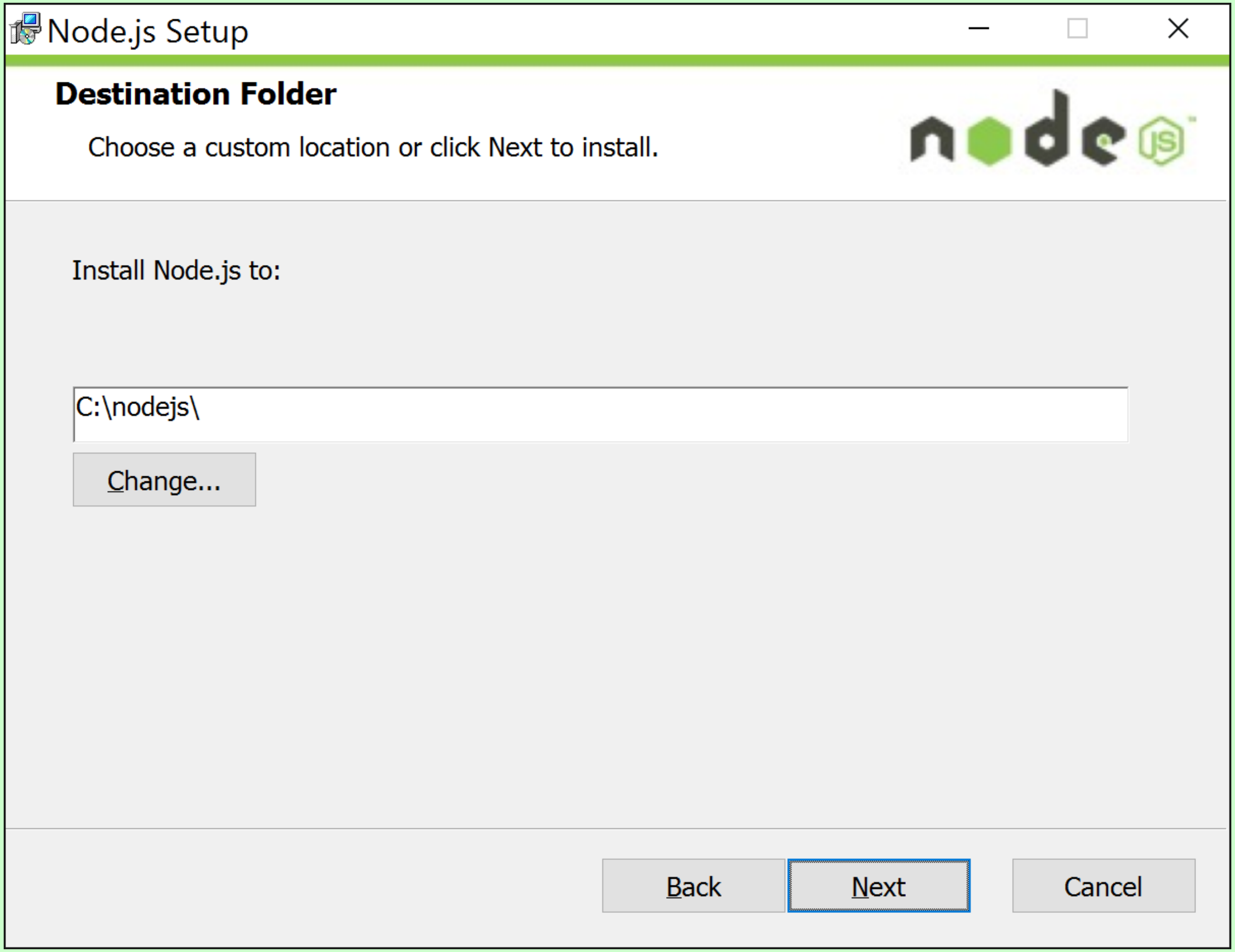
The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software

☑ I accept the terms in the License Agreement

Installing Node.js



Node.js Setup

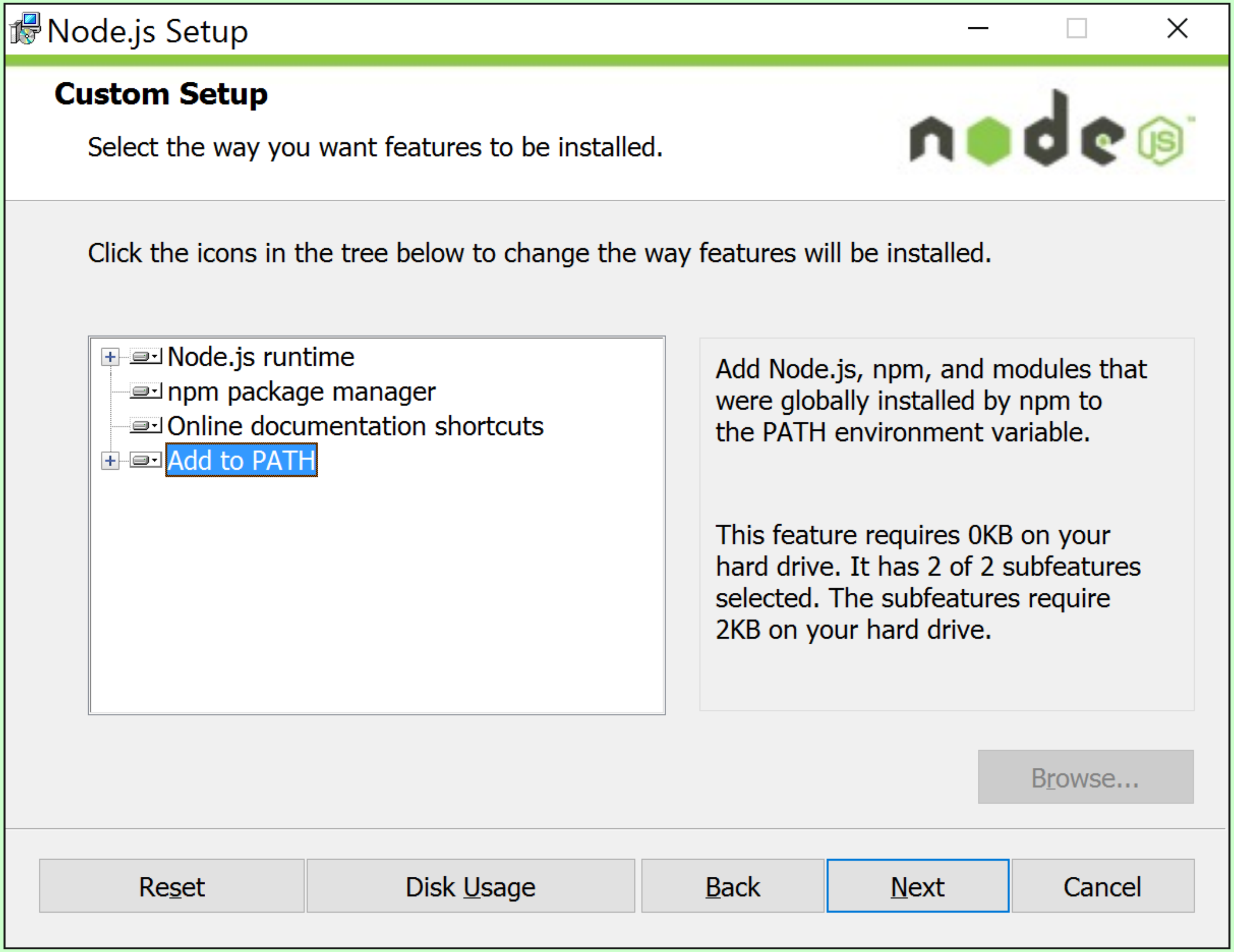
Destination Folder

Choose a custom location or click Next to install.

Install Node.js to:

C:\nodejs\

Installing Node.js



Node.js Setup

Custom Setup

Select the way you want features to be installed.

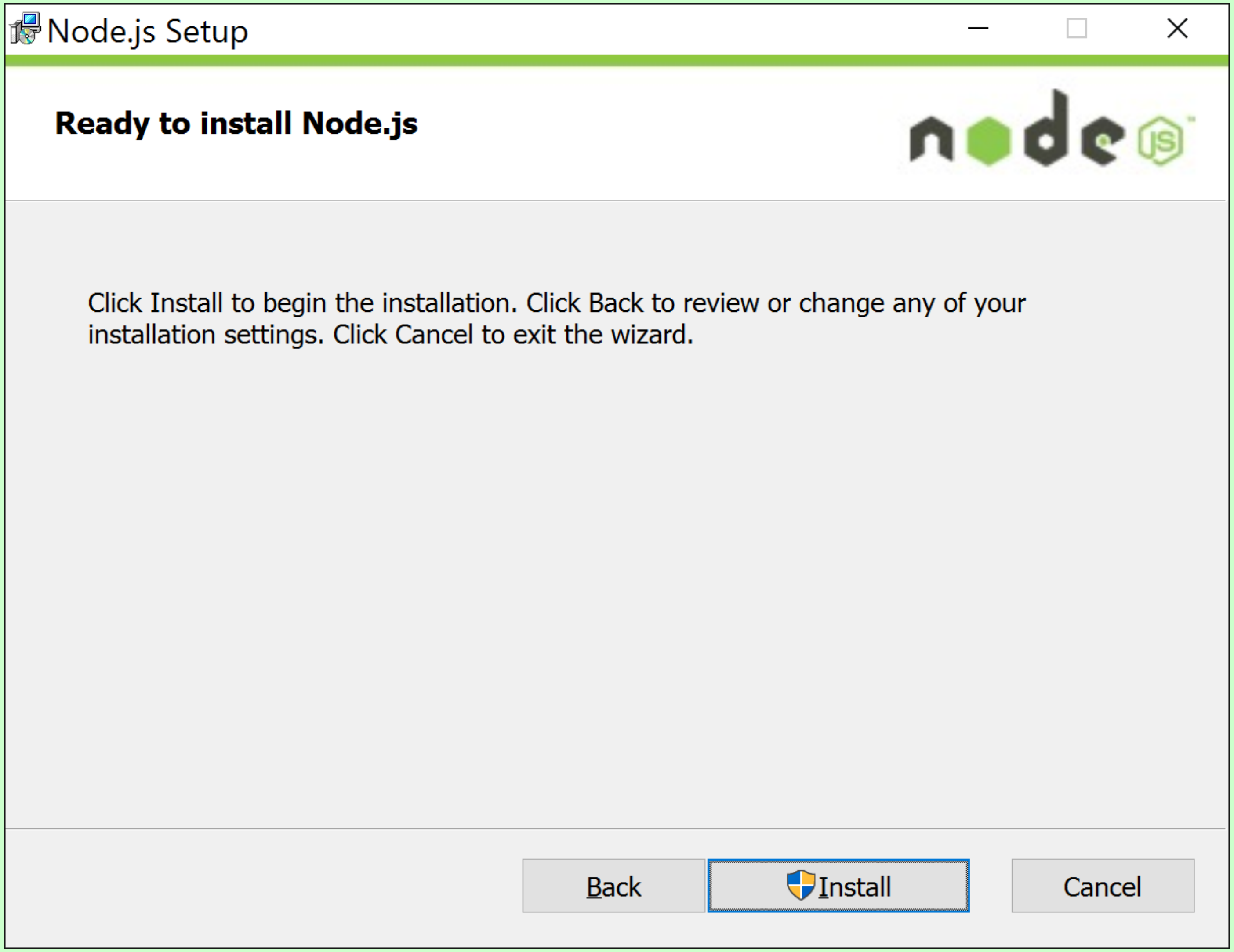
Click the icons in the tree below to change the way features will be installed.

- Node.js runtime
- npm package manager
- Online documentation shortcuts
- Add to PATH

Add Node.js, npm, and modules that were globally installed by npm to the PATH environment variable.

This feature requires 0KB on your hard drive. It has 2 of 2 subfeatures selected. The subfeatures require 2KB on your hard drive.

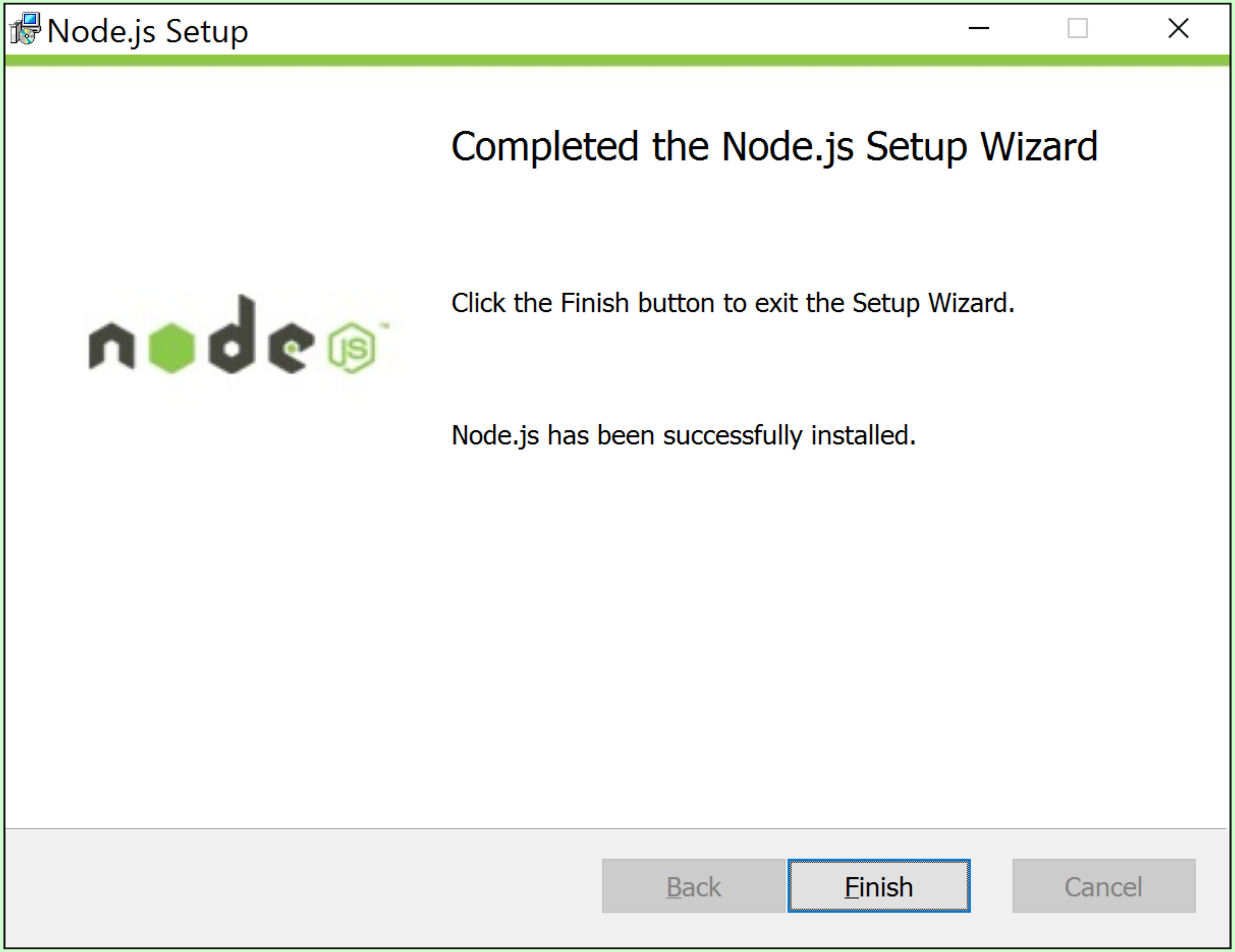
Installing Node.js



Ready to install Node.js

Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.

Installing Node.js



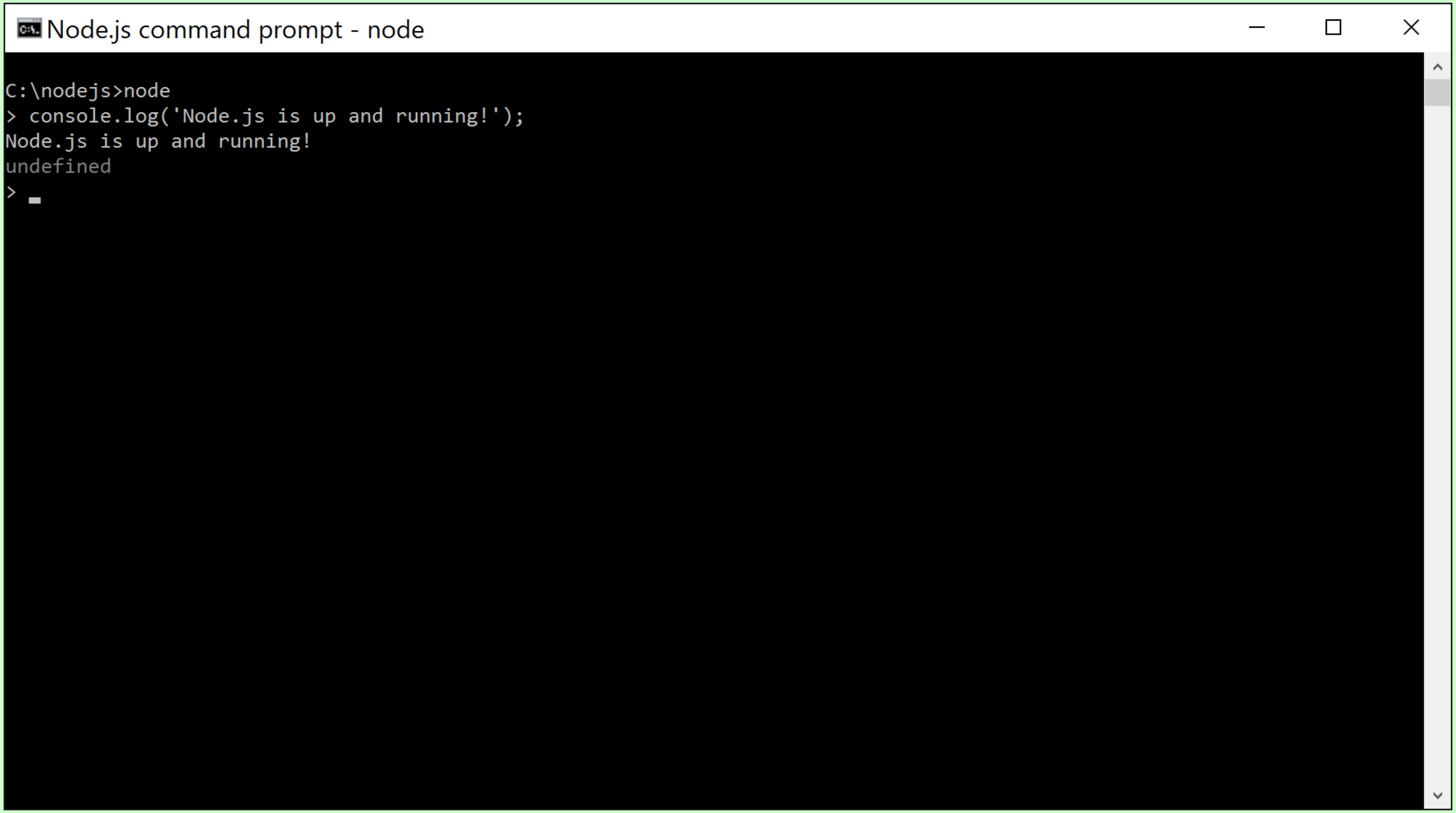
Completed the Node.js Setup Wizard

Click the Finish button to exit the Setup Wizard.

Node.js has been successfully installed.

Running Node.js

- Just run node from command prompt:

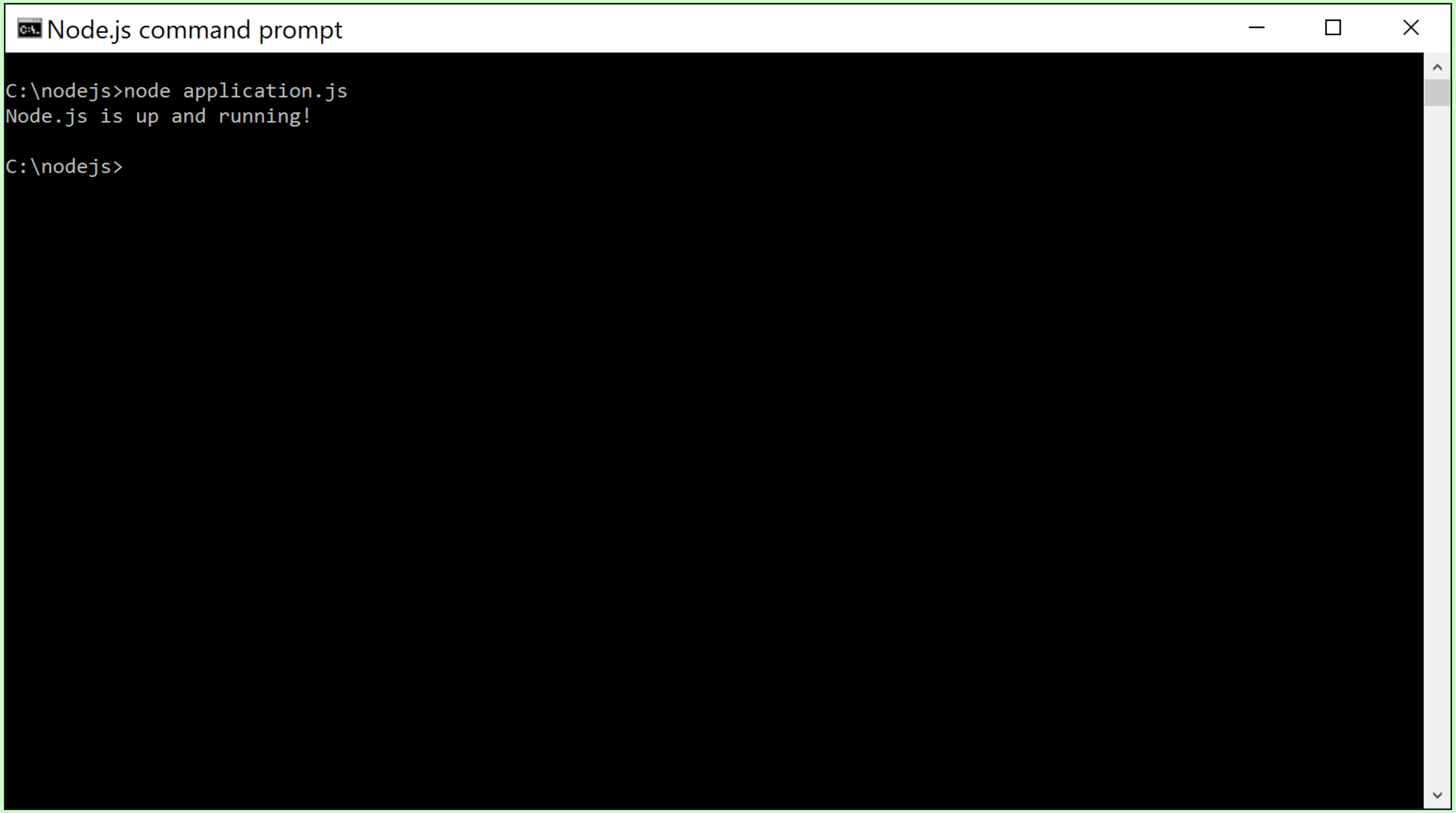


```
C:\nodejs>node
> console.log('Node.js is up and running!');
Node.js is up and running!
undefined
> _
```

Running Node.js

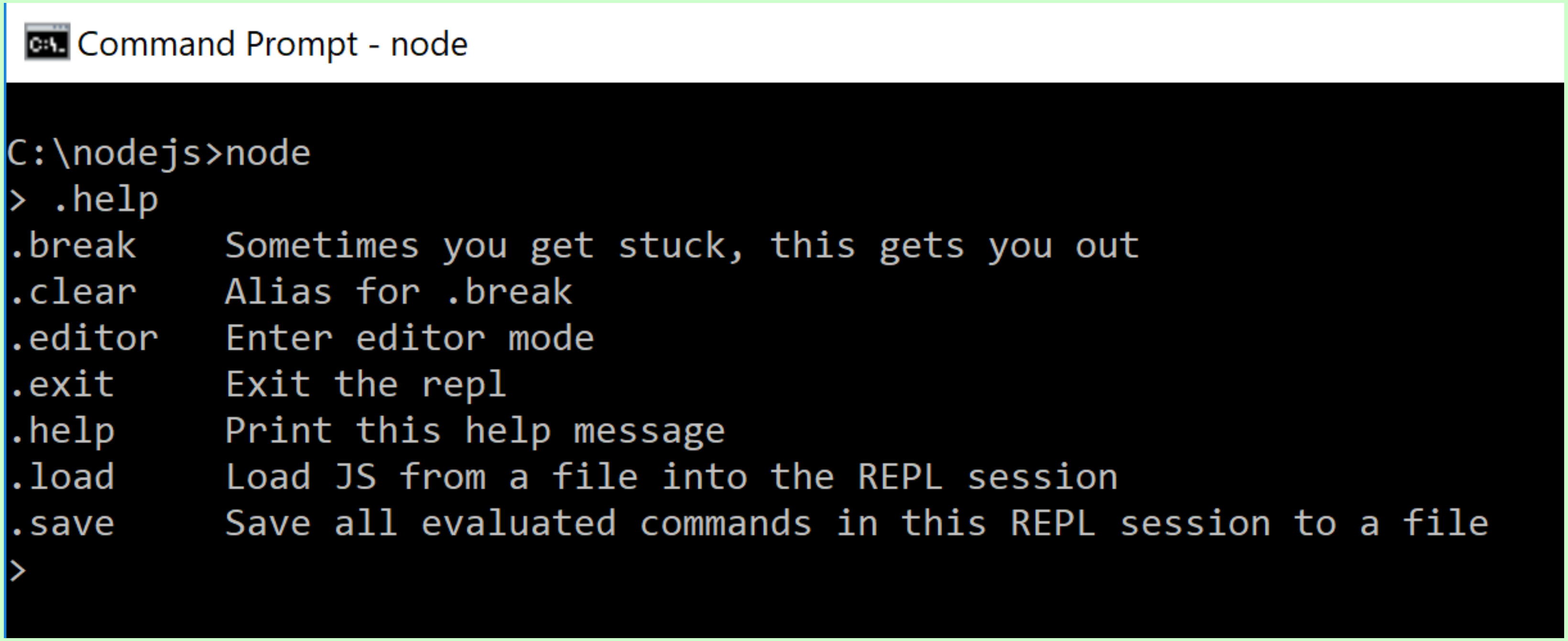
- ❑ Create a JavaScript file application.js with this line:

  console.log(‘Node.js is up and running!’);



```
C:\nodejs>node application.js
Node.js is up and running!

C:\nodejs>
```

Node.js prompt commands



Command Prompt - node

```
C:\nodejs>node
> .help
.break    Sometimes you get stuck, this gets you out
.clear    Alias for .break
.editor   Enter editor mode
.exit     Exit the repl
.help     Print this help message
.load     Load JS from a file into the REPL session
.save     Save all evaluated commands in this REPL session to a file
>
```

Node Package Manager

- NPM is the best way to install, update, and remove Node.js modules
- NPM has the following main features:
  - A registry of packages to browse, download, and install third-party modules
  - A CLI tool to manage local and global packages
- NPM is installed during the Node.js installation process.

Using NPM

- NPM has two installation modes: **local** and **global**.
- The **default local mode** is used more often and installs the third-party packages in a local **node_modules** folder placed inside your application folder.
- It has no effect system-wise, and is used to install the packages your application needs, without polluting your system with unnecessary global files.
- The global mode is used to install packages you want Node.js **to use globally**.
- Will demonstrate the use of NPM by installing Express

Using NPM

- The global mode will usually install the packages in the C:\Users\%USERNAME%\AppData\Roaming\npm\node_modules folder, **making it available to any Node.js application running on the system**.
- To install a package using the npm run the following command:

$ npm install <Package Unique Name>

- Installing a module globally is similar to its local counterpart, but you'll have to add the –g flag as follows:

$ npm install –g <Package Unique Name>

Using NPM

- ❑ For example, to locally install Express, you'll need to **navigate to your application folder** and issue the following command:

```
$ npm install express
```

- ❑ NPM supports a wide range of semantic versioning, so to install a specific version of a package, you can use the **npm** install command as follows:

```
$ npm install <Package Unique Name>@<Package Version>
```

- ❑ For instance, to install the second major version of the Express package, you'll need to issue the following command:

```
$ npm install express@2.x
```

Using NPM

- **Removing a package using NPM**
- To remove an installed package, you'll have to navigate to your application folder and run the following command:

$ npm uninstall < Package Unique Name>

- NPM will then look for the package and try to remove it from the local node_modules folder.
- To remove a global package, you'll need to use the -g flag as follows:

$ npm uninstall –g < Package Unique Name>

Using NPM

- **Updating a package using NPM**
- To update a package to its latest version, issue the following command:

```
$ npm update < Package Unique Name>
```

- NPM will download and install the latest version of this package even if it doesn't exist yet.
- To update a global package, use the following command:

```
$ npm update –g < Package Unique Name>
```

Managing dependencies using the package.json file

- NPM allows you to use a **configuration file** named **package.json** in the root folder of your application.
- In your package.json file, you'll be able to **define various metadata properties of your application**, including properties such as the **name**, **version**, and **author** of your application.
- This is also where you **define your application dependencies**.

Managing dependencies using the package.json file

- ❑ The **package.json** file is basically a JSON file that contains the **different attributes you'll need to describe your application properties**.
- ❑ An application using the latest Express and Grunt packages will have a package**. json** file as follows:

```
{
"name" : "MEAN",
"version" : "0.0.1",
"dependencies" : {
"express" : "latest",
"grunt" : "latest"
}
}
```

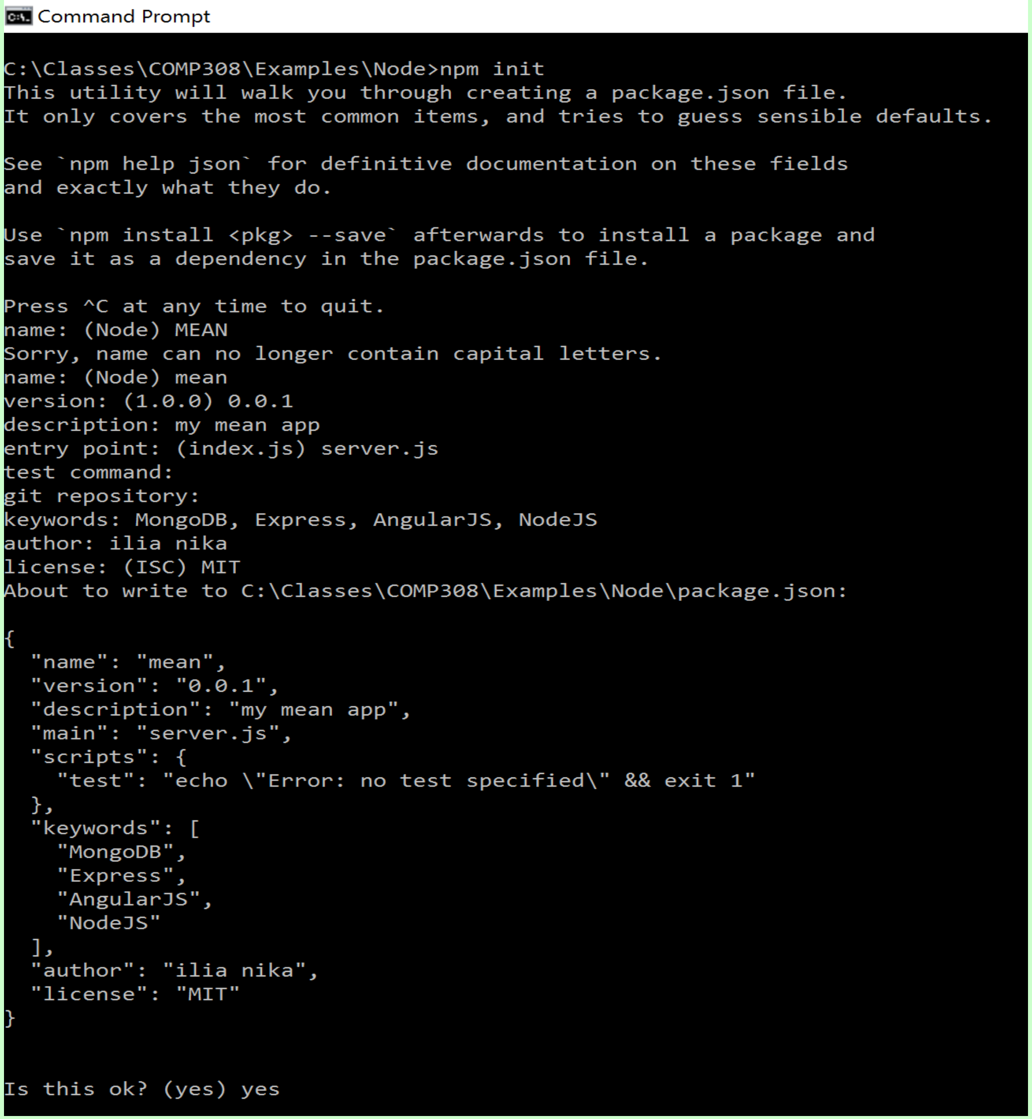
Creating a package.json file

- ❑ While you can manually create a package.json file, an easier approach would be to use the **npm init** command.
- ❑ To do so, use your command-line tool and issue the following command:

```
$ npm init
```

- ❑ NPM will ask you a few questions about your application and will automatically **create a new package.json file** for you.
- ❑ A sample process should look similar to the following screenshot:

Creating a package.json file



Command Prompt

```
C:\Classes\COMP308\Examples\Node>npm init
This utility will walk you through creating a package.json file.
It only covers the most common items, and tries to guess sensible defaults.

See `npm help json` for definitive documentation on these fields
and exactly what they do.

Use `npm install <pkg> --save` afterwards to install a package and
save it as a dependency in the package.json file.

Press ^C at any time to quit.
name: (Node) MEAN
Sorry, name can no longer contain capital letters.
name: (Node) mean
version: (1.0.0) 0.0.1
description: my mean app
entry point: (index.js) server.js
test command:
git repository:
keywords: MongoDB, Express, AngularJS, NodeJS
author: ilia nika
license: (ISC) MIT
About to write to C:\Classes\COMP308\Examples\Node\package.json:

{
  "name": "mean",
  "version": "0.0.1",
  "description": "my mean app",
  "main": "server.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [
    "MongoDB",
    "Express",
    "AngularJS",
    "NodeJS"
  ],
  "author": "ilia nika",
  "license": "MIT"
}


Is this ok? (yes) yes
```

Installing the package.json dependencies

- After creating your **package.json** file, you'll be able to install your application dependencies by navigating to your application's root folder and using the **npm** install command as follows:

```
$ npm install
```

- NPM will automatically detect your package.json file and will install all your application dependencies, placing them under a local **node_modules** folder.
- An alternative and sometimes better approach to install your dependencies is to use the following **npm** update command:

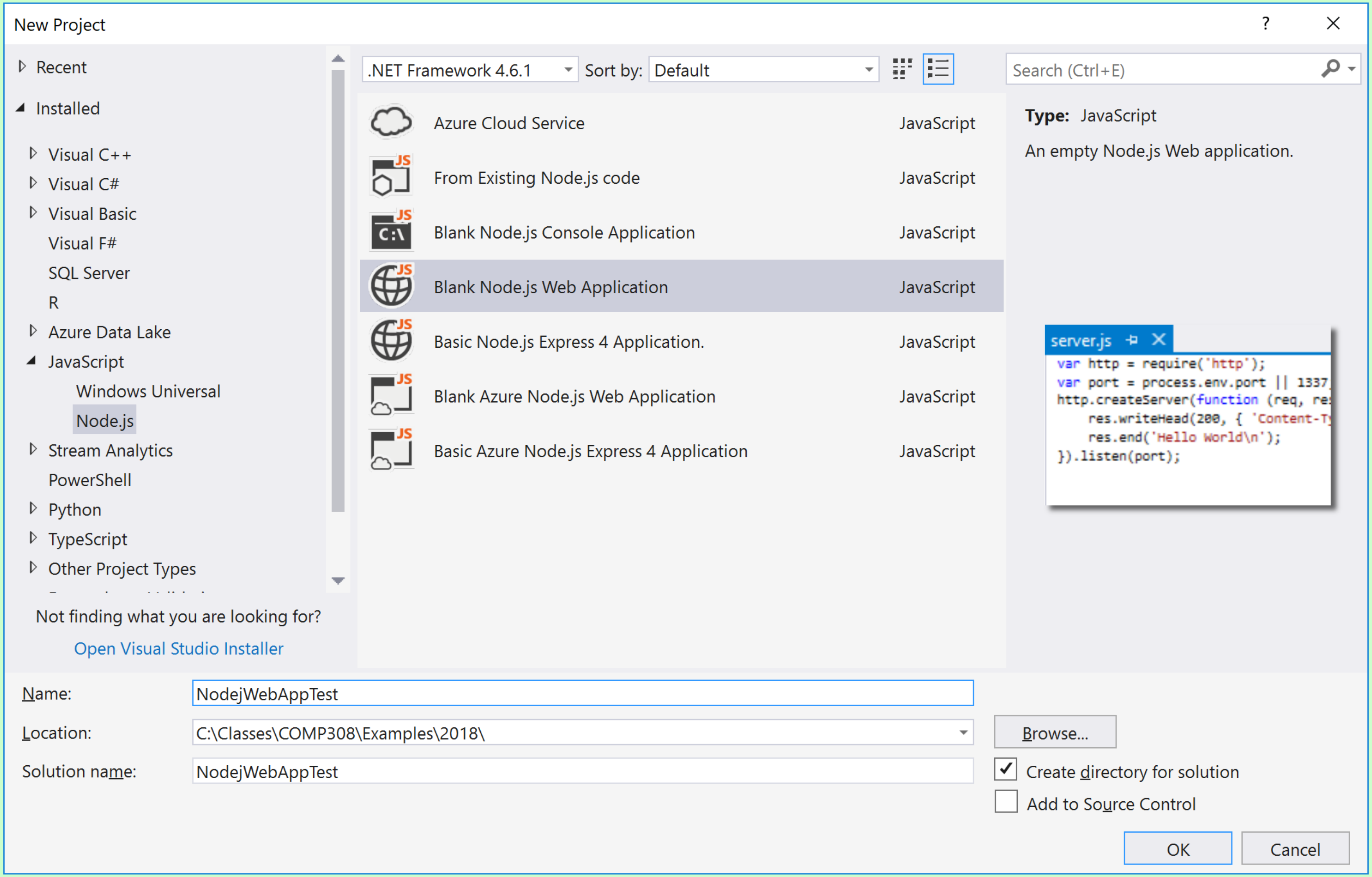
```
$ npm update
```

Updating the package.json file

- Another robust feature of the **npm** install command is the ability to **install a new package and save the package information as a dependency in your package.json file**.
- This can be accomplished using the **--save** optional flag when installing a specific package.
- For example, to install the latest version of Express and save it as a dependency, you can issue the following command:

```
$ npm install express --save
```

Creating Node.js Apps in VS 2017



New Project

- Recent
- Installed
  - Visual C++
  - Visual C#
  - Visual Basic
  - Visual F#
  - SQL Server
  - R
  - Azure Data Lake
  - JavaScript
    - Windows Universal
    - Node.js
  - Stream Analytics
  - PowerShell
  - Python
  - TypeScript
  - Other Project Types

Not finding what you are looking for?

Open Visual Studio Installer

.NET Framework 4.6.1 Sort by: Default

Search (Ctrl+E)

Azure Cloud Service	JavaScript
From Existing Node.js code	JavaScript
Blank Node.js Console Application	JavaScript
Blank Node.js Web Application	JavaScript
Basic Node.js Express 4 Application.	JavaScript
Blank Azure Node.js Web Application	JavaScript
Basic Azure Node.js Express 4 Application	JavaScript

Type: JavaScript

An empty Node.js Web application.

server.js

```
var http = require('http');
var port = process.env.port || 1337
http.createServer(function (req, re
    res.writeHead(200, { 'Content-T
    res.end('Hello World\n');
}).listen(port);
```

Name: NodejWebAppTest

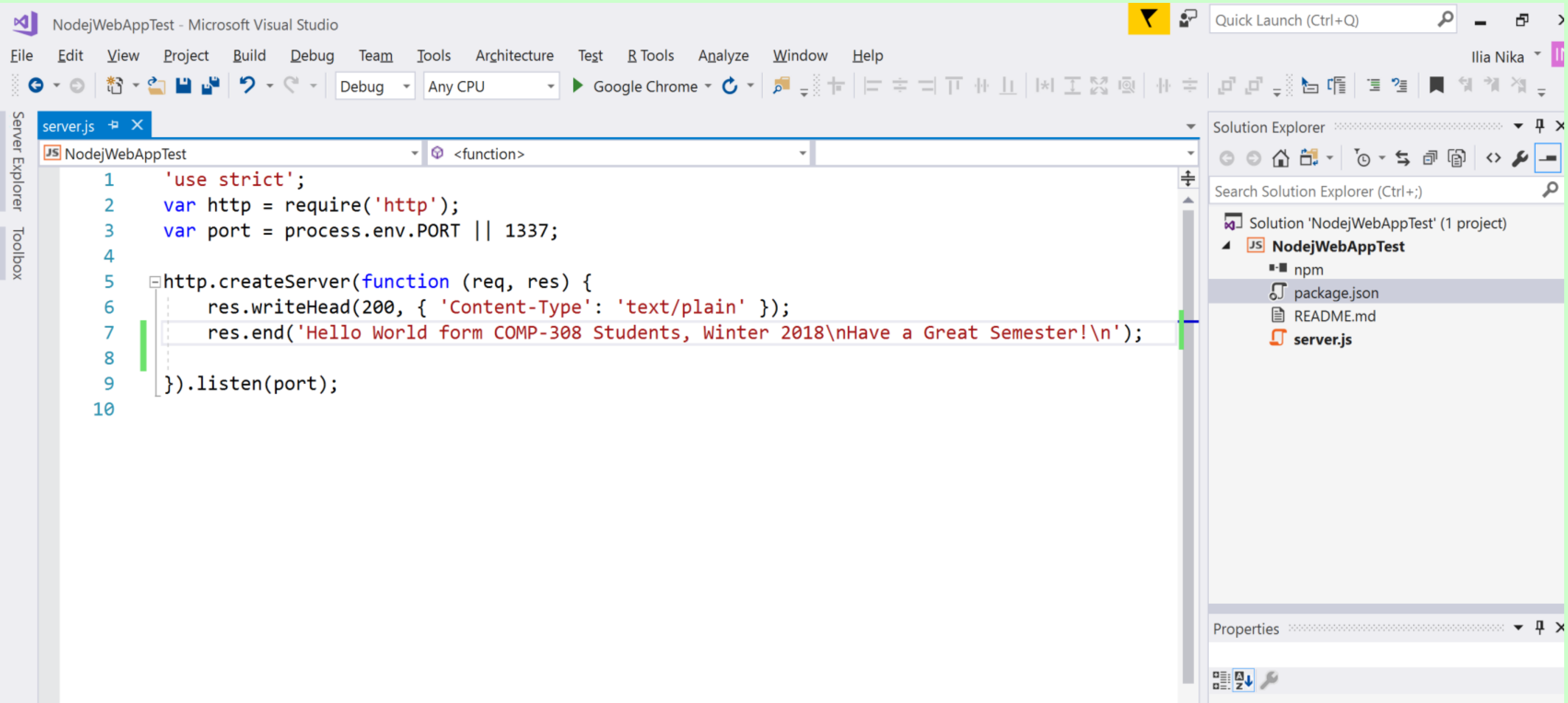
Location: C:\Classes\COMP308\Examples\2018\

Solution name: NodejWebAppTest

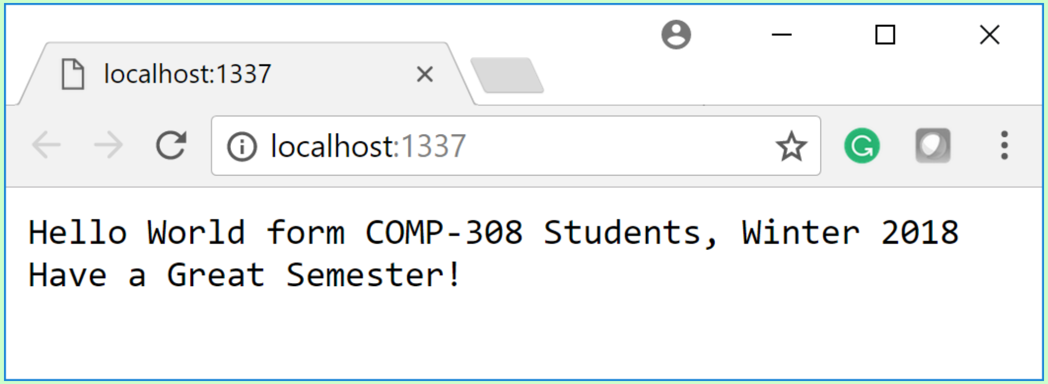
☑ Create directory for solution

☐ Add to Source Control

Creating Node.js Apps in VS 2017


NodejWebAppTest - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
File Edit View Project Build Debug Team Tools Architecture Test R Tools Analyze Window Help
Ilia Nika
Debug
Any CPU
Google Chrome
server.js
NodejWebAppTest
<function>
Server Explorer
Toolbox
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'NodejWebAppTest' (1 project)
NodejWebAppTest
npm
package.json
README.md
server.js
Properties

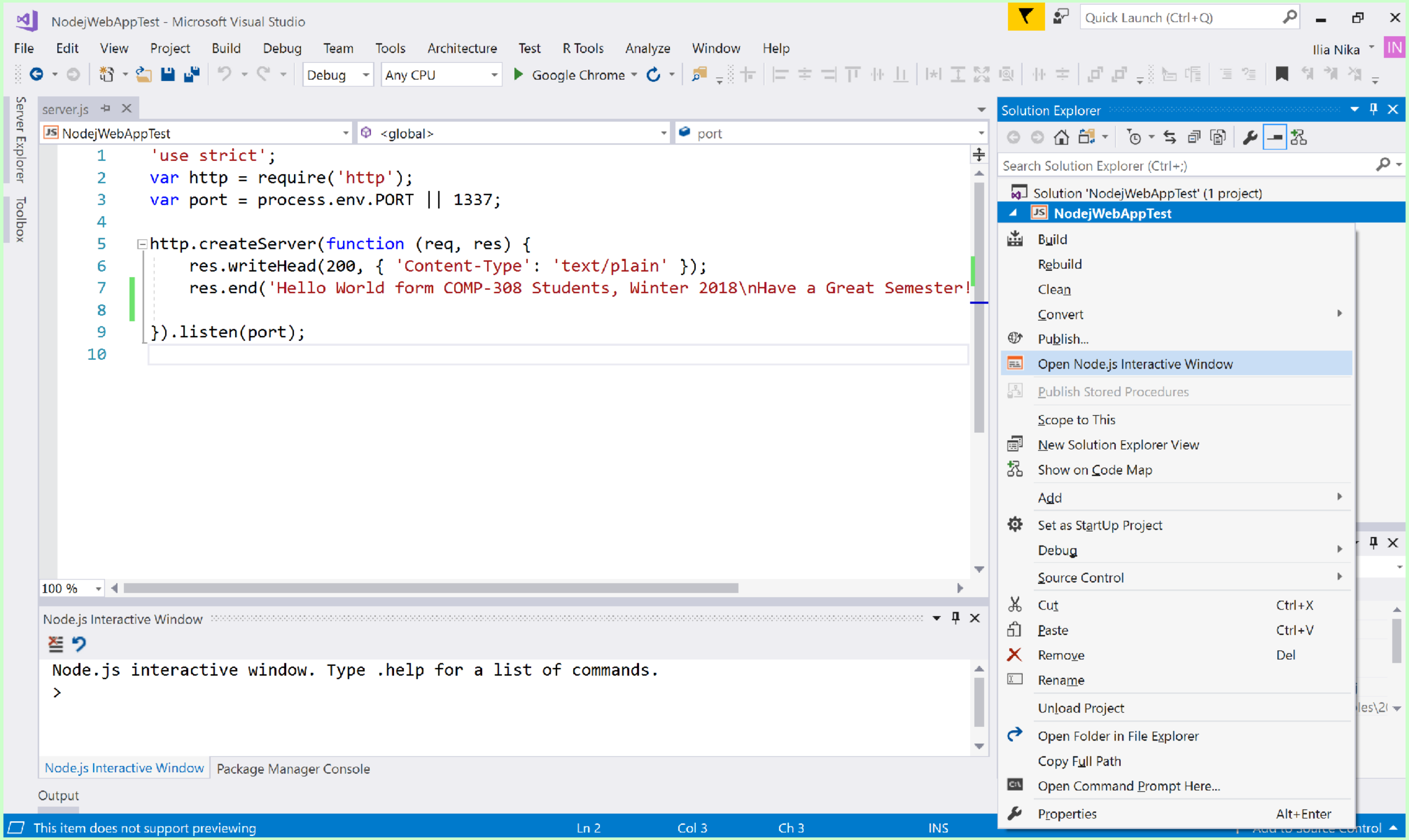
```javascript
'use strict';
var http = require('http');
var port = process.env.PORT || 1337;

http.createServer(function (req, res) {
    res.writeHead(200, { 'Content-Type': 'text/plain' });
    res.end('Hello World form COMP-308 Students, Winter 2018\nHave a Great Semester!\n');

}).listen(port);

```



```
Hello World form COMP-308 Students, Winter 2018
Have a Great Semester!
```

Node.js Interactive Window

- ❑ Right click on the project and select it:



NodejWebAppTest - Microsoft Visual Studio

```
'use strict';
var http = require('http');
var port = process.env.PORT || 1337;

http.createServer(function (req, res) {
    res.writeHead(200, { 'Content-Type': 'text/plain' });
    res.end('Hello World form COMP-308 Students, Winter 2018\nHave a Great Semester!

}).listen(port);
```

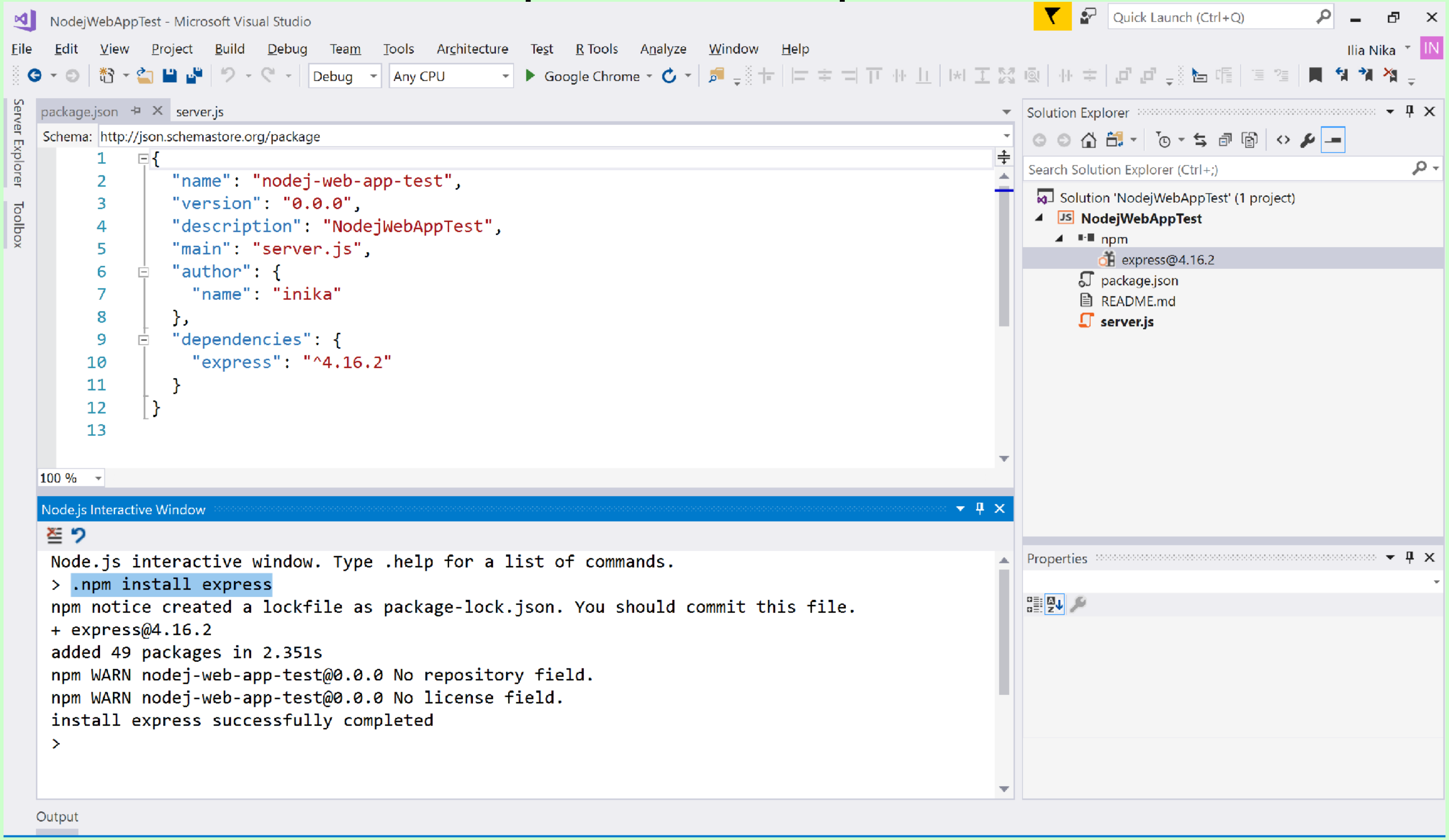
Node.js Interactive Window

```
Node.js interactive window. Type .help for a list of commands.
>
```

Installing Express

- ❑ In Node.js Interactive Window type:

  .npm install express



NodejWebAppTest - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
File Edit View Project Build Debug Team Tools Architecture Test R Tools Analyze Window Help
Ilia Nika
IN
Debug
Any CPU
Google Chrome
Server Explorer
Toolbox
package.json
server.js
Schema: http://json.schemastore.org/package
100 %
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'NodejWebAppTest' (1 project)
NodejWebAppTest
npm
express@4.16.2
package.json
README.md
server.js
Properties
Node.js Interactive Window
Output

```
{
  "name": "nodej-web-app-test",
  "version": "0.0.0",
  "description": "NodejWebAppTest",
  "main": "server.js",
  "author": {
    "name": "inika"
  },
  "dependencies": {
    "express": "^4.16.2"
  }
}
```

```
Node.js interactive window. Type .help for a list of commands.
> .npm install express
npm notice created a lockfile as package-lock.json. You should commit this file.
+ express@4.16.2
added 49 packages in 2.351s
npm WARN nodej-web-app-test@0.0.0 No repository field.
npm WARN nodej-web-app-test@0.0.0 No license field.
install express successfully completed
>
```

References

- ❑ Textbook
- ❑ https://nodejs.org/en/
- ❑ https://nodejs.org/api/cli.html
- ❑ https://nodejs.org/api/repl.html
- ❑ http://expressjs.com/
- ❑ https://angularjs.org/
- ❑ https://www.mongodb.org/
- ❑ https://www.visualstudio.com/vs/node-js/