ĐẠI HỌC BÁCH KHOA HÀ NỘI
VIỆN CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG

Introduction to Node.js

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Introduction

Basic Nodejs

- Node.js is an open-source and cross-platform JavaScript runtime environment
- Node.js runs the V8 JavaScript engine, the core of Google Chrome, outside of the browser. This allows Node.js to be very performant.
  - 2009: **Node.js** was created by Ryan Dahl, the first form of **npm** is created
  - 2011: Larger companies adopting **Node.js:** LinkedIn, Uber,…
  - 2015: The Node.js Foundation is born, release **Node.js 4**
  - 2017: Node.js 8, introduces Node.js in its testing suite, officially making Node.js a target for the JS engine
  - 2020: Node.js 14, 15
- In simple words Node.js is **“Server-side JavaScript”.**

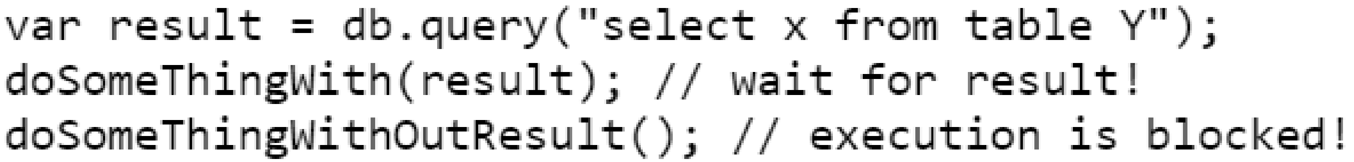
Node’s goal is to provide an easy way to build scalable network programs – (from nodejs.org)

Basic Nodejs (cont.)

- A Node.js app is run in a single process, without creating a new thread for every request.
  - provides a set of asynchronous I/O primitives in its standard library that prevent JavaScript code from blocking – Non-blocking I/O

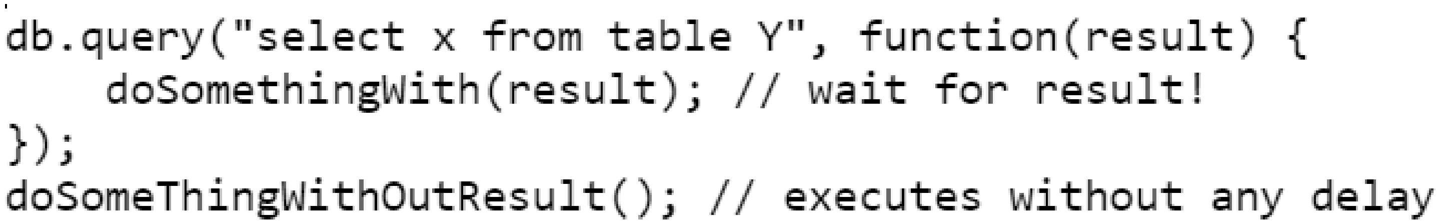
Example:

❑ Traditional I/O



```
var result = db.query("select x from table Y");
doSomeThingWith(result); // wait for result!
doSomeThingWithOutResult(); // execution is blocked!
```

❑ Non-traditional, non-blocking I/O:



```
db.query("select x from table Y", function(result) {
    doSomethingWith(result); // wait for result!
});
doSomeThingWithOutResult(); // executes without any delay
```

When can Node.js do?

- Generate dynamic page content
- Create, open, read, write, delete, close files on server
- Collect form data
- Add, delete, modify data in database
- Etc.

When to use Node.js?

- Node.js is good for creating streaming based real-time services, web chat applications, static file servers, etc.

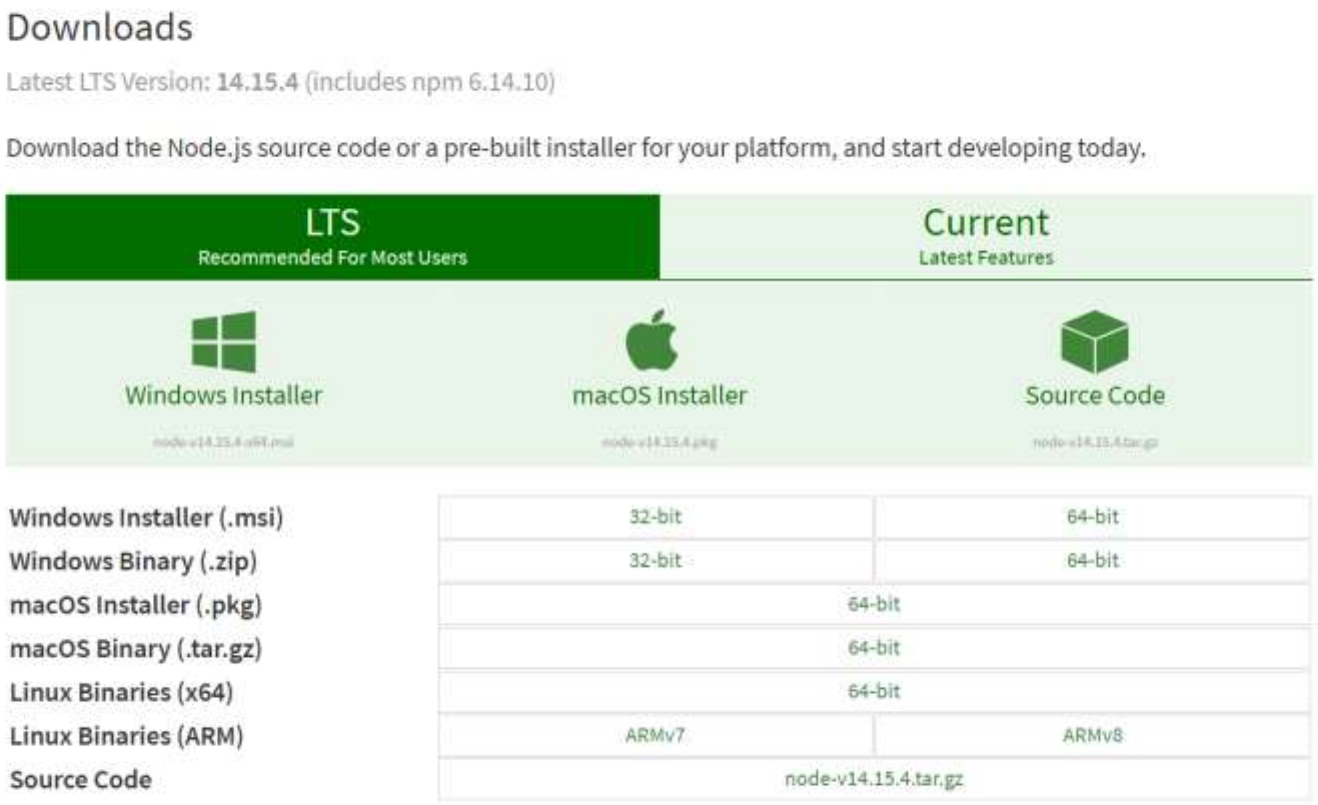
- If high level concurrency and not worried about CPU-cycles.

- If you are great at writing JavaScript code because then you can use the same language at both the places: server-side and client-side

Installation and Example

Installation

- Node.js can be installed in different ways.
  - Download from Node.js website: https://nodejs.org/en/download/



Downloads

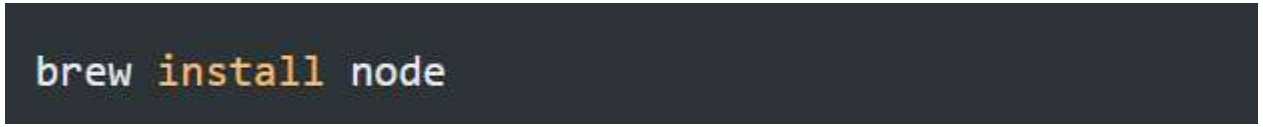
Latest LTS Version: **14.15.4** (includes npm 6.14.10)

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

Windows Installer (.msi)	32-bit	64-bit
Windows Binary (.zip)	32-bit	64-bit
macOS Installer (.pkg)	64-bit	
macOS Binary (.tar.gz)	64-bit	
Linux Binaries (x64)	64-bit	
Linux Binaries (ARM)	ARMv7	ARMv8
Source Code	node-v14.15.4.tar.gz	

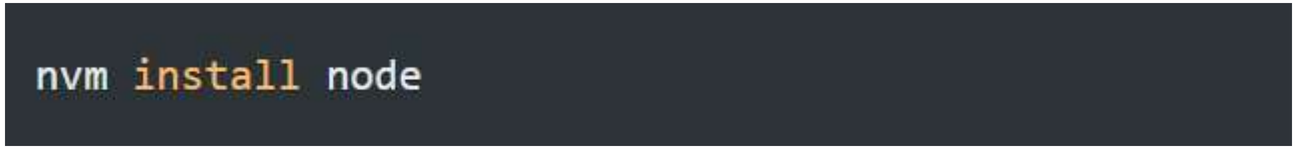
Installation

- Node.js can be installed in different ways.
  - On MacOS: from CLI



```
brew install node
```

  - On Ubuntu

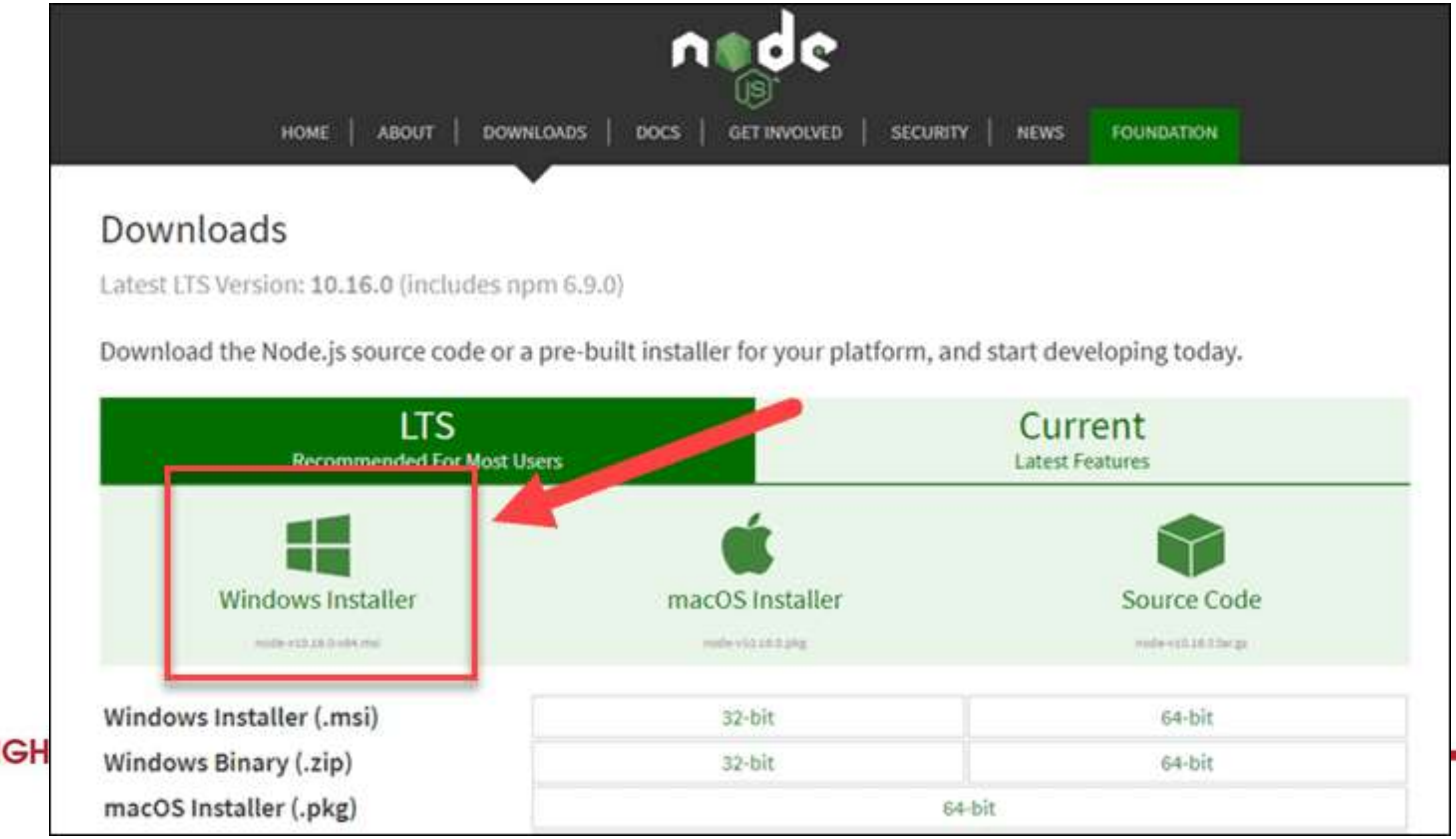


```
nvm install node
```

Install Node.js and NPM on Windows

Step 1: Download Node.js Installer

navigate to https://nodejs.org/en/download/. Click the **Windows Installer** button to download the latest default version.



Downloads

Latest LTS Version: **10.16.0** (includes npm 6.9.0)

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

macOS Installer

Source Code

Windows Installer (.msi)	32-bit	64-bit
Windows Binary (.zip)	32-bit	64-bit
macOS Installer (.pkg)	64-bit	

Install Node.js and NPM on Windows

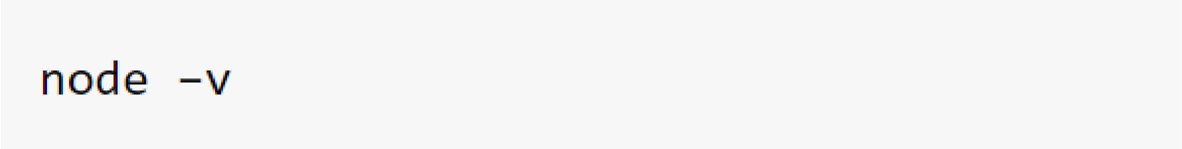
Step 2: Install Node.js and NPM from Browser

- Browse to the location where you have saved the file and double-click it to launch > **Run** > **Next**
- On the next screen, review the license agreement. Click **Next** if you agree to the terms and install the software.
- The installer will prompt you for the installation location. Leave the default location, unless you have a specific need to install it somewhere else – then click **Next**.
- The wizard will let you select components to include or remove from the installation. Again, unless you have a specific need, accept the defaults by clicking **Next**.
- Finally, click the **Install** button to run the installer. When it finishes, click **Finish**.

Install Node.js and NPM on Windows

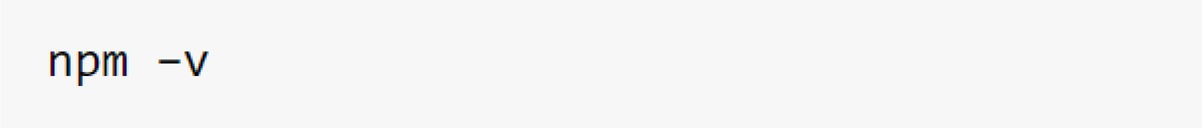
Step 2: Verify installation

Open a command prompt (or PowerShell), and enter the following:



```
node -v
```

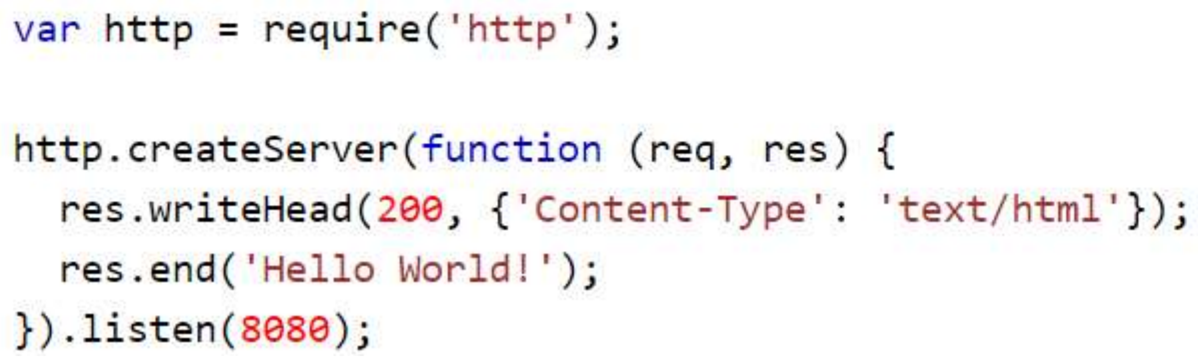
The system should display the Node.js version installed on your system. You can do the same for NPM:



```
npm -v
```

Basic Node.js Usage

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



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

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

Save the file on your computer: C:\Users\Your Name\myfirst.js

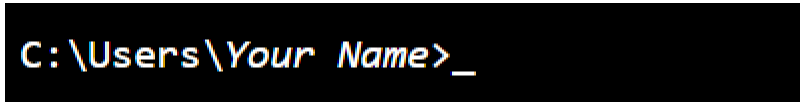
The code tells the computer to write "Hello World!" if anyone (e.g. a web browser) tries to access your computer on port 8080.

Basic Node.js Usage

Command Line Interface:

Node.js files must be initiated in the "Command Line Interface" program of your computer. (cmd in Windows)

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

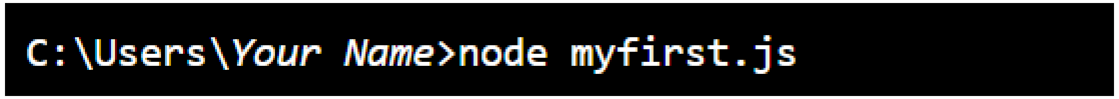


```
C:\Users\Your Name>_
```

Basic Node.js Usage

Initiate the Node.js File

Start your command line interface, write node myfirst.js and hit enter:



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

Start your internet browser, and type in the address: http://localhost:8080
You will get a "Hello World!" message in return!