# Node.js

Lesson 1—Introduction to Node.js

# Lesson Outcomes

- Get conversant with Node.js

- Successfully install Node.js
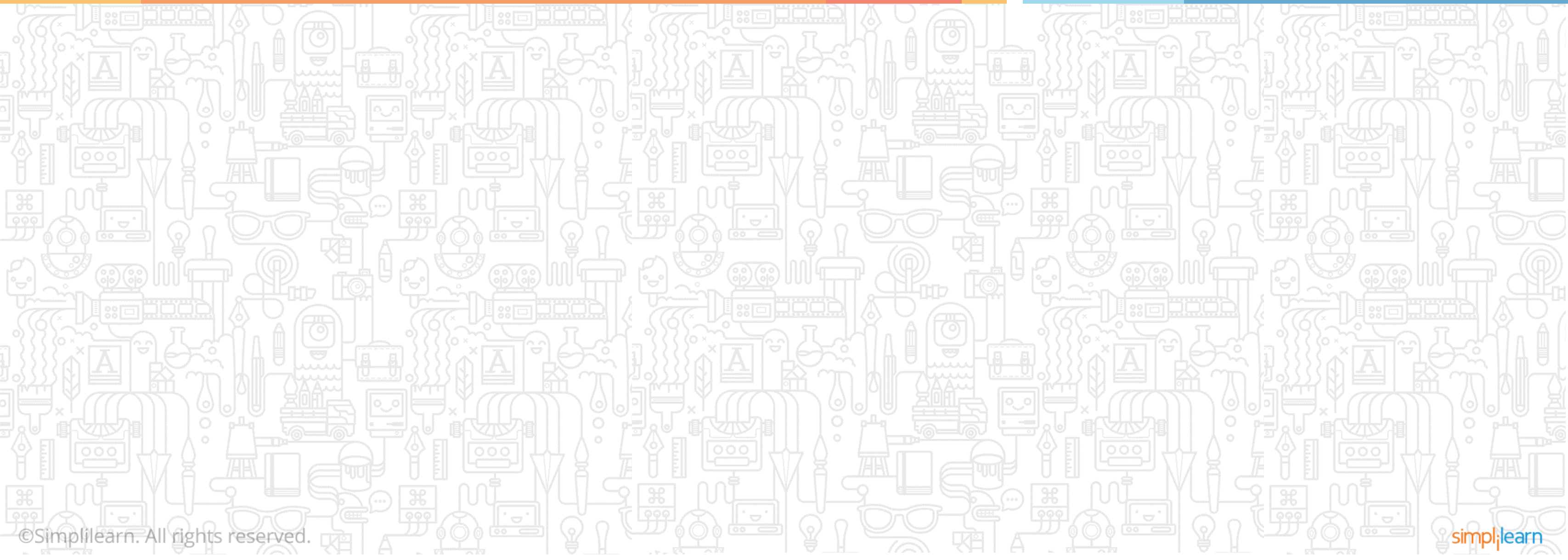
# Learning Objectives
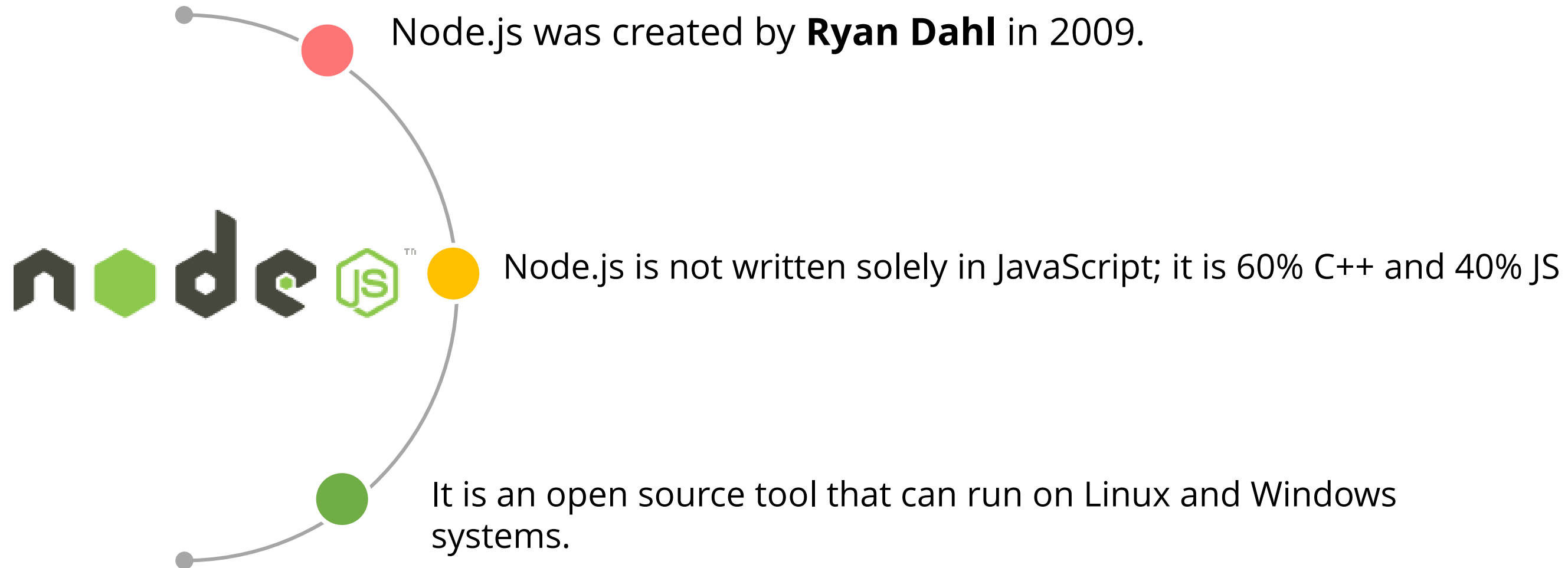
Get an Introduction to Node.js

Understand Node.js in detail

Learn to install Node.js

# Introduction to Node.js

## Topic 1—Introduction to Node.js

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# Introduction to Node.js

Node.js was created by **Ryan Dahl** in 2009.

Node.js is not written solely in JavaScript; it is 60% C++ and 40% JS
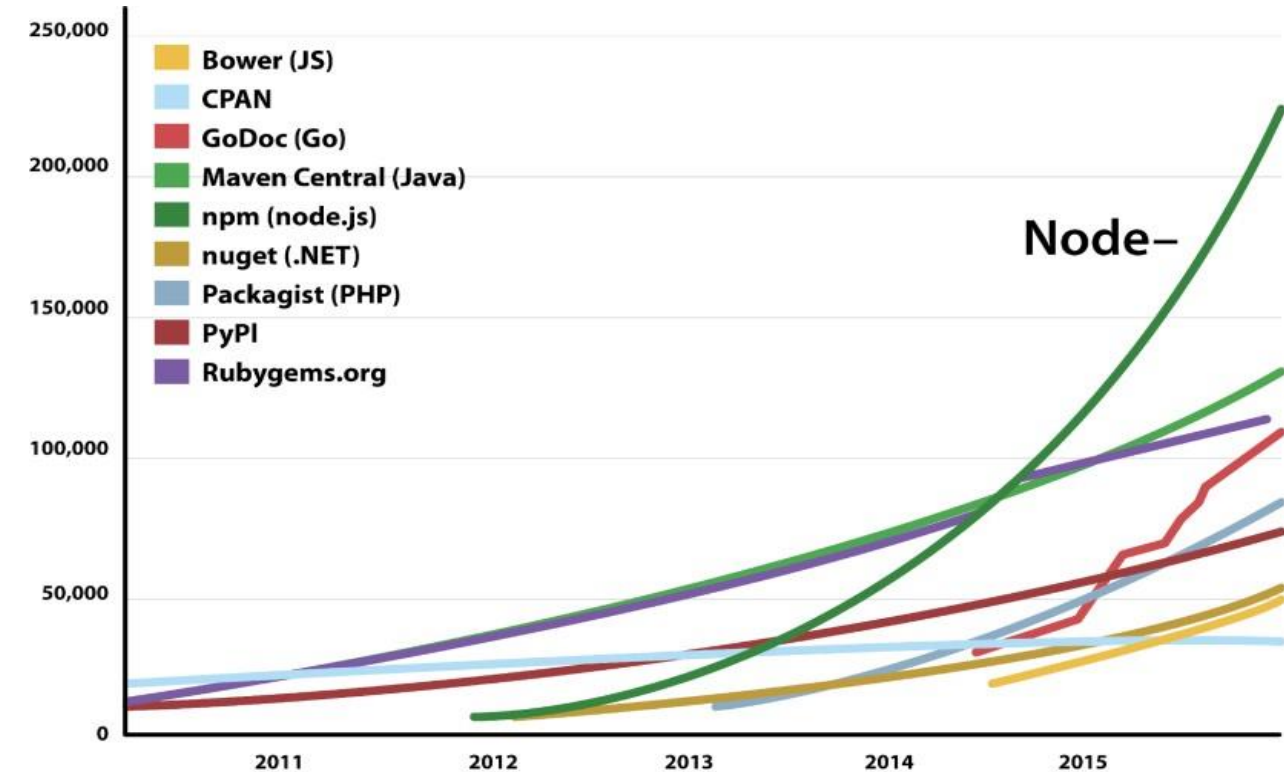
It is an open source tool that can run on Linux and Windows systems.

"Node's goal is to provide an easy way to build scalable network programs."—Nodejs.org

# Introduction to Node.js
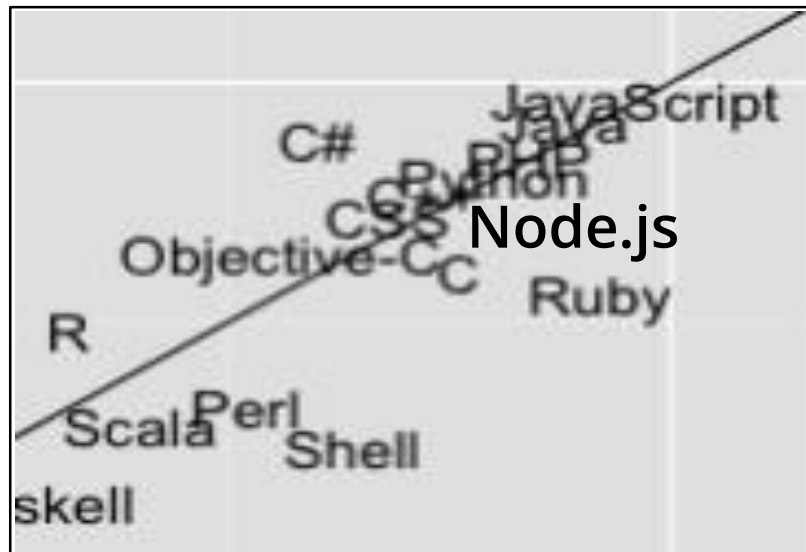
Node.js ranks among the top 10 languages for full stack, front end, and back end developers according to StackOverflow's 2016 developer survey.



Node.js is the only language listed on top 10 most wanted Developer skills.

By many measures, Node.js is the fastest growing and the most significant development language right now. With 4 million users and an annual growth rate of 100%, Node.js is truly everywhere.

# Introduction to Node.js

## NODE.JS DEPLOYMENT IN BIG BRANDS

# Introduction to Node.js

## EXTRAORDINARY PERFORMANCE OF NODE.JS



Taken from: **http://code.google.com/p/node-js-vs-apache-php-benchmark/wiki/Tests**
A benchmark between Apache+PHP and Node.js shows the response time for 1000 concurrent connections making 10,000 requests each, for 5 tests
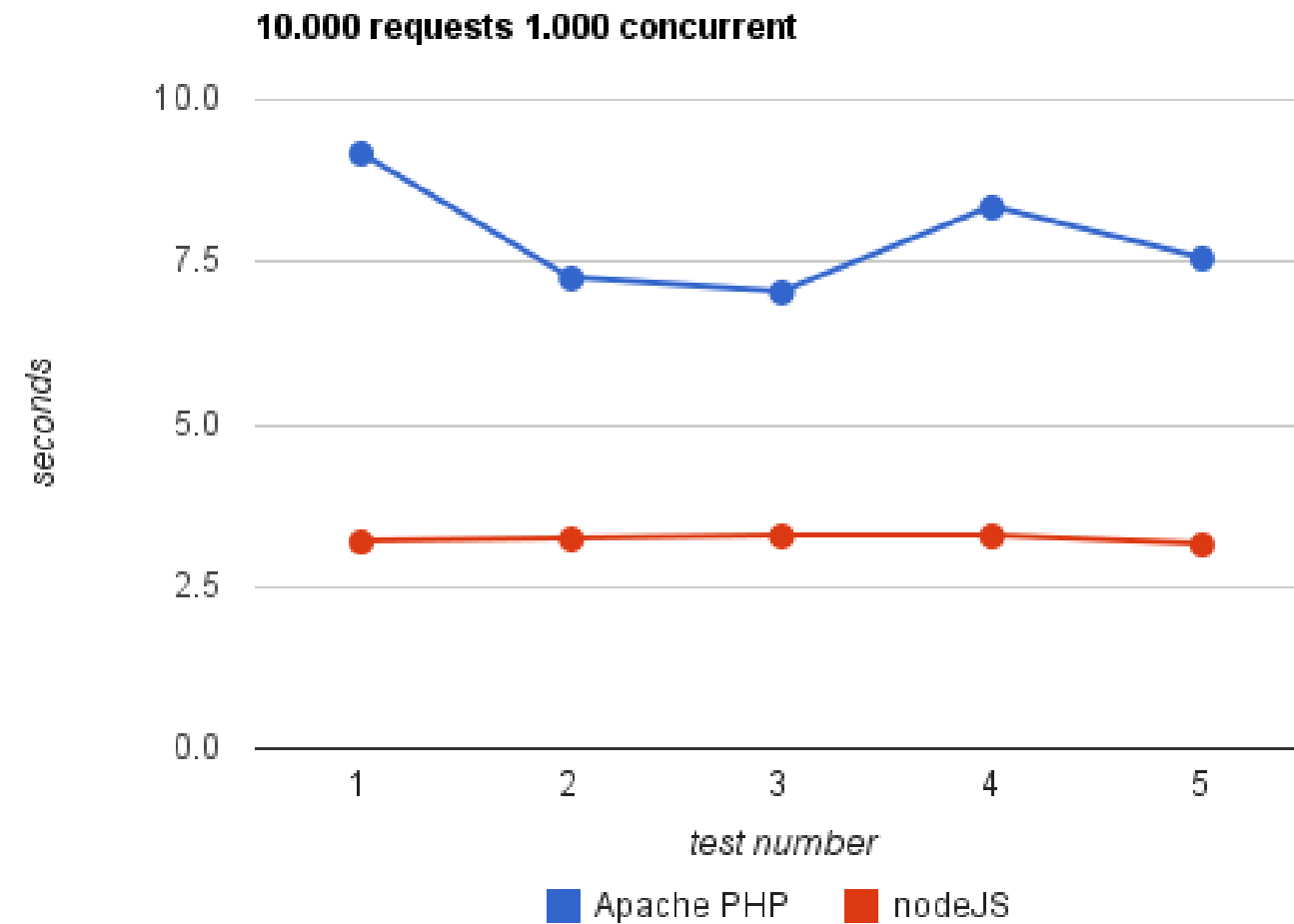


Taken from: **http://nodejs.org/jsconf2010.pdf**
The benchmark shows the response time in milli-secs for 4 evented servers
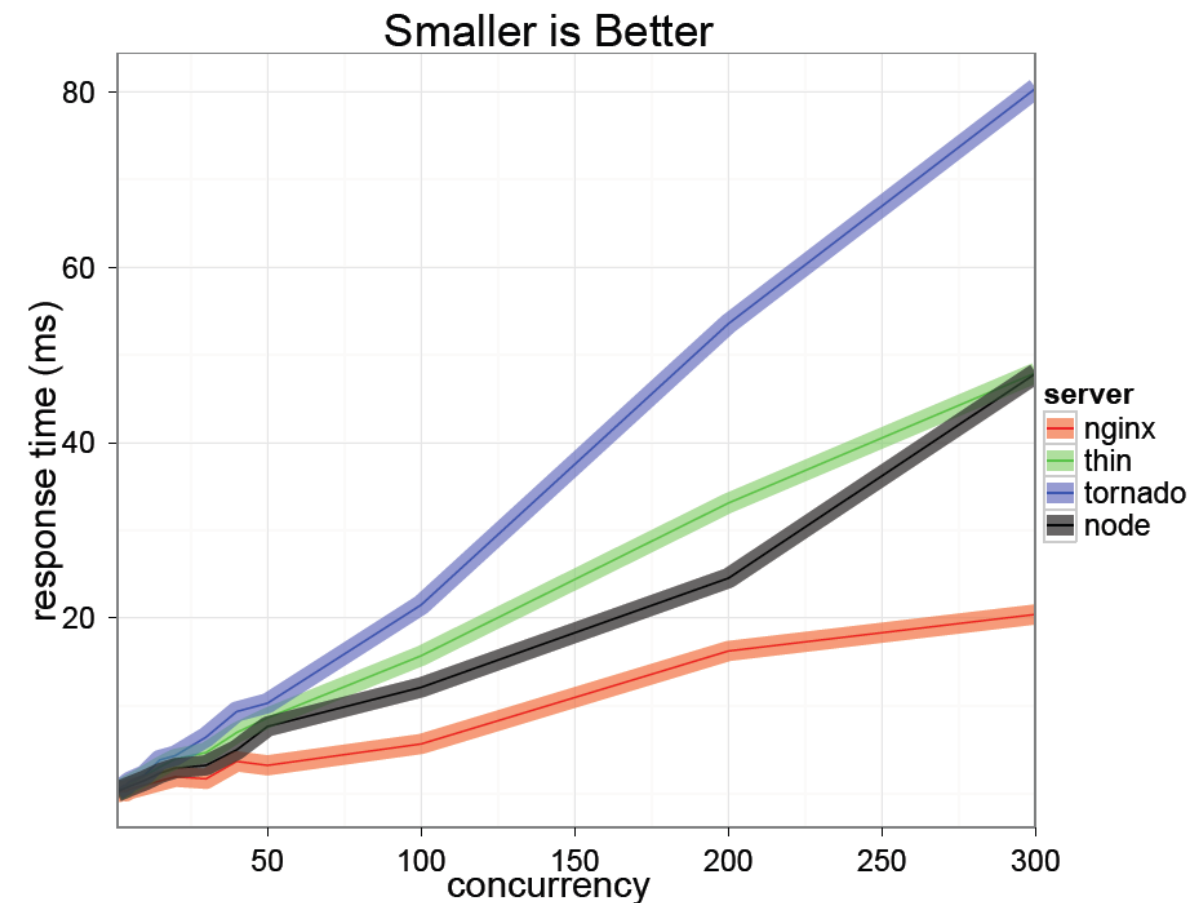
# Introduction to Node.js
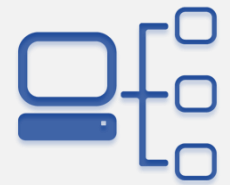
## Topic 2—What is Node.js?
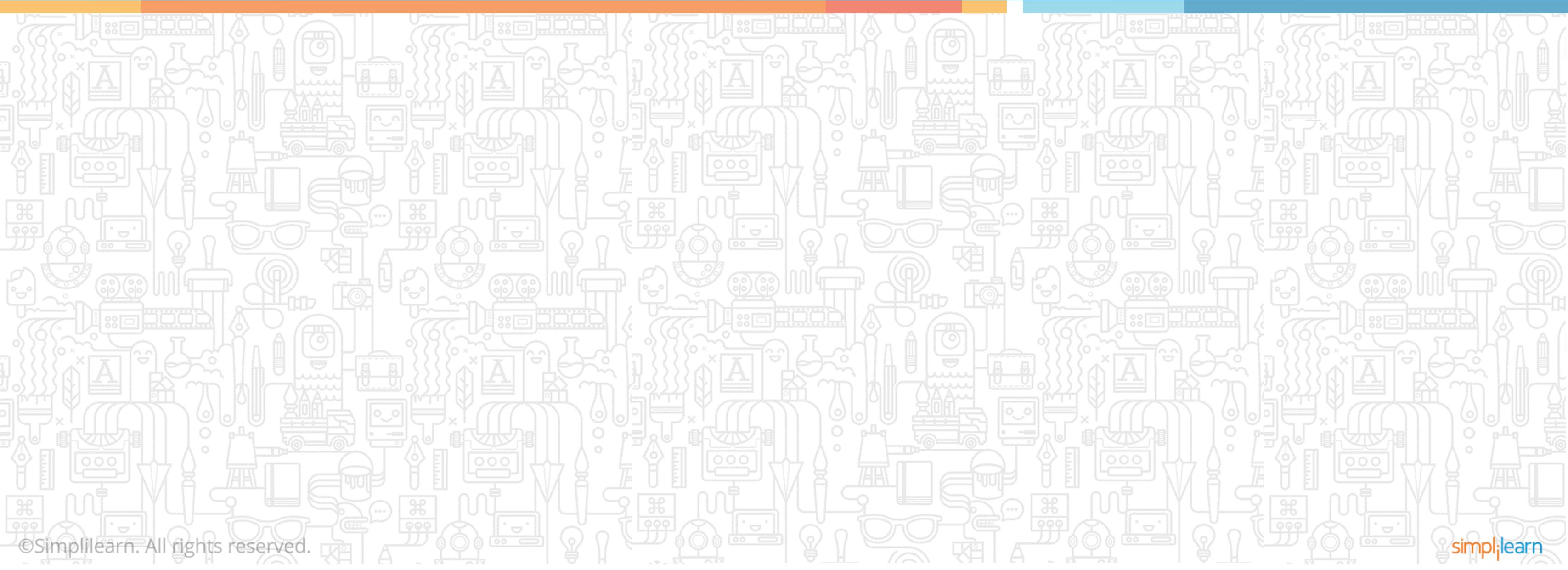
# What is Node.js?

Node.js runs on Chrome's V8 JavaScript engine.

It is "server-side JavaScript" environment.

It is a high-performance network applications framework which is well optimized for high concurrent environments.

It provides an event-driven architecture and a non blocking I/O that is optimized and scalable, which is used for real-time application.

Node.js applications never buffer any data. These applications simply output the data in chunks.

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# What is Node.js?

## V8 JAVASCRIPT ENGINE

V8 is an open source JavaScript Engine developed by Google for its Chrome web browser.

V8 compiles JavaScript to native machine code.

The V8 engine is extremely fast.

V8 focuses on the web, so it works well with HTTP, DNS, and TCP.

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# Diverse Application of Node.js

**Using Node.js you can create:**

DNS server

Static File Server

Web Chat Application like Gtalk in the browser

HTTP server

TCP server

Online games, Collaboration tools

**Node.js can also:**

Share code between the browser and backend

Manage the load without adding additional CPU cycles, when there is a high level concurrency

Interact with MySQL

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# Why Node.js?

## SOME OF THE IMPORTANT FUNCTIONS SUPPORTED BY NODE.JS

| | |
|---|---|
| Assertion Testing | File System |
| Buffer | HTTP/HTTPS |
| C/C++ Addons | Net |
| Child Processes | OS |
| Cluster | Path |
| Crypto | Process |
| Debugger | Punycode |
| DNS | Query Strings |
| Domain | REPL |
| Events | Stream |

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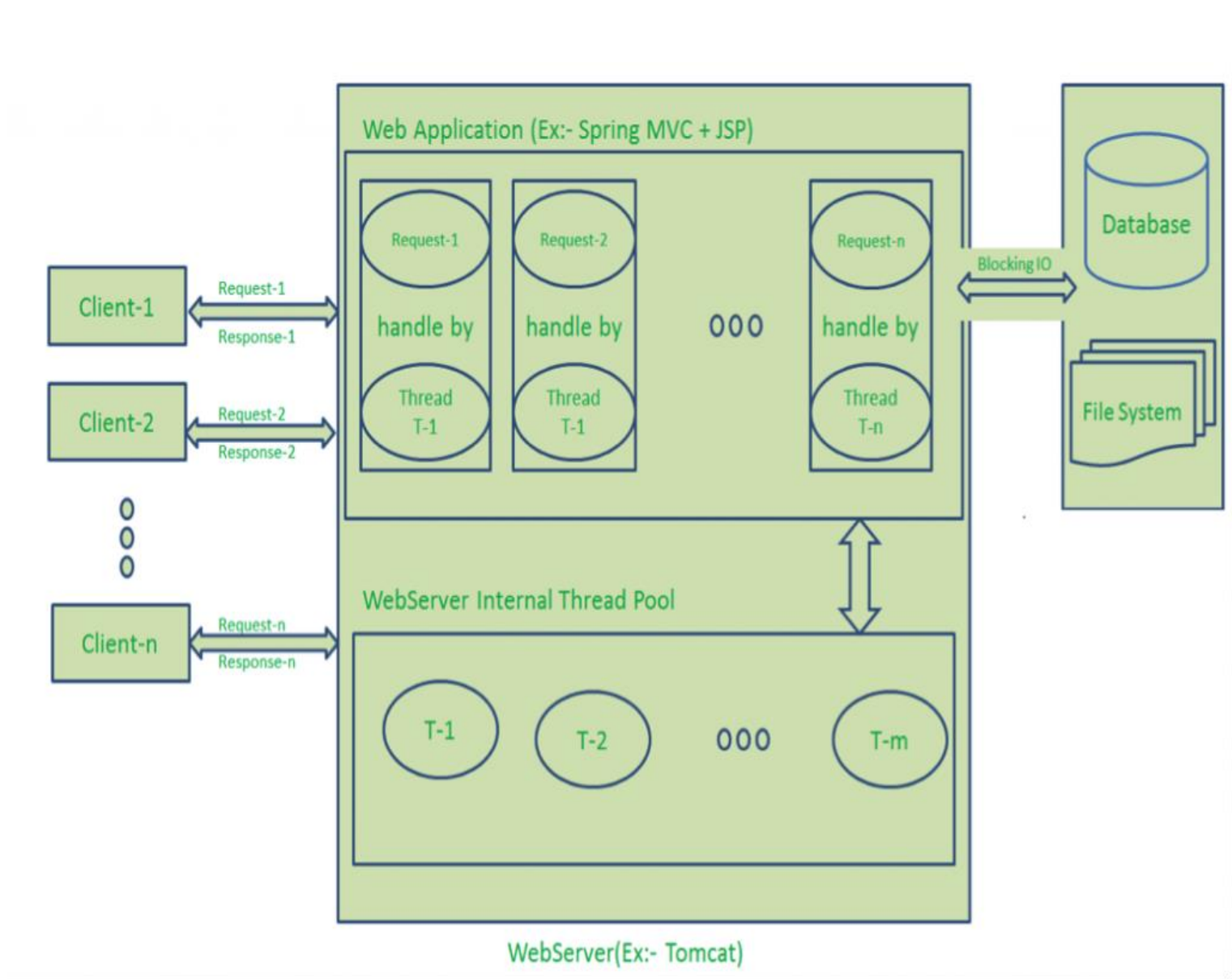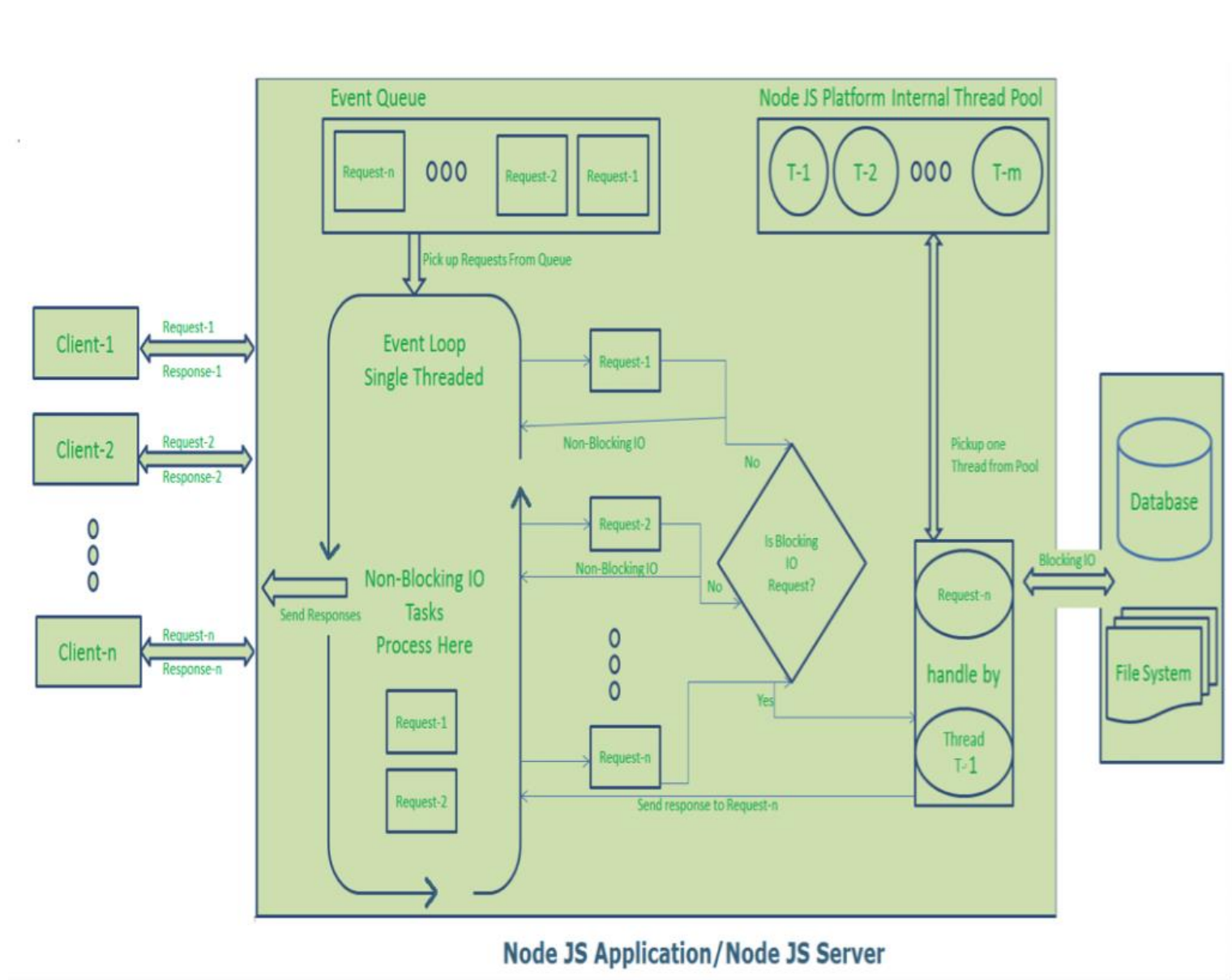
# Features of Node.js

Node.js solves the problem of multi-threaded server by using single-threaded server.



**Tomcat based multi-threaded Server**

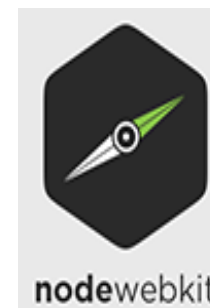**Node.js based single-threaded Server**

# Features of Node.js

Node.js supports some of the major tools like:

It easily creates apps using the web technologies like: HTML, CSS, and JavaScript.

It lets you call all Node.js modules directly from DOM and enables a new way of writing applications.

Grunt is a build/task manager written on top of Node.js.



It is the first operating system powered by Node.js and npm.

NoFlo is a JavaScript implementation of Flow-Based Programming.

Yeoman helps you to kick-start new projects, and prescribes best practices and tools to help you stay productive.

Bower manages your website frameworks, libraries, assets, and utilities.

# Introduction to Node.js

## Topic 3—Installing Node.js

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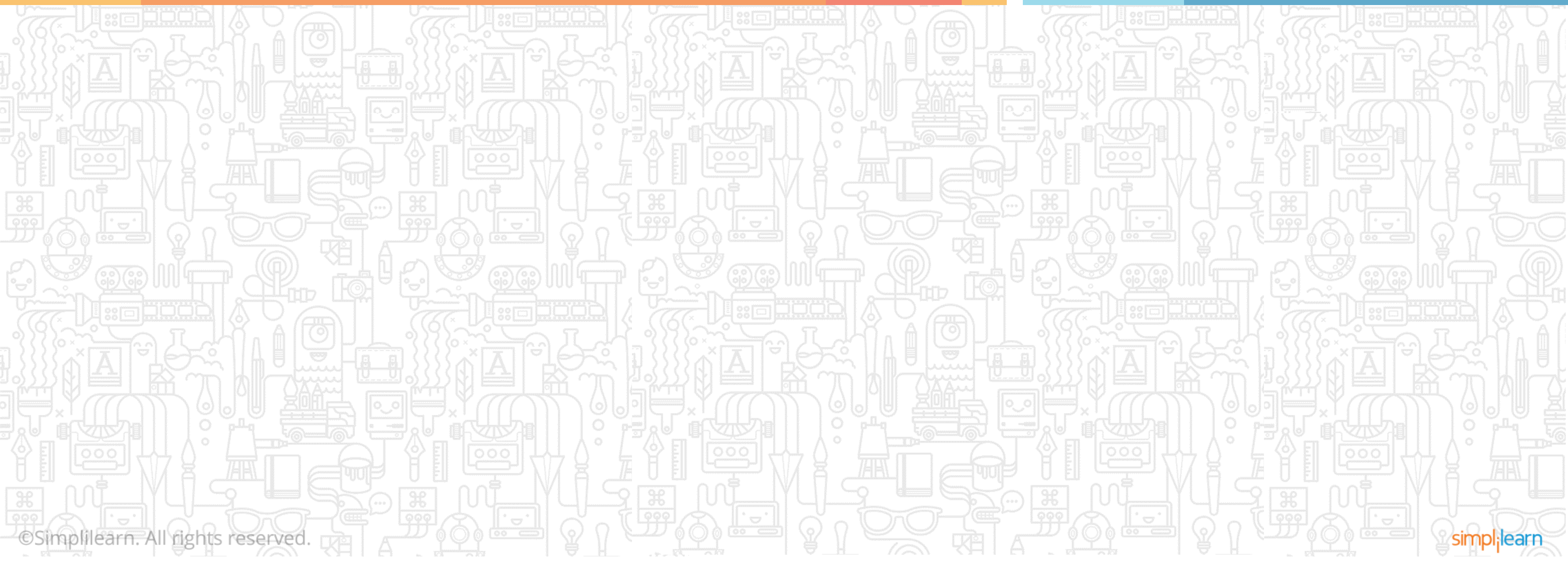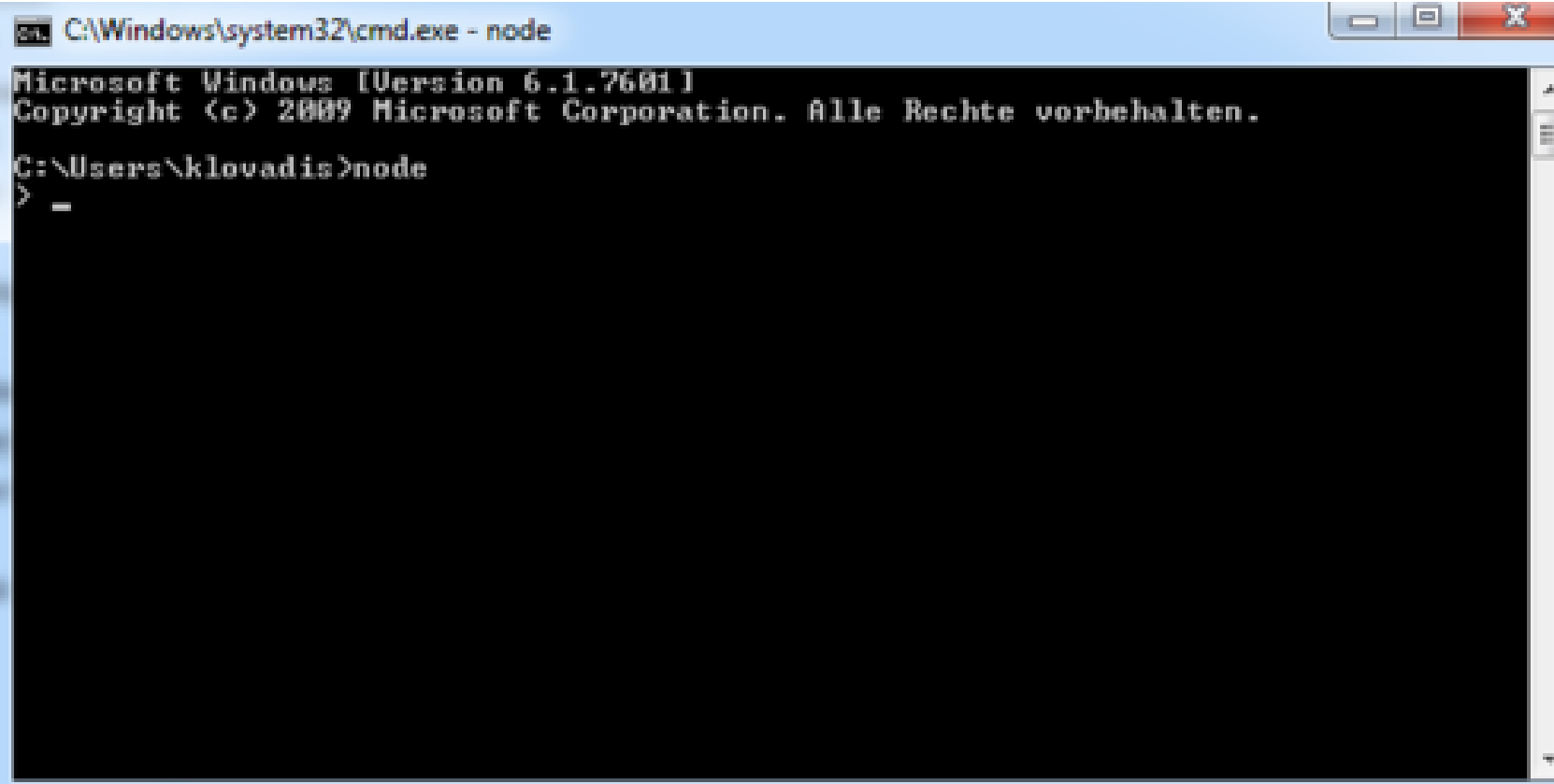
# Installing Node.js

## PREREQUISITES

- Node is not like a traditional window software as you won't find it pinned to the taskbar or in your list of Apps.

- To work with Node.js, one must type command-line instructions. So you need to be well-versed with command-line tools like the Windows Command Prompt.

# Installing Node.js
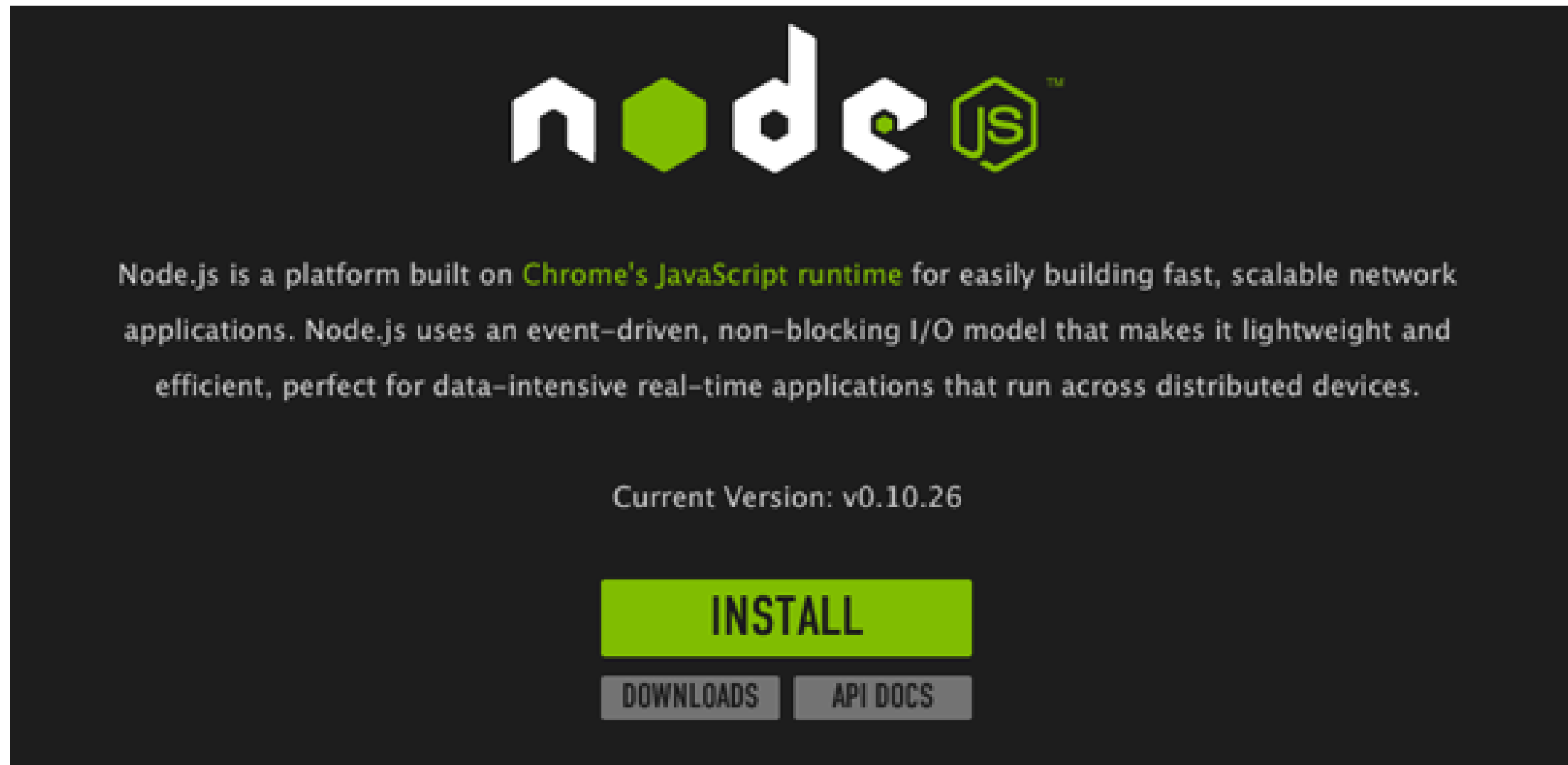
## STEPS FOR INSTALLING NODE.JS

**Step:1** Download the Node.js Windows installer from the Nodes.js website
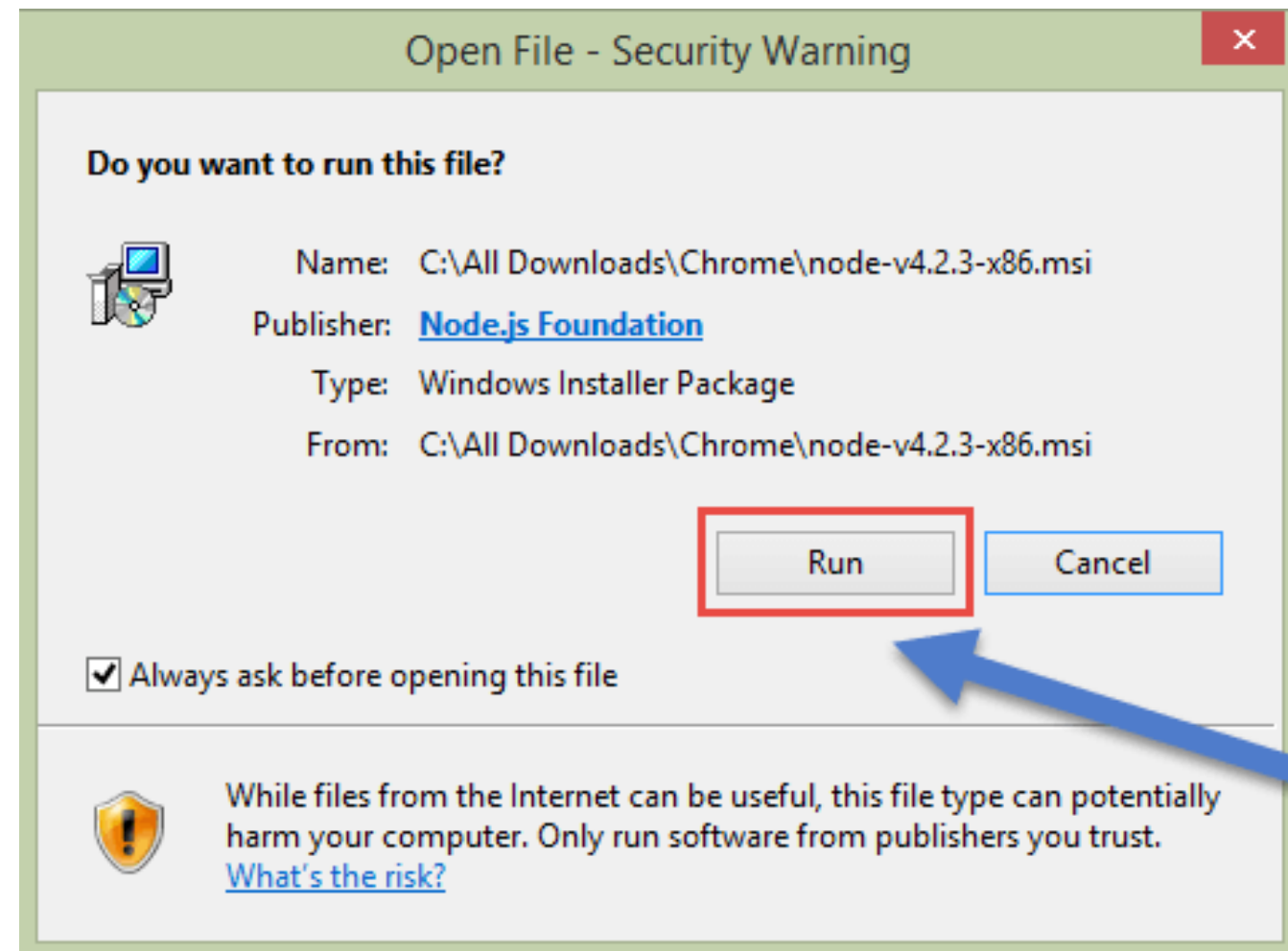
# Installing Node.js

**Step: 2** Run the downloaded installer (the .msi file you have downloaded in the previous step)

1

2

3

# Installing Node.js

## STEPS FOR INSTALLING NODE.JS

**Step: 3** Follow the prompts in the installer (Accept the license agreement, click the NEXT button a couple of times, accept the default installation settings, and move on)

1

2

3
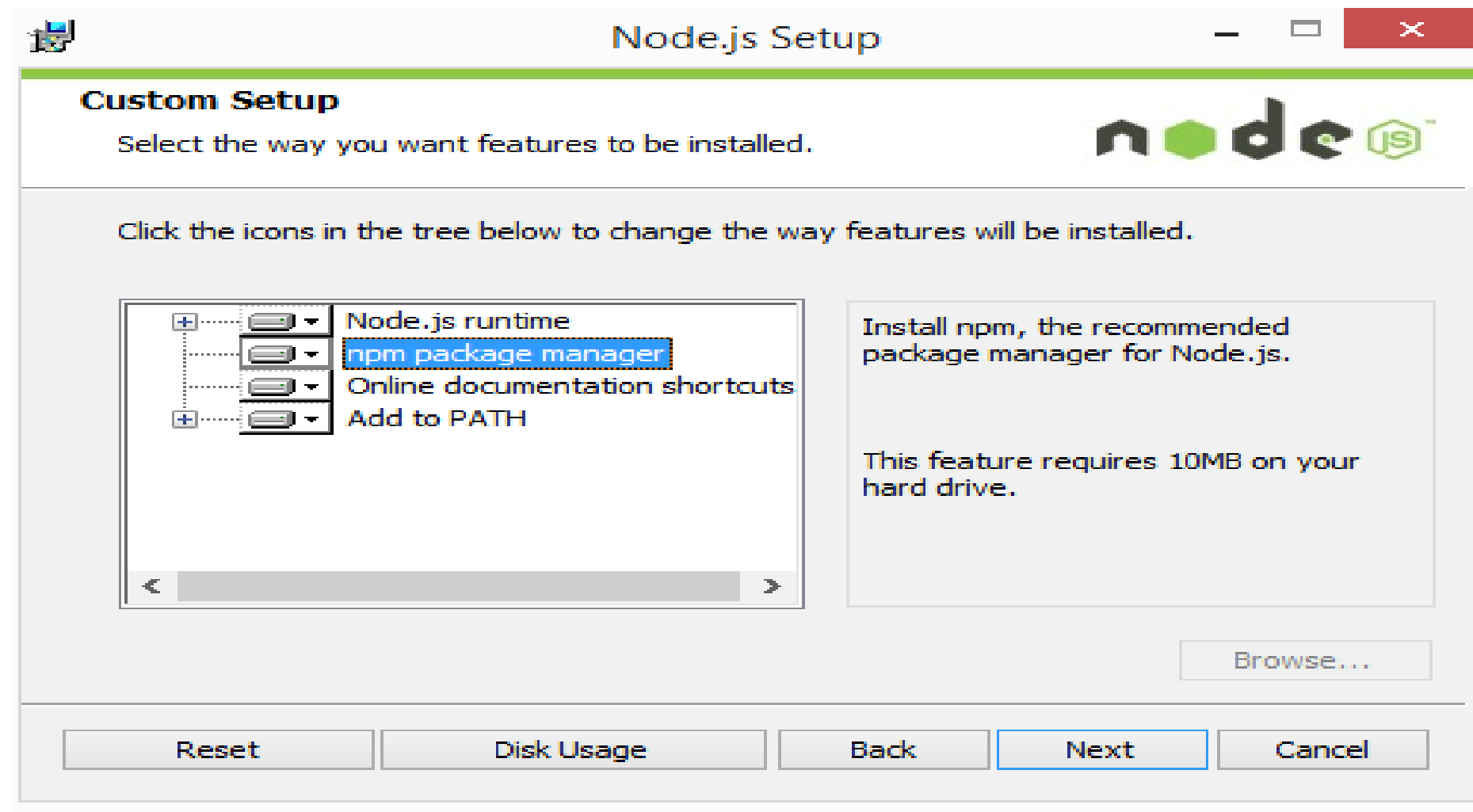
# Installing Node.js
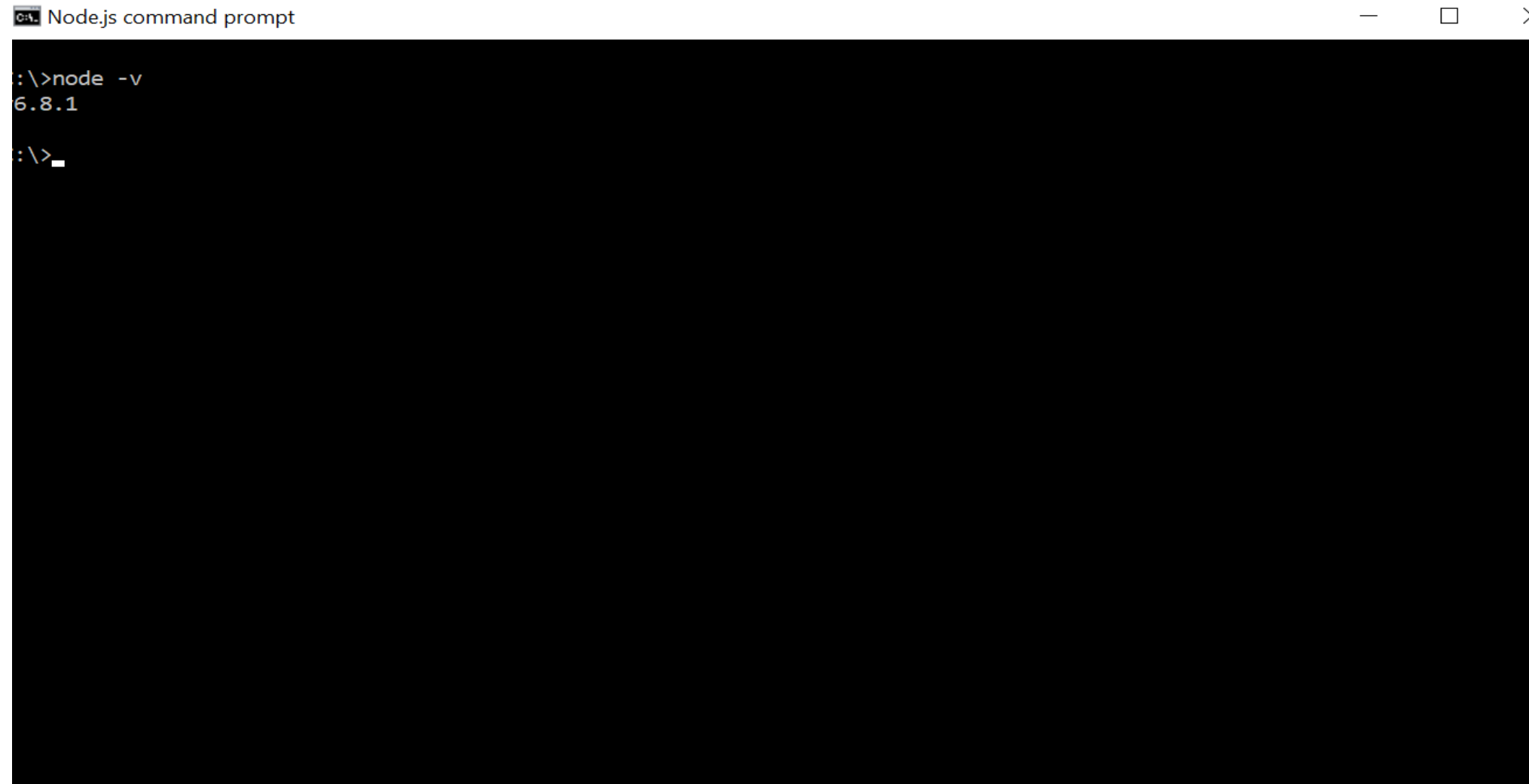
## VERIFY THE INSTALLATION

To verify that your machine has Node.js and npm installed correctly, run the following simple commands:

Verify Node: To verify if Node.js is installed, open the Windows Command Prompt, and type node -v. This should print the latest version.

**1**

**2**

**3**

**4**

```
Node.js command prompt                                    —    □    ✕

:\>node -v
6.8.1

:\>_
```

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# Installing Node.js

To verify that your machine has Node.js and npm installed correctly, run the following simple commands:

**1**

**Verify NPM version:** To check if npm is installed, run command  npm -v in Terminal. This should print npm's version number like this 3.10.8

**2**

**3**

**4**

```
Select Node.js command prompt                           —    □    ✕

C:\>node -v
v6.8.1

C:\>npm -v
3.10.8

C:\>_
```

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# Installing Node.js

To verify that your machine has Node.js and npm installed correctly, run the following simple commands:

**1**

**Create a demo file and run it.** Create a JavaScript file, name it welcome.js, and add the code console.log ('welcome to node');

**2**

**3**

welcome.js — ReactReduxBookStore — Visual Studio Code

File   Edit   Selection   View   Go   Debug   Help

JS welcome.js ✕

```
1    console.log('welcome to node');
```

**4**

# Installing Node.js

**1** To verify that your machine has Node.js and npm installed correctly, run the following simple commands:

**2** To execute the code: open your command prompt, navigate to the folder where you have saved the file, and type node welcome.js.

**3**

**4**

```
Node.js command prompt                                    —    □    ✕

E:\>node welcome.js
welcome to node

E:\>_
```

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# ? Quiz

**QUIZ 1**

**Node.js is primarily for _____.**

a.   Client-side JavaScript

b.   Server-side JavaScript

c.   Both A & B

d.   None of the above

**QUIZ 1**

**Node.js is primarily for _____.**

a. Client-side JavaScript

b. Server-side JavaScript

c. Both A & B

d. None of the above

The correct answer is  **b. Server-side JavaScript**

**Node.js is primarily for Server-side JavaScripting.**

**QUIZ 2**

**Node.js is a combination of _____ and _____.**

a.    JavaScript and Node

b.    JavaScript and C#

c.    JavaScript and C++

d.    JavaScript and C

**QUIZ 2**

**Node.js is a combination of _____ and _____.**

a. JavaScript and Node

b. JavaScript and C#

c. JavaScript and C++

d. JavaScript and C

The correct answer is  **c. JavaScript and C++**

**Node.js is a combination of 40% JavaScript and 60% C++.**

**QUIZ 3**

**Node.js is developed in which of the following engines?**

a.    Google V8 Engine

b.    Firefox JavaScript Engine

c.    Google V6 Engine

d.    Rhino JavaScript Engine

**QUIZ 3**

**Node.js is developed in which of the following engines?**

a.   Google V8 Engine

b.   Firefox JavaScript Engine

c.   Google V6 Engine

d.   Rhino JavaScript Engine

The correct answer is **a. Google V8 Engine**

**Node.js is developed on JavaScript based Google V8 Engine.**

**QUIZ 4**

**Node.js was created by _____.**

a.   Brendan Eich

b.   James Gosling

c.   Bjarne Stroustrup

d.   Ryan Dahl

**QUIZ 4**

**Node.js was created by _____.**

a.   Brendan Eich

b.   James Gosling

c.   Bjarne Stroustrup

d.   Ryan Dahl

The correct answer is  **d. Ryan Dahl**

**Node.js was created by Ryan Dahl in 2009.**

# Key Takeaways

- Node.js is "**server-side JavaScript**" which is built on Google V8 JavaScript Engine.

- Node.js is asynchronous and event-driven, fast in code execution, and single-threaded but highly scalable.

- Node.js helps in creating DNS server, Static File Server, Web Chat Application like Gtalk in the browser, and many more.

- In Node.js one must type command-line instructions. So you need to be well-versed with command-line tool like the Windows Command Prompt .

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Thank You