# Why and When to Use Node.js in 2021

Building an ideal tech stack for a powerful, secure, and robust digital solution can be a rather challenging task. There are a variety of programming languages and frameworks that impact the efficiency of an application. Therefore, it's essential to choose the right tech stack from the very start of an app development project.

When it comes to developing eCommerce sites, messengers, streaming services, and others many software developers opt for Node js. But why is Node.js considered to be one of the best environments for building these kinds of apps? In this article, we look into the reasons why software developers prefer Node.js for building their apps and explain what other digital solutions Node.js is good for.

# Node.js Introduction

Node.js is more than just a framework, it's an independent runtime based on Chrome's V8, a JavaScript engine. It means that Node.js represents a runtime environment that can execute an application code itself regardless of a browser or operating system type. This turns Node.js into a standalone application on any machine.

Other Node.js features include:

- ### A Single-Threaded Non-Blocking Input/Output

This operating model allows executing operations asynchronously, proceeding with other requests instead of waiting for I/O operations to complete. As a result, Node.js solutions have a higher productive capacity and can handle more concurrent client requests than the apps with a multi-threaded blocking model.

- ### JavaScript for Back-End Development

By using JavaScript for building the front-end and back-end of an app, software developers can connect the two layers more easily and smoothly between each other with a minimum number of merging errors between the codes. Moreover, software developers can use a TypeScript package to use this programming language in Node.js.

- ### A Package Manager for Node.js (npm)

The npm contains more than 600,000 open-source and free packages from simple libraries to full-fledged frameworks that can significantly accelerate application development. Besides that, this package manager helps software developers to better structure and organize their codes.

- **Sockets and Event-Driven Architecture**

By using a socket mechanism, a server or a client can quickly exchange and update data with other clients connected to a specific group. This technology is widely implemented for building chat rooms or streaming services. Meanwhile, event-driven and non-blocking architecture alleviates work with Node.js sockets, turning it into a simple and fast application development activity.

- **A Variety of Tools for Building Diverse Apps**

With Node.js software developers can build mobile apps for Android and iOS, web applications, as well as desktop solutions. The diversity of Node.js-based apps can be traced to the most successful apps built with this framework. They include Paypal, LinkedIn, Yahoo, Mozilla, Netflix, Uber, Groupon, GoDaddy, eBay, Slack, Trello, Skype, and many others.

# What is Node.js Used for? Type of Projects

Node.js has got a wide range of advantages. It's a lightweight, robust, and easy to scale environment that facilitates software development. Though, what type of applications can software developers build with Node.js? Let's have a closer look at where we can use Node.js.
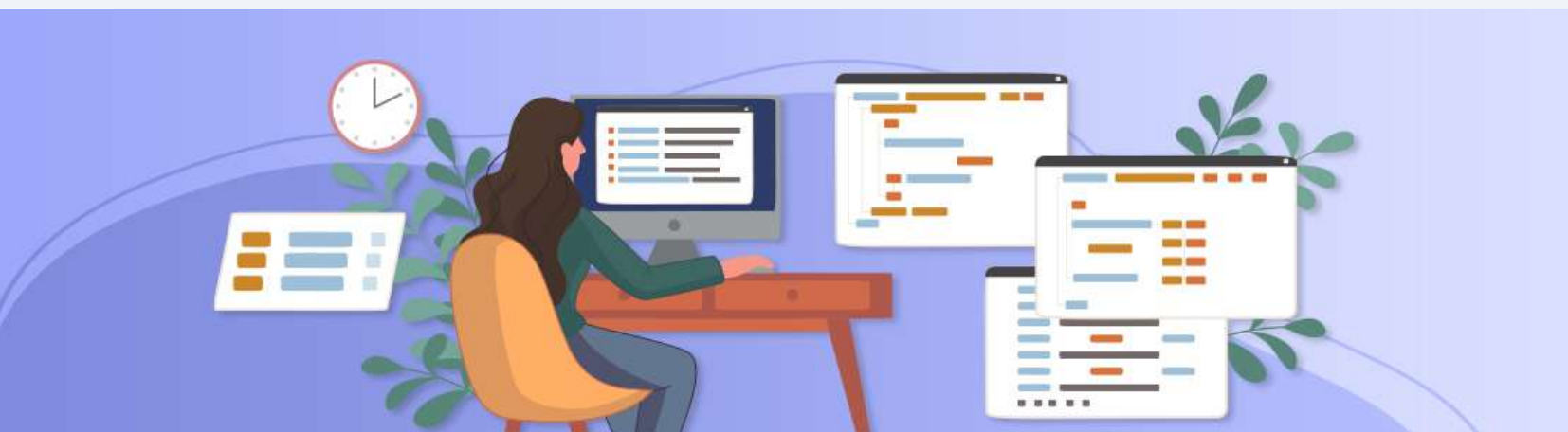


## Internet of Things (IoT)

The Internet of Things represents an ecosystem of various automated computer devices and digital machines that can exchange data with each other without any human interference. The technology is used in a broad variety of cases and diverse industries. Some IoT examples include:

- Agriculture automation;
- Smart Houses and Cities;
- Retail analytics and logistics;
- Healthcare for self-monitoring;
- Connected cars, and many others.

Building an ecosystem of connected devices with Node.js is a smart choice. IoT devices generate a large number of requests that require quick processing. Node.js handles these requests effectively without any downtime. Besides that, Node.js servers can store large amounts of data produced by IoT devices. Finally, as Node.js doesn't load device memory much, it can be integrated with single-board controllers to build digital devices for the IoT ecosystem.

## Real-Time Apps

Node.js perfectly suits for building social networking apps, streaming services, collaboration tools, interactive commercial websites, instant messengers, and many others. All these apps have one common feature – they can transmit live text, audio, or video data in groups or face-to-face interaction.

With event-driven structure and web sockets, Node.js can easily process real-time flows with intense traffic and maintain data streaming with readable and writable data streams on a high level. As a result, users don't experience any delay in the data exchange or its updating.

## Single-Page Applications (SPAs)

A single-page application (SPA) represents a single page on a browser with dynamically changing data in it. This type of apps doesn't need to load the entire new page to display the data to the user. SPAs load much faster than regular websites and can considerably enhance user experience in the areas of low-speed internet connection.

Node.js is well-suited for building SPAs as it can handle intensive I/O workloads and works great with asynchronous calls. Moreover, SPAs are built with JavaScript and this is the primary programming language for the Node.js framework.

## Apps With Microservices Architecture

Any application based on microservice architecture can be easily built with Node.js. This architecture type involves the utilization of separate modules with small functionalities which are integrated into a stand-alone application. Software developers often use microservices architecture to build complex and large enterprise applications. This helps to improve the apps' scalability and makes them simple to modify.

To build microservices architecture, software developers use native Node.js frameworks such as Koa.js and Express.js and a Docker platform. All these tools allow developing robust apps and quickly releasing them to the market.

# Leading Trends in Node.js to Watch in 2021

Node.js is a dynamically developing environment that improves every year. It helps businesses to reach their full potential by offering them the latest technologies to build their digital solutions. Here are some of the most discussed and implemented Node.js trends of 2021.

## GraphQL

GraphQL is a query language used for requesting data in JSON format from the server. The most outstanding feature of GraphQL is that with this language users can request certain data from the server, avoiding problems with data over-fetching or under-fetching. This results in faster data loading, logical, hierarchical, and strongly-typed language structure.

According to the State of JS, GraphQL has been rated the first most interesting, satisfying, and used technology for managing data layers in apps.

## MEAN and MERN Stacks

The two outstanding stacks MEAN (MongoDB, Express.js, Angular, Node.js) and MERN (MongoDB, Express.js, React.js, Node.js) will keep their leading positions in the field of app development in 2021.

Both technologies are super powerful solutions for building dynamic and single-page web applications. These stacks are used by big tech companies such as Netflix, UberEats, Instagram, Accenture, Onkore, Inc., and others.



## Serverless Architecture

Those businesses that don't want to depend much on hardware and spend hours on configuring app servers opt for serverless architecture. In this case, all the software and hardware problems are handled by a platform provider like AWS Lambda, Azure, or Google Cloud while software developers focus on the key features of the built app.

Node.js gets easily integrated into the cloud platforms with serverless architecture services. This way, software developers can considerably cut down the development costs, provide high code quality, and ensure great flexibility of their apps.

## Main Things to Consider When Choosing Node.js

Node.js has the best tools for the development of various applications and it's highly popular among software developers. Nevertheless, like any other development platform Node.js has its own pros and cons.

Here is a quick list of cases you should keep in mind when considering this powerful software development environment for your apps.

Use Node.js when you need to build:

- complex, enterprise-level apps with microservices architecture;
- real-time apps with live streaming services;
- collaboration tools for teamwork;
- apps that heavily rely on scalability with intense traffic and a constantly rising number of users.

Consider other than Node.js solutions with you want to create:

- apps that require heavy computing on the server-side – Node.js utilized only one CPU core, this way, heavy computing can result in blocking all the I/O requests;
- CRUD applications – this type of apps receive the data directly from the server without using any APIs, therefore, Node.js functionality can be excessive for such apps;
- monolithic architecture – although it's possible to build a monolithic architecture with Node.js, it will be hard to scale due to Node.js's single-threaded event loop, slow start-up time, and redeployment of the entire application with each update.

In case Node.js doesn't fit well for building your digital solution, you can always consider some other development frameworks such as Django on Python, Ruby on Rails, Symfony on PHP, and others.

# Conclusion on Node.js

Node.js is an increasingly popular back-end development environment that facilitates the development of versatile applications for large companies, SMEs, and start-ups. This robust solution offers an extensive set of development tools for creating real-time apps, IoT apps, apps with microservices and serverless architecture, and many others.

However, like any other development tool Node.js has its own limitations. Therefore, when considering Node.js for their application development projects, businesses should seek expert advice on how to build their apps more effectively and simply.

Feel free to contact us and ask any questions: info@scand.com