



Learning Node.js in Depth

Course ISI-1414 2 Days Instructor-led, Hands-on

Introduction

This course provides you with all the information that you need to get up to speed with Node.js, a platform for building fast and scalable network applications. You will learn the basics of nodes, get started with building your first Node.js HTTP server, and learn about the five main building blocks of Node.js: modules, callback functions, the event emitter, streams, and NPM.

Node.js programming language is the fastest JavaScript compiler around, and has given that team easy access to an operating system through C++ bindings. Node.js represents a change in how JavaScript helps developers build more resilient network applications at scale. Built on C++ and bundled with Google's V8 engine, Node is fast, and it understands JavaScript. Node.js has brought together the most popular network software is designed and built.

At Course Completion

After completing this course, students will be able to:

- So what is Node.js? helps you find out what Node.js actually is, what you can do with it, and why it's so great.
- Installation teaches you how to download and install Node.js with the minimum fuss and then set it up so that you can use it as soon as possible.
- Quick start will show you how to start building an HTTP server using Node.js.
- Top 5 features you need to know about will teach you how to perform five tasks involving the most important features of Node.js. By the end of this section, you will understand and be able to create modules, install third-party modules via NPM, and use the three main patterns of Node.js: callback functions, event emitters, and streams.
- Understand the Node Environment, gives a brief description of the particular problems Node attempts to solve, with a focus on how its single-threaded event-loop is designed, implemented, and used. We will also learn about how Google's V8 engine can be configured and managed, as well as best practices when building Node programs.
- Understand Asynchronous Event-Driven Programming, digs deep into the fundamental characteristic of Node's design: event-driven, asynchronous programming. By the end of this chapter you will understand how events, callbacks, and timers are used in Node, as well as how the event loop

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works to enable high-speed I/O across filesystems, networks, and processes.

- Learn how to stream Data Across Nodes and Clients, describes how streams of I/O data are knitted through most network software, emitted by file servers or broadcast in response to an HTTP GET request. Here we learn how Node facilitates the design, implementation, and composition of network software, using examples of HTTP servers, readable and writable file streams, and other I/O focused Node modules and patterns.
- Learn how to use Node to Access the Filesystem, lays out what you need to know when accessing the filesystem with Node, along with techniques for handling file uploads and other networked file operations.
- Learn how to manage Many Simultaneous Client Connections, shows you how Node helps in solving problems accompanying the high volume, high concurrency environments that contemporary, collaborative web applications demand. Through examples, learn how to efficiently track user state, route HTTP requests, handle sessions, and authenticate requests using the Redis database and Express web application framework.
- Learn how to create Real-Time Applications, explores AJAX, Server-Sent-Events, and the WebSocket protocol, discussing their pros and cons, and how to implement each using Node. We finish the chapter by building a collaborative document editing application.
- Learn how to utilize Multiple Processes, teaches how to distribute clusters of Node processes across multi-core processors, and other techniques for scaling Node applications. An investigation of the differences between programming in single and multithreaded environments leads to a discussion of how to spawn, fork, and communicate with child processes in Node, and we build an analytics tool that records, and displays, the mouse actions of multiple, simultaneous clients connected through a cluster of web sockets.
- Learn how to scale Your Application, outlines some techniques for detecting when to scale, deciding how to scale, and scaling Node applications across multiple servers and cloud services, with examples including: how to use RabbitMQ as a message queue, using NGINX to proxy Node servers, and using Amazon Web Services in your application.
- Learn how to test Your Application, explains how to implement unit, functional, and integration tests with Node. We will explore several testing libraries, including native Node assertion, sandboxing, and debugging modules. Examples using Grunt, Mocha, PhantomJS, and other build and testing tools accompany the discussion.

Prerequisites

To get the most out of this course you'll need a basic knowledge of JavaScript. You can attend Course ISI-1337, Introduction to JavaScript or have equivalent knowledge and skills.

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Course Materials

The student kit includes a comprehensive workbook and other required materials for this class.

Course Outline

Module 1. Instant Node.js Starter

- So what is Node.js?
- Quick start
- Top 5 features you need to know about
- People and places you should get to know

Module 2: Understanding the Node

- Extending JavaScript
- V8
- The process object
- The Read-Eval-Print Loop and executing a Node program

Module 3: Understanding Asynchronous

- Broadcasting events
- Listening for events
- Timers
- Understanding the event loop
- Callbacks and errors
- Listening for file changes

Module 4: Streaming Data Across Nodes

- Exploring streams
- Creating an HTTP server
- HTTPS, TLS (SSL), and securing your server
- The request object
- Working with headers
- Handling POST data

Module 5: Using Node to Access the Filesystem

- Directories, and iterating over files and folders
- Reading from a file
- Writing to a file
- Serving static files
- Handling file uploads

Module 6: Managing Many Simultaneous Client Connections

- Understanding concurrency

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- Routing requests
- Using Redis for tracking client state
- Handling sessions
- Authenticating connections

Module 7: Creating Real-time Applications

- Introducing AJAX
- Bidirectional communication with Socket.IO
- Listening for Server Sent Events
- Building a collaborative document editing

Module 8: Utilizing Multiple Processes

- Node's single-threaded model
 - Creating child processes
 - Communicating with your child
 - Parsing a file using multiple processes
 - Real-time activity updates of multiple

Module 9: Scaling Your Application

- When to scale?
- Running multiple Node servers
- Message queues – RabbitMQ
- Using Node's UDP module
- Using Amazon Web Services in your application
- Authenticating with Facebook Connect

Module 10: Testing your Application

- Why testing is important
- Native Node testing and debugging tools
- Headless website testing with ZombieJS and Mocha
- Using Grunt, Mocha, and PhantomJS to