



C o m m u n i t y E x p e r i e n c e D i s t i l l e d

Multiplayer Game Development with HTML5

Build fully-featured, highly interactive multiplayer games
with HTML5

Rodrigo Silveira

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BIRMINGHAM - MUMBAI

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Credits

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Rodrigo Silveira

Project Coordinator

Nikhil Nair

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Mahmoud Ben Hassine

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About the Author

Rodrigo Silveira is a software engineer at Deseret Digital Media. There, he divides his time developing applications in PHP, JavaScript, and Java for Android. Some of his hobbies outside of work include blogging and recording educational videos about software development, learning about new technologies, and finding ways to push the Web forward.

Rodrigo received his bachelor's degree in computer science from Brigham Young University, Idaho, as well as an associate's degree in business management from LDS Business College in Salt Lake City, Utah.

His fascination for game development began in his early teenage years, and his skills grew as he discovered the power of a library subscription, a curious and willing mind, and supportive parents and friends.

Today, Rodrigo balances his time between the three great passions of his life – his family, software development, and video games (with the last two usually being mingled together).

I wish to thank my best friend and the love of my life, Lucimara, for supporting me in my many hobbies, her endless wisdom, and her contagious love of life. I also wish to thank my daughter, Samira, who makes each day shine brighter, as well as the latest addition to the team, my son, Juliano, who makes the world a better place by being an exciting part of it.

About the Reviewers

Mahmoud Ben Hassine is a software engineer with several years of experience in designing and developing Java-based solutions. For the last 10 years, he has worked in different industries (transport, telecommunication, and e-commerce) as a developer, team leader, consultant, and mentor.

Mahmoud is a passionate software developer who writes code for fun. In his spare time, he contributes to open source projects, writes technical articles, and gives talks about Java-related technologies.

I would like to thank my family and my friends for their constant support, encouragement, and patience.

Vinod Madigeri is a software developer, game engineer, and technology enthusiast. He has worked with several game companies, and he recently graduated from the highest rated game development program at the University of Utah with a master's degree in entertainment arts and engineering.

I would like to thank my professors at the entertainment arts and engineering program for their continuous support and dedication to expand my knowledge of game engineering.

Daniel Magliola has been writing code since he was 7 years old and games since he was 8. Through the years, he's dabbled in multiple technologies, such as GW-BASIC, C++, VB6, DirectX, C# and finally HTML5/JavaScript. These days you'll find him working at his start-up and experimenting to squeeze a few extra FPS out of JavaScript engines.

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Preface

Welcome to *Multiplayer Game Development with HTML5*. This book will teach you how to develop games that support interacting multiple players in the same game world, and how to perform network programming operations in order to implement such systems. It covers topics such as WebSockets and client-side and server-side game programming in JavaScript with Node.js, latency reduction techniques, and handling server queries from multiple users. We will accomplish this by walking you through the process of developing two actual multiplayer games from start to finish, and it will also teach you about various topics in HTML5 game development in the process. The aim of the book is to teach you to create game worlds for multiple players who want to compete or interact through the Internet using HTML5.

What this book covers

Chapter 1, Getting Started with Multiplayer Game Programming, introduces network programming, with emphasis on designing a multiplayer game. It illustrates the basic concepts of multiplayer game development by walking you through the creation of a real-time game of Tic Tac Toe.

Chapter 2, Setting Up the Environment, describes the current state of the art in the JavaScript development world, including JavaScript in the server through Node.js. It also describes the current techniques to manage the development cycle in JavaScript with workflow and resource management tools, such as Npm, Bower, Grunt, and more.

Chapter 3, Feeding a Snake in Real Time, takes an existing single-player Snake game and builds in the ability to play with multiple players in the same game world using the tools heretofore described. Concepts of lobby, rooms, matchmaking, and handling queries from users are also described and demonstrated, which add the functionality to the Snake game. The chapter introduces the most powerful and widely used WebSocket abstraction in the industry today – socket.io.

Chapter 4, Reducing Network Latency, teaches you techniques to reduce network latency in order to create a smooth playing experience. The most common among such techniques — client prediction — is demonstrated and incorporated into the Snake game that is described in the previous chapter. The game server code is also updated for the purpose of performance by introducing a second update loop.

Chapter 5, Leveraging the Bleeding Edge, describes the exciting opportunities that are found in game development on the web platform. It explains WebRTC, HTML5's gamepad, the fullscreen mode, and media capture APIs. Other promised and experimental technologies and APIs are also described here.

Chapter 6, Adding Security and Fair Play, covers common flaws and security vulnerabilities that are associated with network gaming. Here, common techniques are described and demonstrated, allowing you to develop games that provide a playing experience that is free from cheating.

What you need for this book

To use this book, you will need a working installation of Node.js and Npm, a modern web browser (such as Google Chrome 5.0, Firefox 3.5, Safari 5.0, or Internet Explorer 9.0 and their later versions), and a text editor or an integrated development environment (IDE). You will also need basic to intermediate JavaScript knowledge as well as some previous game programming experience, preferably in JavaScript and HTML5.

Who this book is for

This book is targeted at HTML5 game developers who can make basic single player games and would now like to learn how to incorporate multiplayer functionality in their HTML5 games as quickly as possible.

Conventions

In this book, you will find a number of text styles that distinguish between different kinds of information. Here are some examples of these styles and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "The first will be keyed with the value of `action` and the second will have a key of `data`."

A block of code is set as follows:


```
wss.on('connection', function connection(ws) {  
  board.on(Board.events.PLAYER_CONNECTED, function(player) {  
    wss.clients.forEach(function(client) {  
      board.players.forEach(function(player) {  
        client.send(makeMessage(events.outgoing.JOIN_GAME,  
player));  
      });  
    });  
  });  
});
```


When we wish to draw your attention to a particular part of a code block, the relevant lines or items are set in bold:

```
validator.isEmail('foo@bar.com'); //=> true  
validator.isBase64(inStr);  
validator.isHexColor(inStr);  
validator.isJSON(inStr);
```

Any command-line input or output is written as follows:

```
npm install socket.io --save  
npm install socket.io-client -save
```

 Warnings or important notes appear in a box like this.

 Tips and tricks appear like this.

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1

Getting Started with Multiplayer Game Programming

If you're reading this book, chances are pretty good that you are already a game developer. That being the case, then you already know just how exciting it is to program your own games, either professionally or as a highly gratifying hobby that is very time-consuming. Now you're ready to take your game programming skills to the next level – that is, you're ready to implement multiplayer functionality into your JavaScript-based games.

In case you have already set out to create multiplayer games for the **Open Web Platform** using HTML5 and JavaScript, then you may have already come to realize that a personal desktop computer, laptop, or a mobile device is not particularly the most appropriate device to share with another human player for games in which two or more players share the same game world at the same time. Therefore, what is needed in order to create exciting multiplayer games with JavaScript is some form of networking technology.

In this chapter, we will discuss the following principles and concepts:

- The basics of networking and network programming paradigms
- Socket programming with HTML5
- Programming a game server and game clients
- Turn-based multiplayer games