Contents

Acknowledgments ix
Preface xi

Part I — Getting Up to Speed on Node.js 8

1. **Getting Started** 3
Thinking Beyond the web 3
Node.js's Niche 5
How Node.js Applications Work 6
Aspects of Node.js Development 8
Installing Node.js 9

2. **Wrangling the File System** 11
Programming for the Node.js Event Loop 11
Spawning a Child Process 16
Capturing Data from an EventEmitter 17
Reading and Writing Files Asynchronously 20
The Two Phases of a Node.js Program 23
Wrapping Up 24

3. **Networking with Sockets** 27
Listening for Socket Connections 28
Implementing a Messaging Protocol 32
Creating Socket Client Connections 35
Testing Network Application Functionality 36
Extending Core Classes in Custom Modules 38
Developing Unit Tests with Mocha 43
Wrapping Up 49

4. **Connecting Robust Microservices** 53
Installing ØMQ 54
Publishing and Subscribing to Messages 58
Responding to Requests 62
Routing and Dealing Messages 66
Clustering Node.js Processes 68
Pushing and Pulling Messages 73
Wrapping Up 76

Part II — Working with Data

5. **Transforming Data and Testing Continuously** 81
Procuring External Data 83
Behavior-Driven Development with Mocha and Chai 85
Extracting Data from XML with Cheerio 91
Processing Data Files Sequentially 100
Debugging Tests with Chrome DevTools 104
Wrapping Up 108

6. **Commanding Databases** 111
Introducing Elasticsearch 112
Creating a Command-Line Program in Node.js with Commander 114
Using request to Fetch JSON over HTTP 121
Shaping JSON with jq 126
Inserting Elasticsearch Documents in Bulk 130
Implementing an Elasticsearch Query Command 133
Wrapping Up 142

Part III — Creating an Application from the Ground Up

7. **Developing RESTful Web Services** 147
Advantages of Express 148
Serving APIs with Express 149
Writing Modular Express Services 151
Keeping Services Running with nodemon 155
Adding Search APIs 155
Simplifying Code Flows with Promises 161
Manipulating Documents RESTfully 167
Emulating Synchronous Style with async and await 171

Providing an Async Handler Function to Express 172
Wrapping Up 181

8. Creating a Beautiful User Experience 185
Getting Started with webpack 186
Generating Your First webpack Bundle 190
Sprucing Up Your UI with Bootstrap 192
Bringing in Bootstrap JavaScript and jQuery 196
Transpiling with TypeScript 197
Templating HTML with Handlebars 201
Implementing hashChange Navigation 205
Listing Objects in a View 207
Saving Data with a Form 212
Wrapping Up 216

9. Fortifying Your Application 219
Setting Up the Initial Project 220
Managing User Sessions in Express 225
Adding Authentication UI Elements 227
Setting Up Passport 229
Authenticating with Facebook, Twitter, and Google 234
Composing an Express Router 246
Bringing in the Book Bundle UI 251
Serving in Production 253
Wrapping Up 256

10. BONUS: Developing Flows with Node-RED 259
Setting Up Node-RED 260
Securing Node-RED 261
Developing a Node-RED Flow 262
Creating HTTP APIs with Node-RED 266
Handling Errors in Node-RED Flows 276
Wrapping Up 283

A1. Setting Up Angular 285
A2. Setting Up React 291
Index 295