Test Automation with Nightwatch.js

Simplify web testing with JavaScript and Node.js

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Dedicated to

***Zuzu**, my first son, our Lab (2011-2024), you are missed every day, our baby. We all miss you dearly!*

To the community of the WebDriver ecosystem, whose collaborative spirit drives innovation, and to the brilliant yet often unsung creators of open source projects who generously share their expertise with the world, empowering developers everywhere to build better software.

About the Author

Pallavi Sharma is a versatile professional with a rich experience spanning two decades. She has contributed in various capacities as an individual contributor, technical product manager, scrum master, intellectual property rights coordinator, and coach on various open source tools for test automation, programming for non-programmers throughout her career, and continues.

She is the founder at 5 Elements Learning, an e-learning organization, and Mosaic Words, a Green Literature Publishing company. She is a published author of 4 books on Selenium. She is a committer to the Selenium Project, currently with Selenium Documentation. She is an active participant in various international conferences on testing, automation, AI, and other similar areas, where she serves as a reviewer, judge, organizer, speaker, and enthusiastic attendee. She also holds various certifications in her field, interests, and passions.

Beyond her professional pursuits, Pallavi spends active time in writing, reading, traveling, nature watching, and conservation. She is dedicated to giving back to society and the environment through both her time and resources. She believes in being kind, starting with self.

About the Reviewers

- **Rajkumar Modake** is a senior vice president at a leading financial firm in New York, with over two decades of experience in the IT industry. His expertise spans multiple domains, including financial markets, healthcare, retail, and insurance. Starting his career as a developer, he transitioned into automation. He has excelled as an automation architect, designing robust automation frameworks from scratch using tools like Selenium, Appium, Nightwatch.js, Cypress, Playwright, Puppeteer, and WebDriverIO.

  Rajkumar is passionate about advancing test automation technologies and has played a key role in driving automation excellence across large-scale enterprise environments. Alongside his core focus on automation, he has recently expanded his expertise into AI/ML initiatives, particularly in the area of generative AI.

  He has been recognized with an honorary doctorate for his contributions to information technology and social services. A committed contributor to the technology community, Rajkumar actively engages in open-source projects, shares his knowledge on LinkedIn, and enjoys reviewing technical books to help others grow in their careers.

  Outside of his professional endeavors, Rajkumar volunteers on weekends to teach and mentor aspiring technologists. He also values spending quality time with his wife, son, and daughter, and enjoys playing cricket, blending his love for technology with a fulfilling family life.

- **Jishnu Nambiar** is a senior automation engineer at Tekion with a passion for testing and finding bugs. He has worked extensively with Selenium, Nightwatch, and Appium to build effective automation solutions. He enjoys writing blogs about testing and is deeply passionate about the quality and craft of software testing.

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I extend my heartfelt gratitude to my editor and the technical reviewers whose keen eye for detail and commitment to excellence transformed my technical knowledge into accessible wisdom.

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Finally, I am grateful to the open-source community whose collective brilliance makes tools of the WebDriver ecosystem possible, and to the readers whose desire to grow as automation professionals inspired every page of this handbook.

Preface

In today's fast-paced web development landscape, quality assurance has become as crucial as innovation itself. As applications grow increasingly complex with asynchronous operations and dynamic interfaces, manual testing simply cannot keep pace. This reality inspired my in-depth exploration of test automation, ultimately leading to the creation of this handbook.

Nightwatch.js captured my attention with its perfect balance of power and accessibility, leveraging Selenium WebDriver's capabilities while offering an intuitive JavaScript interface that developers naturally understand. However, I discovered a concerning gap between basic tutorials and real-world implementation, with no comprehensive resource guiding beginners through a complete learning journey.

This handbook fills that void by providing the progressive, practical guide I wish I had when starting out. Rather than a mere technical manual, it is a structured educational experience that transforms testing novices into automation professionals through hands-on learning. We begin with fundamentals and methodically build toward advanced concepts, using realistic scenarios that mirror professional environments.

What distinguishes this guide is its unwavering commitment to practicality. Every concept comes with executable code examples, troubleshooting guidance, and professional best practices. I have addressed the common pitfalls that newcomers encounter, providing solutions that prevent hours of frustration.

Whether you are a developer integrating testing into your workflow, a QA professional embracing automation, or a team lead evaluating frameworks, this handbook offers a clear path forward. My goal extends beyond teaching Nightwatch.js mechanics to instilling a quality-focused mindset that elevates everything you build.

As you progress, remember that mastery requires active practice. Experiment with the code examples, intentionally break things, and learn through doing. By the final chapter, you will possess both the technical skills and confidence to implement sophisticated test automation in any professional environment.

May the force of open source be with you!

Chapter 1: Introduction to Nightwatch- In this chapter, we explore Nightwatch.js as a powerful JavaScript-based test automation framework for web applications. We examine

why JavaScript is ideal for web testing, what distinguishes Nightwatch.js from other testing frameworks, and trace its development history. The topic covers Nightwatch's underlying architecture, explaining how it leverages the Selenium WebDriver API to control browsers and execute tests. A practical setup guide helps establish Nightwatch in your development environment.

Chapter 2: Understand the Web Applications used in the Book- In this chapter, we introduce the specific web applications that serve as examples throughout the book, detailing their features and the particular testing scenarios we will tackle with each one. These real-world applications provide the context needed to understand how Nightwatch effectively automates testing for various web components and user interactions.

Chapter 3: Getting Started with Nightwatch- This chapter guides you through setting up and configuring Nightwatch.js within Visual Studio Code for effective test automation. We explore the folder structure and essential files created during Nightwatch installation, providing insights into their purposes and interactions.

Chapter 4: Setting Visual Studio Code with Nightwatch- This chapter demonstrates how to configure your test environment in VS Code, including setting up proper project structures and installing necessary extensions for enhanced JavaScript testing capabilities. You will learn how to establish and manage test global variables that can be accessed throughout your test suite, streamlining test development and maintenance.

Chapter 5: Identifying Elements- This chapter explores the fundamental concepts essential for effective Nightwatch.js test automation. We begin by examining selectors, the mechanisms used to identify and target specific elements within web pages, and the various selector types supported by Nightwatch, including CSS, XPath, and ID selectors. Through practical examples, you will learn how to create precise selectors for different web elements across various scenarios.

Chapter 6: Interacting with Web Elements- This chapter explains why interaction with web elements is crucial for mimicking user behavior and verifying application functionality. We cover the diverse interaction types available in Nightwatch, from clicks and text input to drag-and-drop operations and keyboard events. The topic details specific commands for implementing these interactions effectively in your test scripts.

Chapter 7: Synchronization- In this chapter, we address the critical concept of synchronization, how Nightwatch manages timing between test steps to ensure reliable execution despite varying page load times and dynamic content. Understanding these core concepts provides the foundation needed to create robust, reliable automated tests with Nightwatch.js.

Chapter 8: Assertions in Nightwatch- This chapter explores verification essentials in Nightwatch.js automated testing. We examine Nightwatch's Command Queue architecture that manages sequential command execution and timing dependencies through callback functions. You will learn about wait commands that ensure elements are ready for interaction and discover the variety of assertion commands available for validating element properties and states. The section covers Nightwatch's 'expect' interface, which provides chainable syntax for intuitive verification of actions and conditions.

Chapter 9: Working with Form Elements- In this chapter, you will learn how to automate form elements using Nightwatch. You will learn about HTML elements and form components like text fields, drop-downs, checkboxes, and radio buttons. The chapter includes hands-on examples and ends with a complete user registration script that demonstrates practical form automation techniques with proper validations.

Chapter 10: Working with Tables, Drop-downs, Frames and Alerts- In this chapter, we learn four essential web elements: tables, drop-downs, iFrames, and JavaScript alerts. You will learn to dynamically traverse HTML tables to extract product data, handle dropdown lists by fetching and validating options, work with embedded iFrames by switching contexts, and manage all three types of JavaScript popups (Alert, Confirm, and Prompt). Each section includes practical examples with complete working scripts using real test applications, giving you the tools to handle these common web elements in any automation scenario.

Chapter 11: Browser Logs, Page Performance, Capture Screenshots, and Actions- This chapter covers advanced Nightwatch techniques, including capturing browser logs for debugging, measuring page performance metrics, taking automated screenshots, and handling complex user actions like right-click, hover, and drag-and-drop. You will learn practical configuration steps and gain tools for sophisticated automation scenarios with complete working examples.

Chapter 12: Page Objects- In this chapter the Page Object Model design pattern is introduced, that separates test logic from application elements, making your automation code more maintainable. You will learn to create reusable page objects through a complete login/logout example, organizing selectors and actions into structured files that reduce code duplication and simplify maintenance when applications change.

Chapter 13: Managing Data Using Excel and CSV Files- In this chapter, you learn to separate test data from your automation scripts by using external data files. You will learn to read and write both CSV and Excel files using Node.js modules, create reusable data reader functions, and build data-driven tests that iterate through multiple sets of credentials. The

chapter includes complete examples of login/logout scenarios that automatically run for each row of data, demonstrating how to make your tests more flexible and maintainable by managing test data externally.

Chapter 14: Learn About Logs, and Screenshots Management- In this chapter, you will learn to build debugging capabilities through logging and screenshot management. You will learn to use the Winston library for structured logging, capture screenshots at key points and failures, and integrate these tools with your existing tests. The chapter shows how to transform unclear test failures into actionable debugging information with comprehensive logs and visual evidence.

Chapter 15: Execution of Tests in BrowserStack- This chapter will guide you through integrating Nightwatch.js with BrowserStack's cloud-based testing platform to execute automated tests across multiple browsers, operating systems, and devices without maintaining local infrastructure. You will learn to set up your BrowserStack account, configure Nightwatch for cloud execution, and run tests simultaneously on different environments like Windows Chrome, Mac Safari, and mobile browsers. The chapter includes practical examples and step-by-step instructions for viewing detailed test results through BrowserStack's dashboard, enabling you to ensure consistent application performance across all user platforms.

Code Bundle and Coloured Images

Please follow the link to download the
Code Bundle and the ***Coloured Images*** of the book:

https://rebrand.ly/d7b663

The code bundle for the book is also hosted on GitHub at
https://github.com/bpbpublications/Test-Automation-with-Nightwatch.js.
In case there's an update to the code, it will be updated on the existing GitHub repository.

We have code bundles from our rich catalogue of books and videos available at **https://github.com/bpbpublications**. Check them out!

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Chapter 1
Introduction to Nightwatch

The world of the web is getting complex as you read this statement. The users of the web have too much content to consume in a short span of time and lack the patience to wait for your application to provide what they want, and where they want the data. We have available at our disposal all kinds of applications, from health trackers to travel booking, everything is now at the click of our fingers. There are more creators of every kind of application, and each is competitive for their segments' user base attention. The demand for the application to be available on the desktop and on the watch is not even a question; it is a norm now. A world where notifications are the way to tell the time of day, and if you do not receive that good morning message in the group, you start getting panic attacks. Yes, welcome to the world of hyper connectivity. In more than one way, we have JavaScript to thank for it.

As the release cycles of the software get shorter, there is a significant shift in testing of the applications being created as well. Cumbersome libraries which require significant setup do not serve the purpose where the developers are looking for solutions which can work with the tools and environments they are already using. This has led to a surge in various test automation tools, libraries, and frameworks available now which are JavaScript based. This book assumes you are already familiar with JavaScript, and with that context set, we will dive into the details and usage of Nightwatch as the test automation framework for web applications and websites.

Structure

In this chapter, we will discuss the following topics:

- JavaScript for test automation for web applications
- Understanding Nightwatch
- History of Nightwatch
- Working of Nightwatch
- Setting up Nightwatch

Objectives

After completing this chapter, you will be able to understand why to use JavaScript test automation framework for web applications. You will also understand what is Nightwatch, its history, and how it works. By the end of this chapter, you will also learn how to set up Nightwatch in your system.

JavaScript for test automation for web applications

JavaScript is the most in-demand programming language for web development in world, as per survey by stackoverflow (**https://survey.stackoverflow.co/2024/technology/#1-programming-scripting-and-markup-languages**). Since the advent of dynamic, interactive web applications, JavaScript popularity has soared. And with that, various front-end frameworks for web development are now available like Angular, ReactJS, and Vue.js. You can find their names and popularity from the latest survey by State of JS here: **https://2023.stateofjs.com/en-US/libraries/front-end-frameworks/**. As the application undergoes the development process, testing gets integrated into it at various levels from unit test to integrated, to system, and finally the end-to-end testing of the web application.

There are many JavaScript-based testing tools and frameworks available in the market for end-to-end web automation, and they have gained significant popularity and acceptance by the community of JavaScript developers and users. The following table lists them:

S.no	Name	Details	Link
1	Selenium	The most popular web automation tool. It is an umbrella project which has Selenium IDE, Selenium WebDriver, and Selenium Grid. It supports multiple programming languages, JavaScript is one of them.	**https://www.selenium.dev/**

S.no	Name	Details	Link
2	Jest	It is a JavaScript based testing framework that supports various JavaScript libraries like Angular, Vue, React. It is the most popular JavaScript testing framework.	**https://jestjs.io/**
3	Puppeteer	It is a JavaScript library which allows you to automate chrome/chromium-based browser and firefox browser.	**https://pptr.dev/**
4	Nightwatch	It is a framework to automate the testing of web applications and native mobile applications. One of the most popular JavaScript based test automation framework.	**https://nightwatchjs.org/**
5	Playwright	It is a framework for end-to-end testing of web applications.	**https://playwright.dev/**
6	Jasmine	It is a behavior driven development framework for testing the JavaScript code written.	**https://jasmine.github.io/**
7	Cypress	It is a JavaScript based end-to-end web testing tool which is primarily focused to be used by the developers.	**https://www.cypress.io/**

***Table 1.1**: JavaScript based test automation libraries and frameworks*

People who use JavaScript and JavaScript-based technologies for web development use one of the above-listed tools or frameworks to test their applications. Let us now have a look at Nightwatch, one of the most popular JavaScript-based test automation frameworks.

Understanding Nightwatch

Nightwatch is a test automation framework to test web applications and web sites. It is written in Node.js and allows us to perform end to end testing of the application across all major browsers, through the usage of the W3C WebDriver API. It is an open-source tool, whose development is now supported by the Browser Stack organization through its open-source program office, headed by *David Burns*. The current version of Nightwatch available is the version 3.x series, at the time of writing this book. The thought behind Nightwatch is to provide an out-of-the-box solution for testing web applications, which do not require other libraries, dependencies, or configurations to be set up. The end user can focus on writing tests, of different types as follows: