Ralph Steyer

Building web applications with Vue.js

MVVM patterns for conventional and single-page websites

Springer

Building web applications with Vue.js

Ralph Steyer

Building web applications with Vue.js

MVVM patterns for conventional and single-page websites

Springer

Ralph Steyer
Bodenheim, Germany

ISBN 978-3-658-37595-9 ISBN 978-3-658-37596-6 (eBook)
https://doi.org/10.1007/978-3-658-37596-6

This Springer imprint is published by the registered company Springer Fachmedien Wiesbaden GmbH part of Springer Nature.
The registered company address is: Abraham-Lincoln-Str. 46, 65189 Wiesbaden, Germany

Preface

Of course, the Internet is still on everyone's lips. Digitization in general is one of the most used "buzzwords" – especially by politicians, media people, and decision makers. But the times of static websites are largely over. While it was common a few years ago that at least simple websites of private persons or smaller associations still used pure HTML code (Hypertext Markup Language), such antiquated websites can be found less and less nowadays. Usually at least content management systems (CMS) like WordPress, Joomla!, Typo, or Drupal are used or such websites are at least spiced up with stylesheets and/or JavaScript.

But if you are not satisfied with these 08/15 solutions of the common CMS or if they do not (cannot) meet the required requirements, the only option is the real programming of websites or even Web applications. On the one hand, this path usually begins with programming on the Web server side, including downstream database systems, but on the other hand, modern websites or Web applications must also be programmed in the client (the browser).

And in the browser, only JavaScript has been available for years as a universally available technology for programming. Together with HTML and CSS (Cascading Style Sheets), JavaScript forms the triad of modern websites and especially of client-side Web programming.

Now JavaScript has been around for a very long time on the Web, but for most years it was completely underestimated and dismissed as a primitive beginner's language. Only in the last few years have we realized what a treasure JavaScript is for efficient and powerful programming and that this language is anything but a beginner's language – even if you can learn it quickly as a beginner. Quite the contrary. But you have to be able to use it professionally, because in contrast to all-round carefree programming worlds from the .NET and Java environment, which have "softened" programmers over the years by hardly allowing them to make mistakes, you can't expect such protective mechanisms in JavaScript. Efficient and secure programming with JavaScript requires skills from the programmer instead of transferring them to IDEs (Integrated Development Environment) and runtime environments. But this also makes JavaScript much leaner and more efficient than its now hopelessly overloaded competitors. Professional, efficient, and secure programming with JavaScript therefore requires immense programming experience. Already in the client, but even more so on the server side, where JavaScript has meanwhile also begun its triumphant march. JavaScript is like a scalpel. In the hands of an experienced surgeon, you can perform miracles with it. In the hands of a layman or someone not working carefully, it can do immense damage. Where JavaScript manages the balancing act of still being easy to use by beginners for simple tasks. In my JavaScript trainings, I hear again and again that many participants have already used JavaScript. Mostly they copied existing scripts and adapted them if necessary or wrote very simple scripts themselves and built them into HTML pages. And that usually works, although almost always the addition of the participants was that they did not really know why it works.

The many frameworks that have established themselves in the Web environment in recent years use some fundamentally different approaches. But most frameworks often try to extend JavaScript by things that are not possible with the core version. This makes it easier to work with JavaScript and also provides possibilities that are not or not easily available with pure JavaScript.

The various frameworks take very different approaches to ultimately end up with the same result in the code that reaches the user, namely a conglomerate of HTML, CSS, and JavaScript. Of course, always connected with resources such as images, videos, audios, and the like.

Now, Vue.js is an increasingly popular framework on the Web that takes a very specific approach. It is a reactive, client-side JavaScript Web framework that is essentially used to create so-called single-screen Web applications or single-page Web applications (only one Web page in the browser that updates parts as needed and does not reload a new Web page) according to a Model-View-Controller pattern (MVC). Strictly speaking, a Model-View-Controller pattern (MVVC) is used. But you can definitely create Web applications and Web pages with it.

Vue.js is both easy to learn and very extensible and customizable. To be able to learn Vue.js successfully, a good knowledge of HTML and JavaScript is sufficient, as well as CSS if possible, which I would also like to assume in the book. The developers of Vue.js call the framework "progressive." This essentially means that it can be used as much for small improvements to individual details of the website as for larger projects. It also supports the creation of reusable components. Another advantage of Vue.js is that it does not require a complex installation and can even be used entirely without installation "from the cloud" (from a CDN content delivery network) if required.

So, follow me into the fascinating world of Vue.js!

Bodenheim, Deutschland
Spring/Summer 2019

Ralph Steyer
http://www.rjs.de

Contents

About the Author

Ralph Steyer has a degree in mathematics and works as a freelance trainer, author, and programmer. You can find his website at http://www.rjs.de and his blog at http://blog.rjs.de. His professional focus is on Web development and programming in Java and .NET.

- Here is another short abstract of the professional career and experiences:
- Studied until 1990 in Frankfurt/Main at the Johann Wolfgang Goethe University.
- After graduation, programmer at a large insurance company in Wiesbaden for actuarial PC. programs.
- After almost 4 years, internal change to the conception of mainframe databases
- Freelancer since 1996. Division of work into different areas of activity – specialist author, specialist journalist, IT lecturer, and programmer/consultant.
- Numerous book publications, video productions, and online trainings in the IT sector as well as technical articles in computer magazines.
- Speaker at various IT conferences.
- Lecturer at the Rhine-Main University of Applied Sciences in Wiesbaden and the TH Bingen.

List of Figures

List of Tables

1 Introduction: Before the Real Thing Starts

1.1 What Do We Cover in the Introductory Chapter?

Before we really get started, this introductory chapter will clarify a few things that will make your subsequent work with this book and Vue.js easier. In particular, you'll learn what you should bring along as prerequisites and where you can get Vue.js. And it briefly discusses what Vue.js brings to the table in terms of features.

1.2 The Aim of the Book

This book is designed to **get** you **started** using the Vue.js framework. Either in the form of self-study or as accompanying material in appropriate courses. It teaches the elementary basics of creating and maintaining web applications with Vue.js. This includes topics such as the following:

- The environment – HTML/JavaScript/CSS and the web
- Basic creation of applications with Vue.js
- The JavaScript basis – especially arrays and JSON, function references and the DOM concept
- The MVVC concept as a special variant of the MVC concept
- The *Vue instance* and how to work with it
- Event handling
- Watcher
- Calculated properties
- Components and their life cycle

R. Steyer, *Building web applications with Vue.js*,
https://doi.org/10.1007/978-3-658-37596-6_1

- The Double Curly Syntax and Data Binding
- Directives
- Templates
- Modularity and the extension of Vue.js

For the Vue.js framework, version 2.x (as of early 2019) is used in the book.

▶ **Definition**
The term ***"framework"*** is not so clear in its form. According to Wikipedia, it is understood to mean that:

> A framework is a programming framework used in software engineering, especially in object-oriented software development and component-based development approaches. In a more general sense, a framework also refers to an order framework.

Generally, a framework is understood to be a real or conceptual structure designed to support or guide the creation of something that extends the structure itself into something meaningful. In IT, it is often understood to be a layered structure that specifies the types of programs that can or should be created and how they relate to each other. Some frameworks include programs, specify application programming interfaces (APIs), or provide programming tools that can be used with the framework. Usually, in IT, a framework will have at least one library along with a set of rules for its use. Sometimes there is an even broader form in which, in addition to certain libraries and syntax structures or languages, tools such as Visual Studio and/or SQL Server are explicitly fully integrated into the concept.

In the documentation, emphasis is placed on the basic application of the various techniques and simple examples, less on completeness of all possible statements, commands or parameters. In particular, only an introduction to the creation of a Vue.js application should and can be provided here. For various further topics, however, reference is made to the official documentation or additional sources, in order to provide you with an introduction there as well.

▶ The source codes of the book can be found sorted by chapters and projects created in them on the publisher's web pages. The names of the current files or projects are given as notes or directly in the text before the respective examples and are repeated if necessary. However, I strongly recommend that you create all of the examples by hand. This is clearly better for understanding and learning than just copying or looking at them.

At some points in the book, tasks are formulated that you should solve at the point. For a few tasks (such as creating a specific program), explicit reference is made to the solution in the appendix if it is necessary and the explanations in the passage do not further explain or describe the solution to the task.

1.3 What Should You Already Be Able to Do?

This book is designed to help you get started with Vue.js and learn the basics of this framework from the ground up. However, working with such a framework is very rarely done without prior knowledge of the web and/or a programming language. Therefore, a good knowledge of HTML and basics in CSS should be assumed. And then there is JavaScript. For the understanding of the book, the basic syntactic principles (integration in web pages, data types including loose typing, variables, loops, decision structures, jump instructions, simple function declarations including calling functions, etc.) should also be assumed.

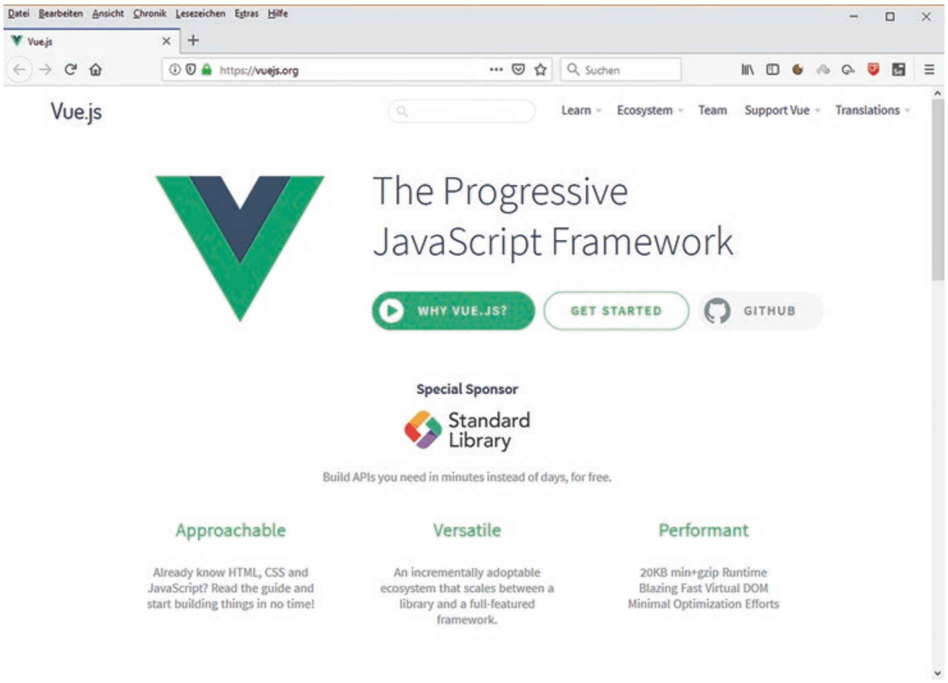
However, the really interesting and non-trivial things in JavaScript are the function references or the callback philosophy and the (largely) equivalence of objects and arrays and especially the JSON format (JavaScript Object Notation). Together with the DOM concept (Document Object Model), these are the absolute basics to understand how Vue.js works. True, you can also "work" with Vue.js without being well-versed in the techniques. However, I would go so far as to say that Vue.js is almost self-evident once you have a little understanding of the MVVC pattern of thinking and just these three key technologies really well. For this reason, the book also explains these concepts thoroughly right at the beginning.

▶ The framework Vue.js itself including the official documentation for the framework can be found on the web (Fig. 1.1) at https://vuejs.org/ or https://vuejs.org/v2/guide/. For various further questions and topics, as mentioned, reference is made to it again and again.

1.4 What Do You Need to Work with the Book?

- A PC or similar is required as a basis for the book.
- The reference operating system is Windows 10 (previous versions like Windows 7 are also possible, but are not explicitly considered), but you can – as usual in web programming – also work with other operating systems like Linux or MacOS.
- Beyond that, any editor will do, but you can also use an IDE like Visual Studio or Visual Studio Code, Eclipse, etc.
- Otherwise, a local web server is highly recommended. If you want to make things as simple as possible, an all-round carefree package such as XAMPP is a good choice, although Internet Information Services (IIS) is also suitable, especially under Windows.

The XAMPP package is a collection of programs with the Apache web server at the center, which is supplemented by the MySQL database management system or, in new versions, its fork MariaDB (including phpMyAdmin for administration of the database management system) and PHP support, the FTP server FileZilla, and several other web



The Progressive JavaScript Framework

Build APIs you need in minutes instead of days, for free.

Approachable

Already know HTML, CSS and JavaScript? Read the guide and start building things in no time!

Versatile

An incrementally adoptable ecosystem that scales between a library and a full-featured framework.

Performant

20KB min+gzip Runtime
Blazing Fast Virtual DOM
Minimal Optimization Efforts

Fig. 1.1 The official website of Vue.js

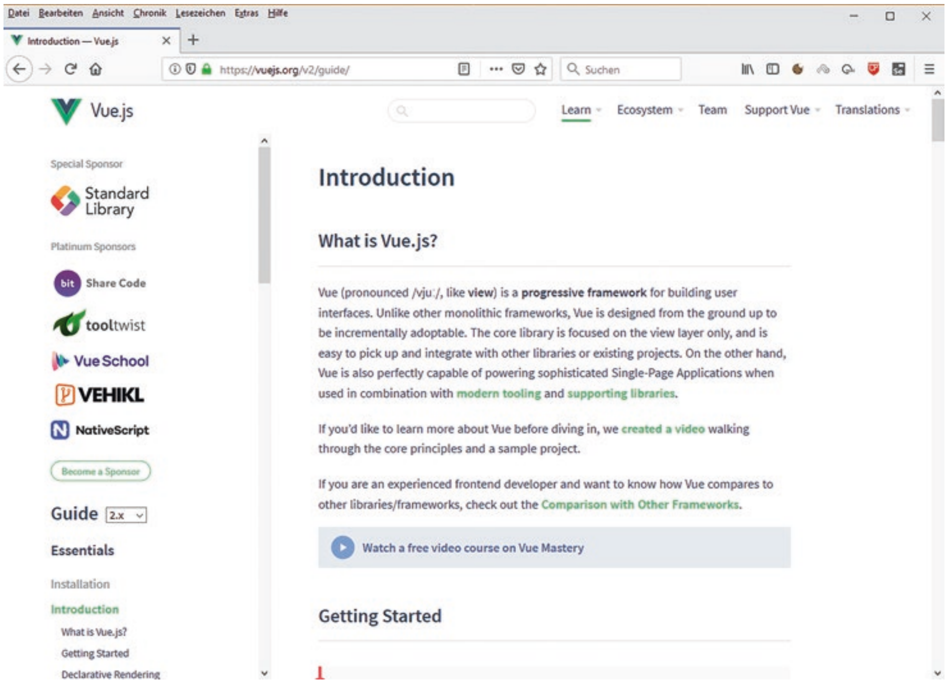
technologies. XAMPP is available for various operating systems (http://www.apache-friends.org/de/).

You only need to install this package with a simple wizard and you will have a fully functional Apache web server in a basic configuration. Note, however, that XAMPP is configured by default for local testing purposes only. To keep things as simple as possible, all security settings are set low. Once the installation of XAMPP is complete, you can either start Apache manually or set it up so that Apache is integrated as a service or process in your operating system and can even be called automatically when the computer is started. XAMPP provides a comfortable and very easy to use control program for administration.

1.4.1 The Vue.js Framework

Of course, then you need Vue.js itself. There are already several good hints on the project's website on how to get started (Fig. 1.2).

Above all, you will find tips on how you can use Vue.js specifically in your website. This is remarkably easy and one of the highlights of this framework.



Introduction

What is Vue.js?

Vue (pronounced /vjuː/, like **view**) is a **progressive framework** for building user interfaces. Unlike other monolithic frameworks, Vue is designed from the ground up to be incrementally adoptable. The core library is focused on the view layer only, and is easy to pick up and integrate with other libraries or existing projects. On the other hand, Vue is also perfectly capable of powering sophisticated Single-Page Applications when used in combination with modern tooling and supporting libraries.

If you'd like to learn more about Vue before diving in, we created a video walking through the core principles and a sample project.

If you are an experienced frontend developer and want to know how Vue compares to other libraries/frameworks, check out the Comparison with Other Frameworks.

Watch a free video course on Vue Mastery

Getting Started

Fig. 1.2 Information about Vue.js

▶ You can join the team around Vue.js itself at https://vuejs.org/v2/guide/join.html (Join the Vue.js Community!).

Since Vue.js is essentially just a JavaScript library, you basically include the framework like any other external JavaScript file. You can include this file – also simple JavaScript – from a foreign or even your own web server.

Note – Vue.js comes in two flavors:

- A minimized version for practical use.
- A non-minimized version for development. The code of this variant is easier to read and provides warnings for common errors. Therefore, it is more suitable at development time, and when publishing, just swap the link.

1.4.1.1 Integrating a CDN

In particular, Vue.js is already provided by the project for inclusion in this way. You just need to specify the link given on the project's web page in the *script tag*. This is something like https://cdn.jsdelivr.net/npm/vue/dist/vue.js, but of course this can change and the exact details can be found on the Vue.js project's web page in each case (Fig. 1.3).