

Foreword by **Greg Jackson**,
Founder of Octopus Energy Group



Practical Web Accessibility

A Comprehensive Guide to
Digital Inclusion

—
Second Edition

—
Ashley Firth

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**A Comprehensive Guide
to Digital Inclusion**

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Practical Web Accessibility: A Comprehensive Guide to Digital Inclusion, Second Edition

Ashley Firth
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For my wife.

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About the Author



Ashley Firth is the Global Director of Engineering at award-winning energy technology company Octopus Energy, responsible for building and overseeing the online experience of its many millions of users worldwide. Starting at the company as one of its very first employees (now standing at over 5,000), Ashley has championed the need for inclusive and accessible websites from the very beginning and has spoken internationally on the subject, taking into account both customer and colleague needs when doing so.

Octopus Energy, along with being one of the best energy companies in the world for customer service, has won numerous customer and digital experience awards thanks to Ashley's approach to accessibility. In 2020 – just four years after starting up – the supplier also became the 15th tech unicorn born out of the United Kingdom. The year after, it became a quintuple unicorn.

Along with his demanding day job, Ashley is determined to make web accessibility a cornerstone of any company's handbook. He spends his spare time as a consultant to government bodies and private companies to help them improve their approach to accessibility. He is also a technical reviewer for books on the subject. He was shortlisted for the Young Energy Professional of the Year award, and is a W3C Invited Expert in the Accessibility Guidelines Working Group - helping to develop WCAG specifications to make content on the Web more accessible for people with disabilities.

All of Ashley's experience culminated in the production of *Practical Web Accessibility*. The first edition of this book reached number one on the Amazon technology charts and is used by readers and companies around the world to understand accessibility and improve their approach to it. Outside of accessibility, Ashley blogs and consults about management, which you can find at mrfirthy.me.

About the Technical Reviewer



Katherine Joyce is a user experience professional, accessibility advocate, and design leader with over ten years of experience having worked across a variety of sectors, including finance and government. She creates innovative, intuitive customer experiences and is an advocate of accessible design. As Director of User Experience at Unisys, she is scaling multidisciplinary design and increasing the UX maturity of a global organization, promoting inclusive and accessible design best practices, standardizing UX and research methodology and processes, while supporting the UI modernization of products driven by user needs. She is also a Design Mentor at DesignLab, where she provides professional global mentorship across a variety of courses combined with career development and portfolio advice for individuals who wish to pursue a career in product design. She also provides content, research, and design mentorship on ADPList, is a LUMA Institute certified Human-Centered Design Practitioner, and is Nielsen Norman Group Certified in the specialism UX Management.

Acknowledgments

This part of the book was rather long in the first edition. I mentioned then that it's never guaranteed that you'll write another book (or edition), so I wanted to ensure that I got the chance to thank everyone who's helped me. For this edition, let me simply say this: the words I committed to print then are just as true now. Thank you immensely for the love and support you show me, that I try every day to return in kind.

For the second edition, I'd like to start by thanking the amazing team at Apress – James Robinson-Prior, Sowmya Thodur, Shaul Elson, Gryffin Winkler, and James Markham. Part of me had forgotten how hard it was to write a book. It'd also forgotten just how great all of you are at turning a book idea into reality and supporting authors. Thank you, sincerely.

I get to thank the brilliant Katherine Joyce again for being the technical reviewer. Thank you for coming back for the second edition and somehow bringing even more insight into it than the first. You found issues, challenged my assumptions, and helped make this book as good as it could be.

I'd like to thank Pete Miller, who followed up his cover design for the first edition with an even better cover. I stretched to two bags of Skittles as a token of my appreciation this time around. Thank you for taking the time out from drawing an Octopus to do it. Cheers, tiger.

Special thanks to the immensely talented Amy Ottley for her help in bringing the illustrations and visual examples in this book to life. They're such a massive step up from the first edition, and they'll help a lot more people understand the topic. I'd also like to thank my senior developer for our design system at Octopus Energy, Tom Sansome, for his sage advice on the pages about component libraries.

To Greg Jackson, who followed up his support of the first edition with some words of his own in the foreword of this edition. He speaks humbly of his involvement in this topic within Octopus, but he was undoubtedly one of the catalysts of its growth, as well as a constant and vocal advocate of it to anyone that's visited us. As a CEO, he uses his platform to speak loudly about an important and often ignored topic. The people within Octopus are well aware of his importance – I'm glad the rest of the world is catching on.

ACKNOWLEDGMENTS

Since writing the first edition, my team has grown rather large and is somehow based in over a dozen countries around the world. It's because of all of you that accessibility remains at the heart of everything we do globally as a company. Every one of you has taken the topic to heart, safeguarded its importance within our culture, and remained curious and caring enough to ask questions. Thank you for teaching me several things every day, supporting one another, and using your talent to do great things in this world. I'm incredibly proud of all of you.

Finally, to my wife. We didn't live together when I wrote the first edition, and so she wasn't entirely aware of the toll writing a book around a full-time job takes. She knows now! She's been boundlessly supportive, forgiving when I'd accidentally disappear into thought, and understanding of the commitment required, all while running her own business. She is my best mate, my teammate, and my soulmate. I promise I probably won't do this again.

P.S.: My fish got a shout-out last time for having to listen to my stupid ideas, and this edition is no different, but my dog had to listen far more often when we went on walks, so a special shout-out to Louie. He always reacted enthusiastically, and that's because he's a very good boy.

Foreword

Nothing makes me prouder than writing this.

I've been lucky enough to have Ashley as a colleague almost since the very beginning of our business – and his work and dedication have not only helped drive the business from startup to \$20 billion of revenue but, more importantly, created deep and meaningful connections with millions of customers from every background.

When Ashley joined Octopus as our first and, for some time, only Front-End Developer, he told me very clearly that he wanted to make accessibility a top priority.

For too long, in many critical sectors, accessibility was considered to be Braille bills, text relay phone calls, and little else. Yet, only a fraction of those with a registered visual impairment can read Braille.

Meanwhile, the Internet is everywhere, and more and more people with disabilities are empowered online through computers and smartphones – devices capable of reading out web pages and emails, adding captions to videos, and catering to any number of other needs.

Indeed, when Ashley discussed his work with me, I learned so much about how to write with autistic readers in mind, or how to design for people with various kinds of color blindness – the importance of thinking about motor skills and neurodiversity.

No company is perfect – but Ashley taught us how to create user experiences that deliver all of the brand and design goals, but in the most inclusive ways possible. And without huge expenses in rework, review processes, etc. – by just making it “how we do stuff.”

I was delighted when regulators, citizens' organizations, government officials, politicians, and even competitors used the first edition to help democratize services for everyone.

Thousands of developers and organizations have benefited from Ashley's work – and I sincerely hope it helped hundreds of thousands, maybe millions, of users access services and products that may otherwise have been inaccessible or too hard to use.

With this second edition, Ashley not only brings us up to date with technology changes and opportunities but also builds on the myriad learnings and pieces of

FOREWORD

feedback. All of this makes it easier than ever for anyone, of any company or discipline, to learn the topic for the first time.

To be able to make the world better for many people, without compromising for others – and at no extra cost – is a huge privilege, maybe even a moral responsibility, and I am delighted that this book enables that.

Thank you Ashley and Apress for publishing this. And, most importantly, thank you for reading it.

Greg Jackson
Founder of Octopus Energy Group

Introduction

Welcome to the book! I know there are a lot of tech books in the world, so I do appreciate you giving your time to this one, and this topic. Let's start by clearing one thing up: this is not a book aimed at just developers. It is written for anyone involved in a website being on the Internet – be that its creation, design, content, maintenance, or running the business that put it there. More generally, it's for anyone interested in understanding an area that so many people are now talking about and one that is so vital to building a Web for everyone.

The truth is, accessibility is something everyone needs to know about for us to be ultimately successful in that goal. Accessibility guidelines, which we'll get to in a moment, state that even if a web page is accessible, but is part of a wider online process or journey that isn't (e.g. like the checkout page of a shopping website), then the **whole** journey is considered inaccessible, including that page.¹ For the same reason, if one person in a team or organization is considering accessibility in their work but nobody else is, they'll make positive gains but will ultimately be swimming against a stronger tide around them.

My point is that it's everyone's responsibility, and the more people involved that are considering and engaged with this topic, the better and more likely that accessibility will become the norm in a company. This idea is at the heart of why this book isn't written for any one discipline. Instead, it's written to allow everyone to explore the topic of web accessibility, understand it and its importance, and apply what they learn to the companies, teams, and sites they're involved with.

¹ *Web Content Accessibility Guidelines 2.21 (WCAG)*, W3C, (05/0610/202318), <www.w3.org/TR/WCAG22/> [Accessed 15/0628/11/2023].

Practical Examples

As you'll see, there will be practical examples throughout the chapters to demonstrate the use of a feature or change to improve accessibility. These are designed for all levels of expertise and are not essential to understand the concepts we'll explore, so don't worry if you're not familiar with code. They're simply a reference for those that may want them, and a complimentary resource. For those interested, the code used in each example will be available on GitHub (GitHub is an easy-to-use site where you can share code and track changes) at <https://github.com/Apress/practical-web-accessibility> – each folder will correspond to the chapter it's used in. Alternatively, in each chapter, there will also be a link to a website that you can visit that will show that feature in action without you having to touch any code. I'll make these links short and easy to type, but you can also find links to every practical example in this book at <https://inclusive.guide/examples>.

These chapters will also sometimes include small code snippets, but feel free to skip them and keep reading if you're not a developer – I've ensured that you'll still understand the points we're covering without them. Alongside these snippets will be design principles, user and customer experience examples, relevant case studies, and some other expert opinions from people who care about accessibility as much as I do. You are of course free to take the project code here and implement it in your sites or use it as a conversation starter with people in your team. It's all here for you to use as you'd like. If you find any of the examples difficult, you can contact me directly using the details in this book.

An Explanation of the Book Format

Over the course of this book, I'd like to share with you, on a chapter-by-chapter basis, a wide range of different disabilities and access needs (an access need is anything a person requires to communicate, learn, or take part in an activity). Some you may have heard of (and even catered for) before, and some will be less well-known. Through understanding the barriers that different people encounter online, we can identify practical ways in which you can alter a website's build, design, content, and user experience to overcome these and cater to all users. After discussing specific impairments, we will move on to areas of websites and user journeys that have, or hold the potential to have, an effect on many access needs.

Here is a quick overview of what we'll be looking at.

The Accessibility Problem (Chapter 1)

We begin with a holistic examination of what web accessibility is and where it's at as a topic today. We'll explore the rise in legal cases, how one of the "fathers of the Internet" saw its purpose for accessibility, the merits of truly understanding access needs rather than just being compliant, and why now is the perfect time to understand it.

Blindness (Chapter 2)

Here we'll explore the role of screen readers that allow users to listen to a web page and how to optimize for them using a range of features. We'll then look at how to make navigating and interacting with content easier for all users by adjusting layout, structure, and functionality.

Low Vision and Color Blindness (Chapter 3)

In this chapter, we'll cover several different types of visual impairment and the impact they have on how a user interacts with your website. We'll look at how you can avoid common pitfalls that exclude those with vision issues, from navigation to color and content, before turning our attention to user preferences that you can utilize to provide catered accessibility.

Motor Impairments (Chapter 4)

Those who navigate the Web using only a keyboard, or other special apparatus, commonly encounter several major barriers. This chapter will provide an overview of some of these challenges, as well as some simple design and experience wins that can drastically improve their experience.

Deafness and Hard of Hearing (Chapter 5)

Audio and video can be a great way to provide different kinds of content on the Web, but it can also inadvertently exclude deaf users. This chapter introduces WebVTT: a technology to help with subtitles and closed captioning. We'll also look at the importance of servicing customers without a telephone and the empowering world of deaf-friendly language.

Cognitive Impairments (Chapter 6)

Cognitive disabilities impact a large percentage of the population and can take many forms. This chapter will look at making the Web more inclusive for those with impaired language, visual, and visual-spatial comprehension, as well as those with inhibited executive function, focus, and memory. We'll look at the importance of language and word choice, the positives (and pitfalls) of using iconography to convey meaning, mastering self-contained actions, and how sites like Reddit have made life easier for those with heightened sensory awareness.

Mental Health (Chapter 7)

This subject has seen a massive increase in exposure over the last few years, yet remains largely undocumented compared to most access needs. In this chapter, we will take a comprehensive look into common causes of anxiety online, known as “dark patterns,” that increase site revenue and metrics but at the expense of a user’s well-being, and how to quell them. We’ll consider how to support users with a range of mental health impairments and why the issue of dark patterns is so important that the inventor of the Web itself is fighting against them.

Imagery (Chapter 8)

This chapter is among the biggest “quick wins” a user will be able to make using this book. Imagery is a major part of nearly every site, yet nearly always contains accessibility issues. We’ll assess the pros and cons of images, videos, icon fonts, and different image types, as well as how to make these accessible for sites both old and new.

Accessible Email (Chapter 9)

A website is only part of your user’s online journey with you. In this chapter, we’ll look at how to ensure that your email formats, content, and styling are all accessible – even if you rely on a third-party email service to handle yours. We’ll also look into a feature that makes user actions both quicker to complete and possible without even opening the email you send them.

Outsourcing Accessibility (Chapter 10)

There have been a range of tools and platforms that have risen dramatically in popularity on the Web over the last few years – changing the process of how websites are built and used. Accessibility overlays you can “bolt on” claiming to solve all of your accessibility problems with a line of code and a toolbar, the “build your own website” phenomenon of websites like Wix and Squarespace bringing large numbers of people without accessibility (or coding) knowledge to the Web, and the rise within the development community of pattern libraries like Material UI with pre-built accessible components, but a complete disengagement from their maintenance and decision-making process – for each of these, we’ll dive into what you’re gaining vs. what you’re giving up and whether they’re helpful or detrimental in the fight to make the Web more accessible.

Tools and Auditing (Chapter 11)

Building an accessible website is great, but ensuring it remains that way is paramount. We’ll discuss how to make sure accessibility is considered during the development process and some key tools to test and improve your site with – both manual and automated. Accessibility is easier when added at the start of a site build, but there are far more sites where that won’t be possible. We’ll cover auditing an existing website through the two frameworks I wrote to help me and my teams – the **FAIR** framework and the **ACCESS** checklist.

Abbreviations

The word “accessibility” is often abbreviated to a11y, which is something I’ll be doing moving forward in this book. The abbreviation is a numeronym, with “11” representing the number of letters between the letter “a” and the letter “y” in “accessibility.” It’s much shorter to write and read and can also read like “ally.” This is a nice reminder to me that, as someone getting involved with accessibility, you’re becoming an ally in supporting the effort of making the Web a better place.

I will also use the words “website” and “site”, and “web page” and “page” interchangeably, as they are common abbreviations.

CHAPTER 1

The Accessibility Problem

Accessibility can be a difficult subject to approach, and it's often tough to know where to start. This is why I have decided to write this book. My aim is to help you understand accessibility and build it into your websites so that together, we can make the Internet the inclusive, empowering place it has the potential to be, for the estimated 1.3 billion people – or 16% of the global population – who experience a significant disability today.¹ Before we get there though, let's begin with a more holistic examination of what web accessibility is and where it's at as a topic today. We'll explore how it's become a problem, the merits of a “disability-driven” approach, and why now is the perfect time to understand it.

*The Internet is for everyone – but it won't be until it can be accessed without limitation.*²

—Vinton Cerf

Vinton Cerf is recognized as one of the “fathers of the Internet” for his work in co-inventing Internet protocols, a breakthrough that formed the foundation of the Web. He was also instrumental in the creation of the first-ever commercial email system.³ It's fair to say that the Internet and email, as we know them, would not exist without him.

Cerf's work is well documented, but more attention is paid to his accomplishments and less to the man himself: the fact that he has a hearing disability is often overlooked.

Cerf saw, perhaps before anyone, the power that the Web held for creating a platform that was truly inclusive – allowing absolutely anyone, regardless of their disability or access needs, to engage with content. At its very origin, what we now know as commercial email was actually an assistive device that allowed deaf users to send and receive messages. In fact, part of Cerf's motivation when building it was to allow him to communicate with his wife Sigrid, who is deaf, while he was at work. Some 20 years after Cerf helped to develop his email service, Sigrid was using the Web to research cochlear implants that would improve her hearing. After nobody returned her calls (via relay service) to Johns Hopkins University, “she sent an email to the doctor and got a response

the next day.”⁴ Thanks to him, she had an alternate way of communicating, specifically designed with her access needs in mind. Indeed, this piece of inclusive design was so successful that her doctor was now using it too.

Cerf described email to the *New York Times* as “the great equalizer in that everyone, hearing and deaf, uses the same technology.”⁵ This is the essence of accessibility. It means removing barriers that might prevent someone from accessing or interacting with something, regardless of their access needs. In the case of this book, this means anything on the Web. Email has become so useful to the world because Cerf considered different access needs, and the fact that everyone – from Sigrid to her doctor, from me to you – still uses his work shows how considering the needs of a diverse range of people helps us design better, more inclusive services.

Unfortunately, if we fast-forward to today, the landscape of the Web doesn’t quite match his expectations.

In an interview with CNet, he lamented:

*It's a crime that the most versatile device on the planet, the computer, has not adapted well to people who need help, who need assistive technology... It's almost criminal that programmers have not had their feet held to the fire to build interfaces that are accommodating for people with vision problems or hearing problems or motor problems.*⁶

His frustration is clear and understandable, especially given his original vision. So, how did the Web go so wrong?

The State of Accessibility Today

Firstly, it’s important to note that there *are* guidelines on how to be accessible on the Web. In fact, there are groups that have been working for decades to make it a more accessible place. These guidelines outline how sites can achieve a certain level of accessibility and compliance – built over several years by the World Wide Web Consortium (W3C), a group headed by Tim Berners-Lee, the inventor of the Internet. W3C’s purpose is to work together in the development of standards for the Web, and Berners-Lee clearly shares Cerf’s ideals:

*The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect.*⁷

—Tim Berners-Lee