



# Practical Web Inclusion and Accessibility

A Comprehensive Guide to Access Needs

---

Ashley Firth

Apress®

# **Practical Web Inclusion and Accessibility**

**A Comprehensive Guide  
to Access Needs**

**Ashley Firth**

**Apress®**

## ***Practical Web Inclusion and Accessibility***

Ashley Firth  
London, UK

ISBN-13 (pbk): 978-1-4842-5451-6  
<https://doi.org/10.1007/978-1-4842-5452-3>

ISBN-13 (electronic): 978-1-4842-5452-3

Copyright © 2019 by Ashley Firth

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

Trademarked names, logos, and images may appear in this book. Rather than use a trademark symbol with every occurrence of a trademarked name, logo, or image we use the names, logos, and images only in an editorial fashion and to the benefit of the trademark owner, with no intention of infringement of the trademark.

The use in this publication of trade names, trademarks, service marks, and similar terms, even if they are not identified as such, is not to be taken as an expression of opinion as to whether or not they are subject to proprietary rights.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Managing Director, Apress Media LLC: Welmoed Spahr  
Acquisitions Editor: Louise Corrigan  
Development Editor: James Markham  
Coordinating Editor: Nancy Chen

Cover designed by Pete Miller

Distributed to the book trade worldwide by Springer Science+Business Media New York, 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax (201) 348-4505, e-mail [orders-ny@springer-sbm.com](mailto:orders-ny@springer-sbm.com), or visit [www.springeronline.com](http://www.springeronline.com). Apress Media, LLC is a California LLC and the sole member (owner) is Springer Science + Business Media Finance Inc (SSBM Finance Inc). SSBM Finance Inc is a **Delaware** corporation.

For information on translations, please e-mail [rights@apress.com](mailto:rights@apress.com), or visit <http://www.apress.com/rights-permissions>.

Apress titles may be purchased in bulk for academic, corporate, or promotional use. eBook versions and licenses are also available for most titles. For more information, reference our Print and eBook Bulk Sales web page at <http://www.apress.com/bulk-sales>.

Any source code or other supplementary material referenced by the author in this book is available to readers on GitHub via the book's product page, located at [www.apress.com/9781484254516](http://www.apress.com/9781484254516). For more detailed information, please visit <http://www.apress.com/source-code>.

Printed on acid-free paper

*For my mum.*

# Table of Contents

<b>About the Author .....</b>	<b>xv</b>
<b>About the Technical Reviewer .....</b>	<b>xvii</b>
<b>Acknowledgments .....</b>	<b>xix</b>
<b>Introduction .....</b>	<b>xxiii</b>
<b>Chapter 1: The Accessibility Problem.....</b>	<b>1</b>
Facing accessibility head on.....	1
The state of accessibility today .....	3
Why is it important now? .....	7
Competitive advantages .....	9
Why approach accessibility in a disability-driven way? .....	10
Notes.....	12
<b>Chapter 2: Blindness .....</b>	<b>17</b>
Screen reader software .....	18
Perceive, navigate, and interact.....	19
Using ARIA.....	20
Applying ARIA attributes .....	23
aria-live .....	25
aria-label .....	26
aria-hidden .....	26
Support.....	27
HTML5 implicit mapping.....	27

## TABLE OF CONTENTS

Heading structure .....	28
Styling headers.....	29
aria-labelledby.....	31
Semantic markup .....	31
Testing heading structure.....	32
Off-screen headers .....	33
Linear layouts .....	34
How users navigate .....	34
What is a linear layout? .....	35
Mobile devices.....	37
“Skip to main content” link.....	39
Alt tags.....	41
Forms.....	45
Proper labelling/identification .....	46
Large click areas .....	47
Conclusion .....	49
Notes.....	50
<b>Chapter 3: Low Vision and Colour Blindness .....</b>	<b>55</b>
Magnification .....	58
Horizontal scrolling.....	58
Tracking.....	59
Text overflow .....	59
Testing zoom .....	60
Responsive web design.....	60
Preventing zoom.....	61
Point of regard.....	62
Navigation .....	63

Accessible text.....	64
Relative units.....	65
Stop using pixels .....	67
Screen sizes .....	67
Raise your base font size .....	68
Line height.....	69
Letter spacing.....	70
Font choice .....	71
Contrast ratio .....	72
Colour blindness .....	79
Different types of colour blindness.....	80
Links .....	86
Testing .....	87
Conclusion .....	87
Notes.....	87
<b>Chapter 4: Motor Disabilities.....</b>	<b>93</b>
Keyboard-only navigation .....	94
Tabindex.....	96
Focus styles .....	101
Accessible overlays .....	103
Pointer-based gestures.....	113
Large hit areas.....	114
Pointer cancellation.....	115
Voice to text .....	117
Support for all motor-impaired users.....	122
Short timeouts.....	123
Provide shortcuts.....	124

TABLE OF CONTENTS

Motion actuation.....	125
Autofill .....	128
Conclusion .....	130
Notes.....	131
<b>Chapter 5: Deafness and hard of hearing .....</b>	<b>135</b>
Subtitles vs. closed captioning .....	137
Caption actions.....	140
Helping all users.....	141
Which should I apply? .....	141
<track> element.....	142
WebVTT files .....	144
.vtt layout.....	145
Different formats .....	146
Styling subtitles.....	147
Positioning.....	150
Future features .....	154
<audio> tag and captions.....	158
Closed caption buttons .....	160
YouTube.....	161
Accessible subtitle/caption content.....	164
Summarising audio and video content .....	167
Unexpected or Automatic Audio.....	168
Linear Layouts.....	169
Servicing customers without a telephone .....	170
Providing alternatives.....	171
Text relays .....	171
Conclusion .....	172
Notes.....	173



<b>Chapter 6: Cognitive Impairments</b> .....	<b>179</b>
Defining Cognitive Impairments.....	180
Language comprehension.....	183
Plain English.....	183
Word choice.....	188
TL;DR's.....	192
Clear iconography.....	195
Avoiding complex pages.....	199
Complex layouts.....	200
Complex experiences.....	202
Breadcrumbs.....	207
Hierarchical.....	208
Historical.....	210
Sitemaps.....	211
Self-contained actions.....	212
Autocomplete.....	214
“Strict” search.....	216
“Fuzzy” matching.....	217
Types of “fuzzy” searching.....	220
Which should I use?.....	221
Conclusion.....	221
Notes.....	223
<b>Chapter 7: Mental Health</b> .....	<b>231</b>
Dark patterns.....	232
Dark pattern: Complicated journeys and dead ends.....	235
Dark pattern: Forced urgency.....	248

## TABLE OF CONTENTS

Dark pattern: “Sneak into basket” .....	253
Dark pattern: Confirm shaming.....	255
Dark pattern: Bait and switch .....	258
Communication anxiety .....	261
Reach users where they feel comfortable.....	262
Familiar integrations .....	264
Conclusion .....	266
Notes.....	268
<b>Chapter 8: Imagery .....</b>	<b>277</b>
Images .....	278
Background images.....	279
Text in images .....	281
Text in responsive images .....	282
Colour in images.....	283
Videos .....	284
Should you do it? .....	292
Reducing movement.....	292
Parallax.....	295
Iconography .....	296
<img> tag .....	296
Sprites .....	297
Windows High Contrast Mode .....	299
SVG.....	305
Conclusion .....	310
Notes.....	311

**Chapter 9: Communication .....315**

- Accessible email ..... 316
  - Highlight actions..... 330
  - Testing ..... 331
  - Understanding email support ..... 332
- Attachments..... 333
- One-click action buttons ..... 333
- No-reply email addresses ..... 337
  - You're going to annoy your users ..... 338
  - Good uses of email ..... 339
- Communicating with users directly ..... 341
  - Identifying access needs ..... 341
  - How to pass on information effectively ..... 343
  - Use plain language ..... 343
  - Set expectations ..... 344
  - After communication ..... 345
  - Accessibility champions ..... 346
- Conclusion ..... 347
- Notes ..... 348

**Chapter 10: New Technologies .....355**

- Smart devices ..... 356
  - Voice assistants..... 357
  - How do they understand us? ..... 358
  - How do smart devices help accessibility? ..... 359
  - How much can you interact with the Web on them? ..... 362

## TABLE OF CONTENTS

Disability-driven design .....	365
Sesame smartphone.....	365
Microsoft adaptive controller .....	366
Support for offline customers .....	368
Telephony software .....	369
Fallbacks .....	373
Impact on accessibility.....	374
Artificial Intelligence .....	375
Providing automatic video captioning .....	376
Providing human-level language translation.....	377
Providing information about images .....	378
Providing information about a user’s surroundings .....	379
Making speech recognition even more inclusive .....	379
Providing catered content for users .....	380
Providing automatic summaries of text.....	381
Conclusion .....	382
Notes.....	383
<b>Chapter 11: Tools and QA.....</b>	<b>393</b>
Tools.....	394
General .....	395
Blindness .....	409
Low vision.....	414
Colour blindness.....	416
Deaf and hard of hearing.....	418
Cognitive impairments .....	420
Mental health.....	420
Communication .....	422

Automating your accessibility testing ..... 424

- AccessLint ..... 425
- Pa11y..... 428
- A11y machine..... 429
- AATT ..... 430
- WAVE evaluation tool ..... 430

Auditing an existing site..... 431

- Aesthetics..... 432
- Content ..... 433
- Communication ..... 434
- Ease of use ..... 434
- Settings ..... 435
- Specifics ..... 435

Conclusion ..... 436

Notes..... 436

**Chapter 12: Conclusion..... 441**

- Questions you should ask yourself ..... 441

  - How can I engage more with users with different access needs?..... 442
  - Should I ask for help?..... 445
  - Should I build everything myself? ..... 446
  - What can I do to engage others in accessibility? ..... 446

- Takeaways ..... 447

  - Robles vs. Domino’s Pizza ..... 448

- Final words..... 452
- Notes..... 454

**Index..... 459**

# About the Author



**Ashley Firth** is head of Front-end Development and Accessibility at award-winning energy supplier Octopus Energy. Since the company’s formation, he has worked together with customers to understand their needs and use new technology to make an online experience, and energy supplier, that is as inclusive as possible. Ashley and Octopus Energy have won numerous customer and digital experience awards for their products, and their approach to web accessibility has been described as “best in class” by the Royal

National Institute of Blind People. Ashley was shortlisted for the 2018 Young Energy Professional of the Year award for customer service, spoke at the Festival of Marketing on the importance of web accessibility, and was part of eConsultancy’s first ever Neurodiversity report. He is a published writer for *Web Designer* magazine on accessibility and acts as a consultant to other companies to help them improve their approach to accessibility. Before Octopus Energy, Ashley ran the front-end development team at Digital and CRM agency, Tangent, helping to build sites for clients such as Walkers, Carlsberg, SAP, and the Labour Party, and before that, at experiential start-up, Fishrod Interactive, helping to make interactive installations for WWE, Sky, and Budweiser. You can find him on Twitter and Instagram @MrFirthy.

# About the Technical Reviewer



**Katherine Joyce** is a passionate designer and developer with over 7 years of experience having worked across the financial and government sectors. She creates innovative, intuitive customer experiences and is an advocate of accessible design. As lead UX/UI designer at Alt Labs, she is leading the UX vision and crafting beautiful solutions driven by user needs. In her previous role, she worked as a senior UX/UI designer for Accenture, promoting accessible design in

government services and helping automate legacy processes to improve the customer journey. She has also spent over 5 years with AXA Insurance as an application support software developer where she fixed bugs in legacy financial systems, debugged issues with browser compatibility, and suggested improvements to customer facing journeys. She is passionate about advocating accessible design and mentoring those who would like to have a career in design or development.

# Acknowledgments

I've always seen this part of a book as similar to the credits of a film, because far more than one person makes something like this a reality and it's important to recognise that. Credits can also be long and cumbersome but, as you can rarely be sure that you'll get the chance to publish a book again, it feels important to give thanks properly.

My first thanks go to Louise Corrigan, Nancy Chen, and James Markham at Apress for their constant support and advice throughout the writing process and for answering my many, many questions. I'd also like to thank my technical reviewer Katherine Joyce for her insight and fantastic suggestions that helped sharpen my words, and the whole team at Apress that gave me a chance to write for them – it's a dream come true.

Secondly to my incredible research and editorial assistant Jackson Howarth. "I couldn't have done it without you" is a cliché but in this instance, it's true. Thank you for engaging in the world of accessibility with such enthusiasm, entertaining every chat and random idea, and for keeping me sane. Time for a celebratory junior spesh.

Next, to some wonderful people within the world of accessibility, who sacrificed their time to allow me to talk to them: My thanks to James Buller, head of the Access Needs team at the Home Office; Áine Jackson, research and policy advisor at the British Deaf Association (now policy advisor at the Ministry of Justice); Merlyn Holkar, research officer at Money and Mental Health; and Robert McDowell, author of Econsultancy's Neurodiversity and Digital Inclusion report.

Then there are those amazing few that, although didn't help me write the book directly, certainly helped me become capable of doing so. This book is dedicated to my mum Tracey, who is the strongest woman I know.



## ACKNOWLEDGMENTS

Her level of care in teaching those with learning disabilities, and now her tireless work in fostering, is no doubt what motivates me to apply the same care and inclusiveness to my work.

Next to my brother Hayden for *constantly* reminding me of the power in being silly and taking a break, teaching me to fish, carrying me in Fortnite, and always visiting (even if it's only for the burgers and cookies). His humor makes me laugh when I don't want to laugh, and I'm proud of the man he's become.

My dad Michael is the only person that will go to the snooker with me and be happy about it, which for me is a big deal. He has taught me to be composed and pragmatic and how to destroy stud walling with a large sledgehammer. His ability to reinvent his career helped give me the confidence to do the same.

My stepdad Richard was actually the first person I spoke to about leaving the study of law to pursue coding, and without his calm words and reassurance, I may not have done so. He's been a great teacher when he didn't have to be, and a strong (albeit biased) football companion.

Turbo-thanks go to my wonderful partner Charlotte for her endless support, love, and unbreakable spirit. Her contagious happiness and craziness have pulled me from bad moods more times than I'd care to admit. I'm lucky to have found her, and for all of the above, she has my thanks and my heart.

Octopus Energy has supported me in my pursuit of an inclusive Web ever since it was founded, and it is quite frankly the best place I can think of to work. To everyone in the octo-family, thank you for making it fun, accepting, and inspiring to work there every day. Love and power.

We're not a company that likes to single people out because we achieve as a team, so I hope they forgive me for making a few exceptions on this occasion. Firstly, I'd like to thank Greg Jackson for giving up the 15 minutes of his time that it took to convince me to join Octopus and for the numerous weeks at the start of the company's life he gave me to build

accessible standards, simply because I told him it was “the right thing to do.” I believe he’s the type of leader all modern companies need.

Secondly to my two mentors/enablers:

Pete Miller, who has put his faith in me twice now to do his front-end bidding and has never mentioned in earshot of me that he regrets that. He designed the cover for this book and asked only for Skittles in return. He’s one of those awful work friends that becomes your real-life friend without asking. I’m very lucky.

Rebecca Dibb-Simkin has helped me navigate management, business, public speaking, and about a hundred other things. How she does what she does around long train journeys and endless kickboxing injuries is beyond me. She’s a truly inspiring woman.

Lastly to my front-end development team, who wholeheartedly uphold (and improve) my initial standards of accessibility and operate as an incredible hive mind. There’s never a day when I don’t learn something from them, and that’s the very best you can ask for in a team.

To wrap this up, it seems wrong not to mention these amazing humans who have helped and supported me in so many ways, but I also know that the acknowledgments can't be longer than the book itself, so as a compromise, I’ll just say thank you to Chris, Natalia, Harrison, Ronan, Sarah, Robin (finish your album), Austin, Louise, and Kat – I’m hugely thankful for all of you.

And a small shout-out to my fish, who had to listen to many read-throughs of this book and never once complained.

# Introduction

Welcome to the book! Let's start by clearing one thing up – this is not just a book aimed at developers. It is written for anyone involved in the design, build, or maintenance of a site, or for anyone generally interested in understanding an area that so many people are now talking about.

Accessibility guidelines, which we'll get to in a moment, state that even if a page is accessible, but is part of a wider online process or journey that isn't (like the checkout process of a shopping website),<sup>1</sup> then the whole journey fails, including that page. For the same reason, if one person in a team or organisation is considering accessibility in their work but nobody else is, you'll make positive gains, but run the risk of encountering a similar problem.

In fact, if you are working as a part of a large team, many people have argued that the project manager, and not developers or designers, are in the best place to make sure everyone involved is working with accessibility in mind, as they have oversight on the whole project. My point is that the more people are thinking about this issue, the better, and this idea is the crux of why this book isn't written for any one discipline.

As we'll see, due to the growing trend of lawsuits and media coverage, it's also important for project stakeholders to understand the importance and repercussions of exclusionary design. The more people that are aware, the more likely that accessibility will become the norm in a company.

This book is therefore aimed at all levels and disciplines, written simply to allow everyone to explore the avenues of web accessibility, understand it and its importance, and to apply what they've learned to the sites they're involved with. As you'll see, there will be practical examples throughout the chapters to help you, and they're designed for all levels

## INTRODUCTION

of expertise. 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-inclusion-and-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 code snippets, but feel free to skip them and keep reading if you’re not a developer – I’ve ensured that you’ll still get value out of what I’ve written. Alongside these examples 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. Equally, you’re also free to steal the project code here and implement it in your sites. It’s all here for you to use as you’d like, and 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 – some you may have heard of (and even designed 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 your site’s build, design, and user experience to cater for these 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:

## **Blindness (Chapter 2)**

Here, we'll explore the role of screen readers and how to optimise them using a range of features, from alt text to ARIA tags. We'll then look at how to make navigating and interacting with content easier for blind users by adjusting layout, structure, and functionality.

## **Low vision and colour blindness (Chapter 3)**

In this chapter, we'll cover several different types of ocular impairment and the impact they have on how users interact with a design. We'll look at how you can avoid pitfalls that exclude those with vision issues, for example, taking some time to cover the importance of avoiding a reliance on colour to convey meaning (using it as a compliment not a crutch), before turning our attention to user preferences that provide catered accessibility.

## **Motor disabilities (Chapter 4)**

Those who navigate the Web using a keyboard-only setup or other special apparatus commonly encounter several major barriers. This chapter will provide an overview 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, but it can also inadvertently exclude deaf users. This chapter introduces WebVTT: a new 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. In this chapter, we will take a comprehensive look into the causes of anxiety online and how to quell them. We also consider disabilities ranging from dementia to schizophrenia, as well as how to reach and support users with mental health issues, both on your site and away from it.

## **Imagery (Chapter 8)**

This chapter is among the biggest “quick wins” you will be able to make using this book. Imagery is a major part of nearly every site, and we’ll assess the pros and cons of images, videos, icon fonts, and SVGs, as well as how to make these accessible for sites both old and new.

## **Communication (Chapter 9)**

A website is only part of your user’s online journey with you. This chapter explores the importance of using a range of communicative channels, the power of accessible emails, and how you can make communication easier by reducing the amount of necessary interaction.

## **New technologies (Chapter 10)**

There are some fascinating new technologies emerging right now. As the wave of in-home “smart tech” continues to rise, we’ll look at some interesting new ways these can be used to solve accessibility problems, how new tech can be accessible even when the user doesn’t have an Internet connection, and delve into the fascinating world of artificial intelligence.

## **Tools and QA (Chapter 11)**

Building an accessible site and journey is great, but ensuring it remains accessible is paramount. We’ll discuss how to make sure accessibility is considered during the development process, neat approaches to auditing an existing site, and some key tools to test and improve your site with.

## Practical examples

As I mentioned, where relevant, I have built a practical example to demonstrate the use of a feature or change to improve accessibility. Storing these on Github allows developers to access and alter the source code of the examples, but every chapter also includes a website link that you can access on your browser – to view the example and understand its purpose. These could even act as useful examples to share with developers and designers in your company to advocate their inclusion in your sites.

Depending on the purpose of your site, some of these examples may not be the perfect fit for you. However, you are welcome to use each and every one, or adapt them for your needs (I encourage you to – it'll make the Web a better place).

## Note

1. *Web Content Accessibility Guidelines 2.1 (WCAG)*, W3C, (05/06/2018), <<https://www.w3.org/TR/WCAG21/>> [accessed 01/03/2019].



## CHAPTER 1

# The Accessibility Problem

Accessibility is 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 sites, so that together, we can make the Internet the inclusive, empowering place it has the potential to be. To begin with, we'll take a moment to explore the merits of a "disability-driven" approach, and then we'll turn to look at why the timing has never been more important.

## Facing accessibility head on

*The Internet is for everyone – but it won't be until it can be accessed without limitation.*<sup>1</sup>

—Vinton Cerf

Vinton Cerf is recognised 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. It's fair to say that 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.

Vint 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 needs, to engage with content. At its very origin, commercial email was an assistive device that allowed deaf users to receive messages. In fact, part of Vint's motivation was to allow him to communicate with his wife Sigrid, who is deaf, while he was at work. Some 20 years after Vint 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 John Hopkins University, “she sent an email to the doctor and got a response the next day.”<sup>2</sup> Thanks to Vint, 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.”<sup>3</sup> This is the essence of accessibility. It means removing barriers that might prevent someone from using something, regardless of their access needs (an access need is anything a person requires to communicate, learn, or take part in an activity). Email has become so useful to the world because it caters for different access needs, and the fact that everyone, from Sigrid to her doctor – from me to you – still uses it 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 doesn't quite match Cerf's expectations.

In an interview just 2 years ago, 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.*<sup>4</sup>

His frustration is clear and understandable, especially given his original vision.

## The state of accessibility today

Despite the Web's current shortcomings, there are groups that have been working for decades to make it a more accessible place. There are guidelines that outline how sites can be technically accessible, built over several years by the World Wide Web consortium (W3C), who are headed by one of Cerf's former colleagues, Tim Berners Lee – the inventor of the Internet. W3C's purpose is to work together in the development of standards for the Web and Tim clearly shares Vint's ideals:

*The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect.*<sup>5</sup>

—Tim Berners Lee

With this in mind, the group created the Web Content Accessibility Guidelines (WCAG) – a comprehensive list of requirements that when met, improve a site's web accessibility. It has three levels: "A," "AA," and the strictest "AAA," with "AA" being widely considered as an acceptable legal standard. This, at the very least, offers a consistent way to achieve measurable accessibility.

It's a good resource and a great idea; however, there are a few issues. The first is just how big it is. The latest WCAG release (2.1) has a page entitled "Understanding WCAG" which is nearly as long as the update itself.<sup>6</sup> Each point in WCAG is accompanied by a long page to help the reader actually understand the rule, and a separate page describing how

to meet the requirement. This can get in the way of understanding and adopting accessibility, as the solutions are almost always too dense to digest.

Another issue is oversight, as WCAG do not enforce these rules themselves. Although (as we shall see) the threat of litigation is growing, the fact is that you can, with a server and a basic understanding of code, publish your own website without anyone or anything stopping you from doing so on the grounds that your content is inaccessible.

There is also the issue of relevancy; prior to last year, the last full version of WCAG (2.0) was released nearly a decade ago.<sup>7</sup> As technology has evolved at a rapid rate, regulation often struggles to keep pace.

And after all of this, you're faced with the final boss: being WCAG compliant doesn't guarantee that you're fully solving access issues. James Buller, head of the access needs team at the British Home Office encountered this when he undertook some research into how users apply for a passport:

*We did some testing with deaf people. Initially the query was why would you do that, there's no audio involved in the service? But the researchers were soon vindicated... [The subject] was going through the form, and there had been no big problems until she got to the most boring page on the site – the contact page. It asked her to “provide a phone number” and she did, but also wanted to write “I’m deaf please don’t call me”. In this case, it wouldn’t let her submit an answer with both numbers and text in it. When we tested this page against WCAG it passed, but on human terms, it was not accessible because we did not provide her with that option.<sup>8</sup>*

This is why you need to go beyond being compliant and “ticking boxes.” You need to be proactive and check where you may well find nothing wrong.

There was, however, something interesting in the latest version of WCAG: a slight change of approach. This new format addresses accessibility from a “disability-driven mindset.”<sup>9</sup>

This approach encourages you to imagine a user with a specific access need, the problem they’re facing, and then, using the regulation WCAG have created, consider an appropriate solution. Here’s an example of one of the new additions, which states that your site should give a user feedback when an action is initiated:

*Accountant who is blind and uses a screen reader:*

***Problem:*** *I selected a class for the conference, but I can't tell if it got added to my schedule.*

***Works well:*** *When I add a meeting to my calendar, I hear a confirmation.*<sup>10</sup>

It’s simple, and it feels like a return to Cerf’s idea of designing and developing to address access needs, in the same way he considered deafness while he developed commercial email. This is important, because a few things happen when you consider accessibility in this way.

First, by approaching your site from a perspective other than your own, you learn to make other access needs a part of your everyday thought process. This practice helps you begin to see potential constraints and design for them from the outset, rather than coming back to them once the site has been built. Cerf said that accessibility shouldn’t be “pixie dust” that designers and developers sprinkle on as an afterthought – it needs to be consciously considered.<sup>11</sup> This is what makes disability-driven accessibility a practical solution.

You also see that “accessibility” needs are often also in fact “user” needs. By designing for disabilities, you start solving issues for everybody, accounting for requirements you might not have even considered.<sup>12</sup>

This reflects the World Health Organisation’s most recent definition of disabilities, referring to a disability not as a “personal attribute” – as they were described in 1980 – but as “context dependent... reflecting the

interaction between features of a person's body and features of the society in which he or she lives."<sup>13</sup> Their point was that disabilities happen during interactions between a person and the world around them on a physical and cognitive level, and this plays out regularly on the Web. The needs of the user are not always reflected in the design or function of a page, and these conflicts prevent a person from engaging, or even interacting, with the content of a site.

Using this definition, everyone has access needs, and anyone could develop new ones at any time. You see this everywhere, in interactions with content in a language that isn't your first, with short-term injuries or illnesses, or even when trying to hold a child in one arm and a tablet in the other. As we get older, our eyesight, hearing, dexterity, or mental capacity may well get worse (one of the new examples in WCAG is focused on correct sizes for buttons to cater for elderly users with hand tremors). These all create needs that can be met by accessible features. Video captions, for example, help those with hearing loss, but also those who want to engage with the content without sound in a quiet room.

It is therefore our job, as designers, developers, and anyone involved in building a site, to factor in these cases and create inclusive web experiences that work for the largest number of people possible.

It's not just about which device has market share right now or what a user's browser of choice is. It's about somebody's experiences of their surroundings. It's about whether someone sees a site or hears it. It's about whether they see your design in a hundred colours or several shades. It's about whether they only use a keyboard to navigate everything on their computer.

The increased awareness of accessibility's ethical importance, and the recent updates to guidelines, makes this the perfect time to explore disability-driven accessibility in more depth.