

INDIAN LANGUAGE RESOURCES— ACCESSIBILITY SUBCOMMITTEE REPORT

Authored by

IEEE SA Accessibility Subcommittee

TRADEMARKS AND DISCLAIMERS

IEEE believes the information in this publication is accurate as of its publication date; such information is subject to change without notice. IEEE is not responsible for any inadvertent errors.

The ideas and proposals in this specification are the respective author's views and do not represent the views of the affiliated organization.

ACKNOWLEDGMENTS

Special thanks are given to the following contributors/reviewers of this report:

Mahesh D. Kulkarni, *Formerly Sr. Director, Corporate R&D, C-DAC*

Charudatta Jadhav, *Head Accessibility and Inclusion R&I, TCS*

Srinivasan Ramakrishnan, *IISAC Private Limited; Formerly DG, C-DAC*

The Institute of Electrical and Electronics Engineers, Inc. 3 Park Avenue, New York, NY 10016-5997, USA

Copyright © 2023 by The Institute of Electrical and Electronics Engineers, Inc.

All rights reserved. 18 September 2023. Printed in the United States of America.

PDF: STDVA26425 979-8-8557-0064-0

IEEE is a registered trademark in the U.S. Patent & Trademark Office, owned by The Institute of Electrical and Electronics Engineers, Incorporated. All other trademarks are the property of the respective trademark owners.

IEEE prohibits discrimination, harassment, and bullying. For more information, visit <http://www.ieee.org/web/aboutus/whatis/policies/p9-26.html>.

No part of this publication may be reproduced in any form, in an electronic retrieval system, or otherwise, without the prior written permission of the publisher.

Find IEEE standards and standards-related product listings at: <http://standards.ieee.org>.

NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF IEEE SA INDUSTRY CONNECTIONS DOCUMENTS

This IEEE Standards Association (“IEEE SA”) Industry Connections publication (“Work”) is not a consensus standard document. Specifically, this document is NOT AN IEEE STANDARD. Information contained in this Work has been created by, or obtained from, sources believed to be reliable, and reviewed by members of the IEEE SA Industry Connections activity that produced this Work. IEEE and the IEEE SA Industry Connections activity members expressly disclaim all warranties (express, implied, and statutory) related to this Work, including, but not limited to, the warranties of: merchantability; fitness for a particular purpose; non-infringement; quality, accuracy, effectiveness, currency, or completeness of the Work or content within the Work. In addition, IEEE and the IEEE SA Industry Connections activity members disclaim any and all conditions relating to: results; and workmanlike effort. This IEEE SA Industry Connections document is supplied “AS IS” and “WITH ALL FAULTS.”

Although the IEEE SA Industry Connections activity members who have created this Work believe that the information and guidance given in this Work serve as an enhancement to users, all persons must rely upon their own skill and judgment when making use of it. IN NO EVENT SHALL IEEE OR IEEE SA INDUSTRY CONNECTIONS ACTIVITY MEMBERS BE LIABLE FOR ANY ERRORS OR OMISSIONS OR DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO: PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS WORK, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE AND REGARDLESS OF WHETHER SUCH DAMAGE WAS FORESEEABLE.

Further, information contained in this Work may be protected by intellectual property rights held by third parties or organizations, and the use of this information may require the user to negotiate with any such rights holders in order to legally acquire the rights to do so, and such rights holders may refuse to grant such rights. Attention is also called to the possibility that implementation of any or all of this Work may require use of subject matter covered by patent rights. By publication of this Work, no position is taken by the IEEE with respect to the existence or validity of any patent rights in connection therewith. The IEEE is not responsible for identifying patent rights for which a license may be required, or for conducting inquiries into the legal validity or scope of patents claims. Users are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. No commitment to grant licenses under patent rights on a reasonable or non-discriminatory basis has been sought or received from any rights holder.

This Work is published with the understanding that IEEE and the IC Com members are supplying information through this Work, not attempting to render engineering or other professional services. If such services are required, the assistance of an appropriate professional should be sought. IEEE is not responsible for the statements and opinions advanced in this Work.

TABLE OF CONTENTS

1. SCOPE	5
2. INTRODUCTION	6
2.1 ACCESSIBILITY IN CONTEXT	6
2.2 ACCESSIBILITY.....	6
3. BACKGROUND	8
3.1 INTRODUCTION.....	8
3.2 INITIATIVES OF THE GOVERNMENT OF INDIA.....	8
4. STATUS OF ACCESSIBILITY STANDARDS.....	13
4.1 GLOBAL.....	13
4.2 STATUS OF INDIAN STANDARDS	34
5. GAPS AND RECOMMENDATIONS	37
5.1 VIEWS.....	37
5.2 GENERIC GAPS.....	39
5.3 SPECIFIC GAPS	40
5.4 KEY OBSERVATIONS AND DECISIONS	40
6. USE CASES/CASE STUDIES.....	43
6.1 BANKING	43
6.2 EDUCATION	45
6.3 OTHERS—AGRICULTURE, ELECTION PROCESSES, E-GOVERNANCE, SMART CITIES, AND HEALTH	47
7. ACCESSIBILITY PERSONAS.....	48
8. LINKS TO OTHER WORK	49
9. SUGGESTED AREAS FOR FUTURE ACTION	49
10. REFERENCES	50

1. SCOPE

This report of the subgroup on information and communication technology (ICT) accessibility is part of pre-standardization studies for Indian language resources. It was initiated with industry consultation of IEEE Standards activity to pool expertise across government, industry, and academia. Other subgroups cover script processing, text processing, speech processing, and evaluation methodologies.

After a brief introduction of the significance of accessibility that underlines the needs of people with disabilities (PwDs), the role and relevance of accessibility in ICT products and services is covered. Once the significance and context of accessibility in ICT is brought out, the Rights of Persons with Disabilities Act, 2016 is briefly covered, especially the provisions that relate to mandates in respect to the formulation of ICT standards, contents, goods, and services used in everyday life.

Section 2 details relevant global ICT accessibility standards, especially those of the World Wide Web Consortium (W3C), Web Accessibility Initiative (WAI), and the Web Content Accessibility Guidelines (WCAG) as they have evolved and their plans for the future. Features of the standard that have a bearing on languages are explicitly brought out. Other prominent global standards—namely EN 301 549 of ETSI/CEN/CENELEC adopted in Europe and Section 508 of Rehabilitation Act adopted in the United States—are briefly outlined. The latter two were fully harmonized with the WCAG 2.0 or 2.1 standards or were largely extended for contexts beyond the web, based on the WCAG 2 ICT guideline document. Many of the requirements that are germane to aspects of languages in accessibility standards (including script, text, and speech) have been highlighted.

Section 3 reviews the status of accessibility requirements for ICT products and services currently in progress at the Bureau of Indian Standards (BIS). Explicit reference to the requirements of PwDs using Indian languages has been made in the BIS Indian standard IS 17802 [38], which was notified in December 2021 and May 2022, respectively by BIS in respect of Part 1 (Requirements) and Part 2 (Compliance criteria). They have been notified under RPWD Rules 2017 and Amendment Rules 2019, 2020, and 2023 [75]. It is fully harmonized with WCAG 2.1. Only Indian language script processing standards figure in the standard. In other areas like text processing and speech processing, progress in terms of maturity of solutions and standards need to be rapidly made for the next version of Indian accessibility standards to benefit from and support Indian language PwDs.

Section 6 and Section 7 reveal some sectoral responses to inclusion of the needs of PwDs in an increasingly digitalized society and ways of addressing them. India's rapid progress in the area of digitalization spotlights the

need to accelerate technologies and standards for progress in natural language processing of Indian languages.

With the previous in mind, gap analysis and recommendations have been made. Areas that need linkage with the work of the other four subcommittees have been underlined. Bibliographic references for potential future work are provided.

2. INTRODUCTION

2.1. ACCESSIBILITY IN CONTEXT

According to the World Health Organization (WHO), about 15% of the world's population lives with some form of disability. About 2.2% of India's population lives with some form of disability—more than the entire population of Australia, according to the National Statistics Office report on disability released in 2019. These include disabilities of vision, hearing, speech, movement, intellect, as well as mental illness, multiple disabilities, and others. India is a signatory to the United Nations Convention on the Rights of Peoples with Disability and has an obligation to provide equal opportunities and facilities to everyone, irrespective of any disabilities. This is guaranteed in the right to equality and the right to life, which are enshrined in the Fundamental Rights in the Constitution of India.

THE POWER OF THE WEB IS IN ITS
UNIVERSALITY.
ACCESS BY EVERYONE REGARDLESS OF
DISABILITY IS AN ESSENTIAL ASPECT.

—TIM BERNERS-LEE,
W3C DIRECTOR AND INVENTOR OF THE WORLD WIDE WEB

2.2. ACCESSIBILITY

Accessibility enables people with disabilities to perceive, understand, navigate, interact with, and contribute to the web (and other information technology-based activities). Digitalization is all pervasive and ICT accessibility needs to be present as a built-in feature rather than as add-on. Apart from standards development, its implementation and compliances are key factors and need to be respected. Accessibility deserves a place in the full ecosystem of standards (and guidelines and best practices)—from standards development, awareness creation, capacity building and training, development of test suites and test tools, compliance matrices, certification labs, and research and development on new technologies and products.

W3C has done tremendous work in bringing out standards/recommendations in web accessibility. However, implementation of accessibility features needs to comprehensively expand to devices and ever-evolving web and digital publications, infrastructure in offices and cities (as in ‘smart cities’), industry automation, and more. Certain guidelines/recommendations are quite elaborate and hence it is important to harmonize the current activity with W3C. The United States and Europe have harmonized their accessibility standards with W3C, but they also have certain regional impacts. Similarly, India being a multilingual, multicultural country, has also looked at accessibility standards and recommendations from W3C and other countries to harmonize, leverage, and tune them to India’s specific requirements. This effort needs to continue.

Since accessibility is a wide-ranging subject matter, it may be useful to look at the gaps in accessibility standards/recommendations and focus on domain-specific case studies, even while Indian accessibility standard efforts are ongoing. Use cases bring out barriers and opportunities from the point of view of citizens and challenge the pace of adoption. Banking, financial services, and insurance (BFSI) is an illustrative case. With many BFSI functions going digital, it is already possible to make payments accessible through apps (e.g., transactions through UPI* supporting digital payment apps have sky-rocketed in the recent years in India). Even access to credit is becoming possible digitally. Education is another sector to relate to the value of accessibility through access to digital contents made available through platforms and e-books.

Other use cases in the following domains will be of particular relevance to the larger public. Agriculture, elections, e-governance, smart cities, health, mobility/ transportation, and workplace (for employees).

As standards and recommendations evolve, it is desirable to look at gaps in the available technologies, their limitations, the investments needed for compliance, and other factors. Speech technologies, sign languages, and audio captioning are some of the key technologies in various languages that will be most needed for accessibility in a multilingual country with diverse literacy levels and age groups like India.

Assistive technologies like screen-readers rely upon text-to-speech (TTS) engines and speech inputting relies upon automatic speech recognition (ASR) engines. The readiness of TTS/ASR engines in many of the scheduled 22 Indian languages has not yet matured to the level of user acceptance. These technologies have a higher level of maturity for higher-resourced languages.

Since DEPwD is chartered with the role and power to facilitate empowerment of PwDs, it will be ideal to involve them as well as the Ministry of Electronics and IT (MeitY).

3. BACKGROUND

3.1. INTRODUCTION

As stated previously, approximately 2.2% of India's population lives with some form of physical or mental disability, as per the National Statistics Office report on disability released in 2019.

The 2011 census estimated that the number of people with disabilities in India is close to 26.8 million (or 2.2% of the population)—more than the entire population of Australia.

The National Statistics Office report on disability released in 2019 included questions to identify people with temporary loss of an ability as well as neurological and blood disorders in addition to the earlier definition, which included mental illness, intellectual disability, and permanent inability to move, speak, hear, or see. Significantly, the revised definition recognizes deformities and injuries “of acid attack victims” as disabilities, entitling them to various relief measures.

3.2. INITIATIVES OF THE GOVERNMENT OF INDIA

3.2.1. THE RIGHTS OF PERSONS WITH DISABILITIES ACT, 2016

The Indian Parliament on 27 December 2016, passed this act to give effect to the United Nations Convention on the Rights of Persons with Disabilities and for matters connected therewith or incidental thereto. It came into effect in April 2017. The act specifies that:

“40. The Central Government shall, in consultation with the Chief Commissioner, formulate rules for persons with disabilities laying down the standards of accessibility for the physical environment, transportation, information and communications, including appropriate technologies and systems, and other facilities and services provided to the public in urban and rural areas.”

It mandates ICT accessibility for both the public and private sector and places many mandatory obligations on the government with respect to standards and technologies.

“42. Access to information and communication technology. The appropriate Government shall take measures to ensure that

- i. all contents available in audio, print and electronic media are in accessible format.
- ii. persons with disabilities have access to electronic media by providing audio description, sign language interpretation and close captioning.
- iii. electronic goods and equipment which are meant for everyday use are available in universal design.”

The act defines:

- “Information and communication technology” to include all services and innovations relating to information and communication technology, including telecom services, web-based services, electronic and print services, digital and virtual services.
- “Communication” to include means and formats of communication, languages, display of text, Braille, tactile communication, signs, large print, accessible multimedia, written, audio, video, visual displays, sign language, plain language, human-reader, augmentative and alternative modes, and accessible information and communication technology.

DEPWD has launched Accessible India Campaign [2] (“Sugamya Bharat Abhiyan”) as a nationwide campaign for achieving universal accessibility for PwDs on 3 December 2015, International Day of Persons with Disabilities. It has the following three important components:

- Built environment accessibility
- Transportation system accessibility
- Information and communication ecosystem accessibility

3.2.2. BUILT ENVIRONMENT ACCESSIBILITY

The Accessible India Campaign [2] aims to provide an accessible physical environment to everyone. To achieve this, measures need to be undertaken to eliminate obstacles and barriers to indoor and outdoor facilities including schools, medical facilities, and workplaces. The built environment not only covers buildings, but also steps and ramps, corridors, footpaths, curb cuts, parking, entry gates, emergency exits, toilets, and obstacles that block the flow of pedestrian traffic.

3.2.3. TRANSPORTATION SYSTEM ACCESSIBILITY

Transportation is a vital component of independent living. The term *transportation* covers many areas including air travel, buses, taxis, and trains.

- Inaccessible transportation systems restrict mobility and deny freedom of movement and active participation for much of the population who may need accessible transportation.
- The Accessible India Campaign focuses on providing persons with disabilities an equal right to travel and use public and private transportation infrastructure with dignity and independence.

3.2.4. INFORMATION AND COMMUNICATION ECOSYSTEM ACCESSIBILITY

Access to information and ICT based devices, systems and services create opportunities for everyone in society. *Access to information* refers to all information. People use information in many forms to make decisions about their daily lives. This can range from actions such as reading price tags, physically entering a hall, participating in an event, reading a pamphlet with healthcare information, understanding a train timetable, or viewing web pages. No longer should societal barriers of infrastructure and inaccessible formats stand in the way of obtaining and utilizing information in daily life.

This target will ensure the conversion of public documents published as of a specified year and all current websites meeting the BIS Standard IS 17802 [38].

Public documents refer to all documents issued by the national government as well as all subnational documents. They include all publications such as laws, regulations, reports, forms (including online forms), and informational brochures [2].

3.2.5. TARGETS OF THE ACCESSIBLE INDIA CAMPAIGN

These targets include the following:

- Conducting accessibility audits of all government (both central and state governments) websites and converting them into fully accessible websites
- Ensuring that all public documents issued by central and state governments meet accessibility standards, in OCR-compliant PDF format
- Training and developing sign language interpreters

- Developing and adopting national standards on captioning and sign-language interpretation in consultation with national media authorities
- Ensuring that all public television programs aired by government channels meet these standards

3.2.6. TARGETS OF ACCESSIBLE INDIA CAMPAIGN— OBJECTIVE 5

Objective 5 enhances the proportion of accessible and usable public documents and websites that meet internationally recognized accessibility standards. This target will ensure the conversion of public documents published as of a specified year and all current websites meeting the BIS Standard, IS 1780 [38]. *Public documents* refer to all documents issued by national as well as subnational documents. They include all publications such as laws, regulations, reports, forms, and informational brochures. From the Accessible India Campaign [2], the targets are as follows:

- “Target 5.1: Conducting accessibility audit of 50% of all government (both Central and State Governments) websites and converting them into fully accessible websites.”
- “Target 5.2: Ensuring that at least 50% of all public documents issued by the Central Government and the State Governments meet accessibility standards (March 2018).”

3.2.7. TARGETS OF ACCESSIBLE INDIA CAMPAIGN— OBJECTIVE 6

Objective 6 from the Accessible India Campaign [2] enhances the pool of sign language interpreters, one who meets professional standards in the official sign language.

- “Target 6.1: Training and developing 200 additional sign language interpreters (March 2018).”

3.2.8. TARGETS OF ACCESSIBLE INDIA CAMPAIGN— OBJECTIVE 7

Objective 7 from the Accessible India Campaign [2] enhances the proportion of daily captioning and sign-language interpretation of public television news programs. *Public television* refers to programs that are produced, funded, or subsidized by the government.

- “Target 7.1 Developing and adoption of national standards on captioning and sign-language interpretation in consultation with National media authorities. (July 2016)”

- “Target 7.2 Ensuring that 25% of all public television programs aired by government channels meet these standards. (March 2018)”

“Accessible India Campaign will seek cooperation of all Central Government Departments/Ministries and State Governments to seek ‘accessible police stations’, ‘accessible hospitals’, ‘accessible tourism’, and ‘accessible digital India’ etc.”

3.2.9. INITIATIVES OF THE MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY, GOVERNMENT OF INDIA

The following activity has been initiated by MeitY through funding to the Centre for Development of Advanced Computing (C-DAC):

- 1) Develop Indian standard for ICT Accessibility Products and services through BIS, harmonized with prominent global standards (W3C, EN 301 549 [66], and Sector 508 of ADA) and fulfilling Indian needs. Promote ability of Indian ICT industry to support accessibility at the ground level through stakeholder consultation meetings. Issue of Official Mandate (through update to Rule 15 of RPwD Act, 2016) by DEPwD based on the above is expected in the near future, specifying dates for compliance for various categories of ICT products and services, possible phasing and possible provision for voluntary compliance by the industry (through schemes like VPAT) while holding respective ministries responsible for overseeing/ensuring compliance. Of particular relevance is the fact that, earlier, the Rule was referring only to applicability for government websites, apps, documents etc., the forthcoming revised Rule will make it applicable to Private suppliers and providers as well. Compliance of Indian products and services to the accessibility standard will also help the manufacturers and service providers to gain competitive access to global markets. As mentioned before, the BIS Standard IS 17802 [38] has already been issued and DEPwD is in the process of making it mandatory for compliance.
 - One aspect of an India-specific requirement is the inclusion of Indian language support, explicitly, in respect of text and audio. Where standards currently exist (global or Indian), as in the case of scripts (UNICODE), display, and keyboard to support Indian languages, these have been specified as normative (mandatory) while absence (global or national) of standards in respect of others (text and audio) has led to such requirements to be specified only as informative (or desirable). As such, Indian/Indic language resources and standards are vital to fulfill the needs of Indian language users with disabilities or to satisfy the needs of a wider Indian audience through universal design.

- 2) Capacity building and broad-based awareness creation through training/workshops for various sections of users (including PwD users and NGOs representing their interests), industry/providers, developers, service providers, government officials, content creators, and public procurement officials has been an exercise that has been on-going since the publication of the Indian (BIS) standard. Other strategies would include identification and partnering with various government and private agencies to scale up capacity building and form an ICT accessibility community for knowledgebase dissemination [42].

4. STATUS OF ACCESSIBILITY STANDARDS

4.1. GLOBAL

4.1.1. W3C'S INITIATIVE ON ACCESSIBILITY

At the core, the web is designed to *work for each and every person*, irrespective of hardware, software, language, location, or ability. In order to achieve this goal, W3C is working on various standards so that the web is accessible to people with a diverse range of hearing, speech, movement, sight, and cognitive abilities/disabilities [43].

Web accessibility depends on several components of web development and interaction working together and shows the relationship between the WAI guidelines: Web Content Accessibility Guidelines (WCAG), Authoring Tool Accessibility Guidelines (ATAG), and User Agent Accessibility Guidelines (UAAG).

Web Content Accessibility Guidelines (WCAG)

WCAG is an internationally established set of guidelines for accessible content on the Internet. These guidelines are mainly for people with various disabilities but are also applicable to different devices used for browsing websites. The WCAG 2.0 version was published in 2008 and became an ISO standard (ISO/IEC 40500:2012) in 2012, while Web Content Accessibility Guidelines (WCAG) 2.1 became W3C Recommendation on 5 June 2018. As of now, WCAG 2.2 is scheduled to be completed and published in April 2023. W3C released WCAG 2.2 Working Draft dated 11 August 2020.

WCAG 2.0 series has the following three levels:

- A is the minimum level, with 30 success criteria to be met in WCAG 2.1.
- AA is the medium difficulty level and has 20 additional success criteria to be met in WCAG 2.1.

- AAA is the highest level of accessibility and requires the maximum effort to meet. It has another 28 success criteria to be met in WCAG 2.1

So, WCAG 2.0 has a total of 61 Success criteria, while WCAG 2.1 has 78. WCAG 2.2 is expected to have nine (9) additional success criteria and two changes (referred to as ‘exceptions’).

Web Accessibility

Web accessibility means that websites, tools, and technologies are designed and developed so that people with disabilities can use them. More specifically, people can:

- Perceive, understand, navigate, and interact with the web
- Contribute to the web

Web accessibility encompasses all disabilities that affect access to the web, including:

- Auditory
- Cognitive
- Neurological
- Physical
- Speech
- Visual

Web accessibility also benefits people without disabilities, for example:

- People use mobile phones, smart watches, smart TVs, and other devices with small screens, different input modes, etc.
- Older people with changing abilities due to aging
- People with “temporary disabilities,” such as a broken arm or lost eyeglasses
- People with “situational limitations,” such as in bright sunlight or in an environment where they cannot listen to audio
- People using a slow Internet connection, or who have limited or expensive bandwidth

WCAG 2.0 [44]

WCAG 2.0 consists of the following twelve guidelines divided into four different categories (POUR):

1. Perceivable

- 1.1. Provide text alternatives for non-text content like images
- 1.2. Offer captions or text summaries for audio and video
- 1.3. Structure content to be programmatically identified and write it to be presented in different ways
- 1.4. Design content to be easy to read and listened to (good contrast, volume control)

2. Operable

- 2.1. All functionalities should be available just by using a keyboard
- 2.2. There should be enough time to read content and perform wanted tasks
- 2.3. Avoid designing content that might cause seizures
- 2.4. Help users navigate and find content as much as possible

3. Understandable

- 3.1. Write easy-to-read text with assistive technologies in mind
- 3.2. Design content and the interface to behave in predictable ways
- 3.3. Help users to avoid and correct mistakes when entering input

4. Robust

- 4.1. Provide maximum compatibility with as many web browsers as possible
- 4.2. Each of the guidelines in WCAG has measurable success criteria divided into the levels of A (lowest), AA, and AAA (highest). More As equals more demands, but better accessibility when met.

Note that some guidelines only have one or two levels of success criteria, for instance, some have levels A and AAA, but no AA.

WCAG 2.1 [45]

WCAG 2.1 with 17 new guidelines that focus on improving accessibility for users with cognitive disabilities and for

users who browse websites on mobile devices like tablets and smartphones. WCAG 2.1 is backward compatible with WCAG 2.0. This means that:

- The previous categories and guidelines still apply
- The numbering still applies
- The basic principles still apply
- The three levels of success criteria (A, AA, AAA) still apply

The following Success Criteria are new in WCAG 2.1:

- 1.3.4 Orientation (AA)
- 1.3.5 Identify Input Purpose (AA)
- 1.3.6 Identify Purpose (AAA)
- 1.4.10 Reflow (AA)
- 1.4.11 Non-Text Contrast (AA)
- 1.4.12 Text Spacing (AA)
- 1.4.13 Content on Hover or Focus (AA)
- 2.1.4 Character Key Shortcuts (A)
- 2.2.6 Timeouts (AAA)
- 2.3.3 Animation from Interactions (AAA)
- 2.5.1 Pointer Gestures (A)
- 2.5.2 Pointer Cancellation (A)
- 2.5.3 Label in Name (A)
- 2.5.4 Motion Actuation (A)
- 2.5.5 Target Size (AAA)
- 2.5.6 Concurrent Input Mechanisms (AAA)
- 4.1.3 Status Messages (AA)

WCAG 2.2 [46]

Web Content Accessibility Guidelines (WCAG) 2.2 defines how to make web content more accessible to people with disabilities. Accessibility involves a wide range of disabilities, including visual, auditory, physical, speech, cognitive, language, learning, and neurological disabilities.

The following Success Criteria are new in WCAG 2.2:

- Accessible Authentication
- Dragging
- Findable Help
- Fixed Reference Points
- Focus Appearance (Minimum)
- Focus Appearance (Enhanced)
- Hidden Controls
- Pointer Target Spacing
- Redundant Entry

Silver (aka WCAG 3.0) [47]

The first Public Working Draft (FPWD) was released on 21 January 2021, and 26 February 2021 was the deadline to submit comments. A broad cross-section of accessibility experts from government, education, for-profit, non-profit, and accessibility consulting organizations were involved in drafting. WCAG 3.0 will help develop a content management system that can provide advice and guidelines without having to wade through hundreds of pages of documentation.

WCAG 3.0 is *not backward compatible with WCAG 2.X*. WCAG 3.0 does not supersede WCAG 2.2 and previous versions; rather, it is an *alternative set of guidelines*.

WCAG 3.0 uses a model that allows it to address more disability needs than WCAG 2.X, as well as address publishing requirements and emerging technologies such as web XR (augmented, virtual, and mixed reality) and voice input. It is focused on two Ps, people and process, it is the beginnings of something that changes how you work, how you test, and how you define *good*.

WCAG 3.0 aims are these:

- Improve usability—especially for beginners