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Digital Accessibility

Building awareness and understanding

We are a technology modernization firm.

We **adapt and build systems** that strike the balance between the shifting technology landscape and evolving user expectations. Our sensible approach appropriately integrates with your team's capabilities and technical architecture, adjusting for business and industry constraints.

What differentiates SPR isn't what we do but how we do it. We **deliver beyond the build**.

Proactive Advice

Natural Knowledge Sharing

Agile Response

Deep Discovery

Capabilities Include:

Custom Software Development | Cloud Infrastructure | Data

Emerging Technologies | User Experience | Software Testing

WHY CUSTOMERS SEEK OUR EXPERTISE

Require future-forward insight and expertise that frequently doesn't exist inhouse
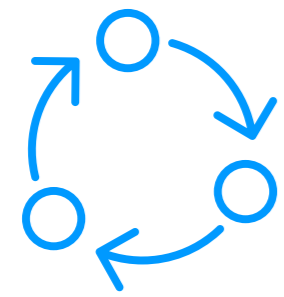
Ensure current technology approach will not limit long-term direction

Implement the best and right strategy, the right solutions, and the right guidance

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Our leadership in optimizing testing

We help **streamline and integrate** manual and automated testing to get the most value for testing time and cost.
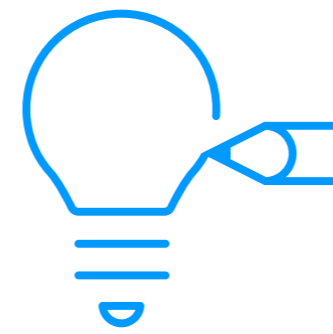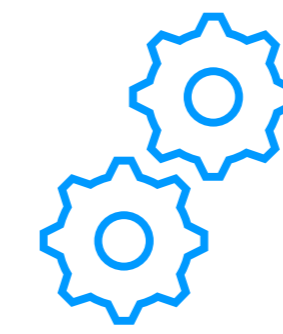
TEST PROCESS	TEST TOOLS	TEST DESIGN	TEST AUTOMATION	DEVOPS
Assessments	Selection	Strategy	Assessments	Test Automation
Definition	Integration	Test Suites	Strategy	Integration
Adoption	Training	Test Assets	Frameworks	
		Data	Platforms	
			Automated Scripts	
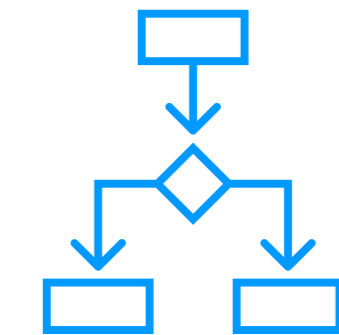
Today's Objective

- Define digital accessibility and its importance

- Understand disabilities and use of assistive technologies

- Review WCAG guidelines and common non-compliances

- Understand how accessibility and usability differ

- How to test for accessibility with manual and automated tools

- How to build in accessibility throughout a project

- Getting started with a holistic digital accessibility program

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Definition

dig·i·tal ac·ces·si·bi·li·ty

All users and potential users can understand and operate digital content

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

Tim Berners-Lee
World Wide Web Consortium (W3C)

All users can easily find, understand, and manipulate information

Content may need to be presented in multiple ways to make it universally accessible

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Disabilities

Blind - unable to read printed information such as that on a screen; requires screen reading software to access content.

Visually Impaired - has some usable vision; may be able to use a screen magnification package to access content.

Visual Color - has good vision except may not be able to differentiate between colors.

Hearing Loss - is deaf, unable to hear or has difficulty hearing. May rely on methods other than audio to access content.

Motor skill - has a condition that makes it difficult or impossible to walk or use hands and arms. May use alternative techniques to access content.

Learning - has a condition such as dyslexia that affects ability to understand information presented. May need information presented in simplified language or in a different way.

Diversity and inclusion impacts millions of people.

From diversity and inclusion perspective:

U.S. Census Bureau (2010):

54 million people have a disability

CDC (2015):

1.02 million people are blind

3.22 million people have vision impairment

From business revenue perspective:

U.S. Department of Labor: the market of people with disabilities has $175 billion in discretionary spending

Figure 1. Estimated Numbers of Persons With Visual Impairment in the United States by Race/Ethnicity (All Persons) and Year
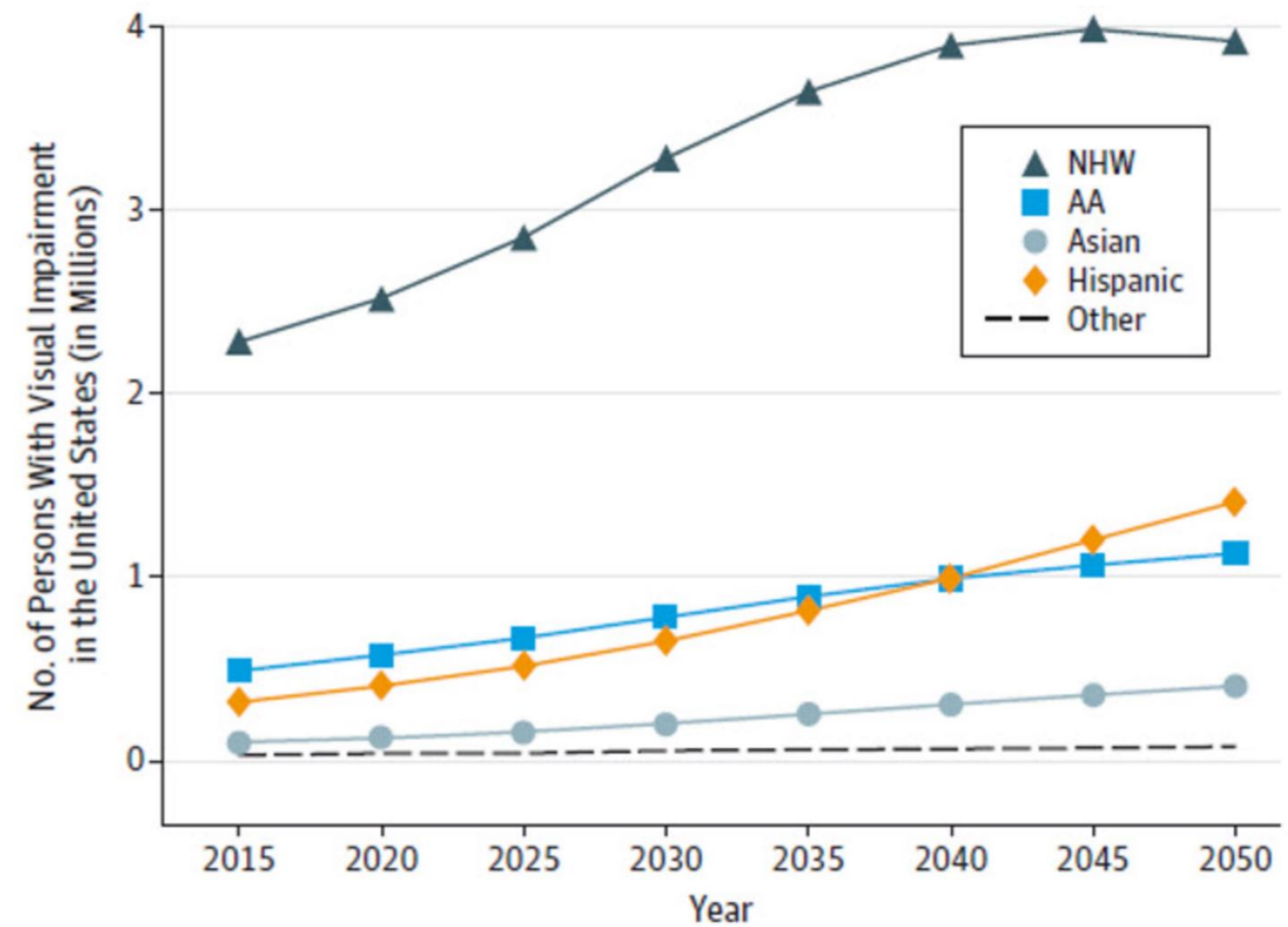
⤢ View Larger

AA indicates African American; NHW, non-Hispanic white.
Source: Varma, et. al (2015)

Lawsuits surrounding digital accessibility continue to multiply.

UsableNet Study (2020): lawsuits increased by 23%, amounting to almost 10 lawsuits every day.

| 20% of lawsuits are apps, **not** websites

| Over 250 companies sued had invested in accessibility widgets or overlays

| Example lawsuits:

Amazon	Miami University
Blue Apron	Nike
Dominos Pizza	Peapod
EDX	Target
Five Guys	Winn Dixie
H&R Block	

BASED ON FEDERAL COURT FILINGS

76%	Retail
12%	Food Service Industry
3%	Other
2%	Entertainment & Leisure
2%	Travel/Hospitality
1%	Banking/Financial
<1%	Healthcare
<1%	Digital Media & Agencies
<1%	Insurance
<1%	Education
<1%	Fitness & Wellness
<1%	Automotive
<1%	Real Estate Agencies & Properties
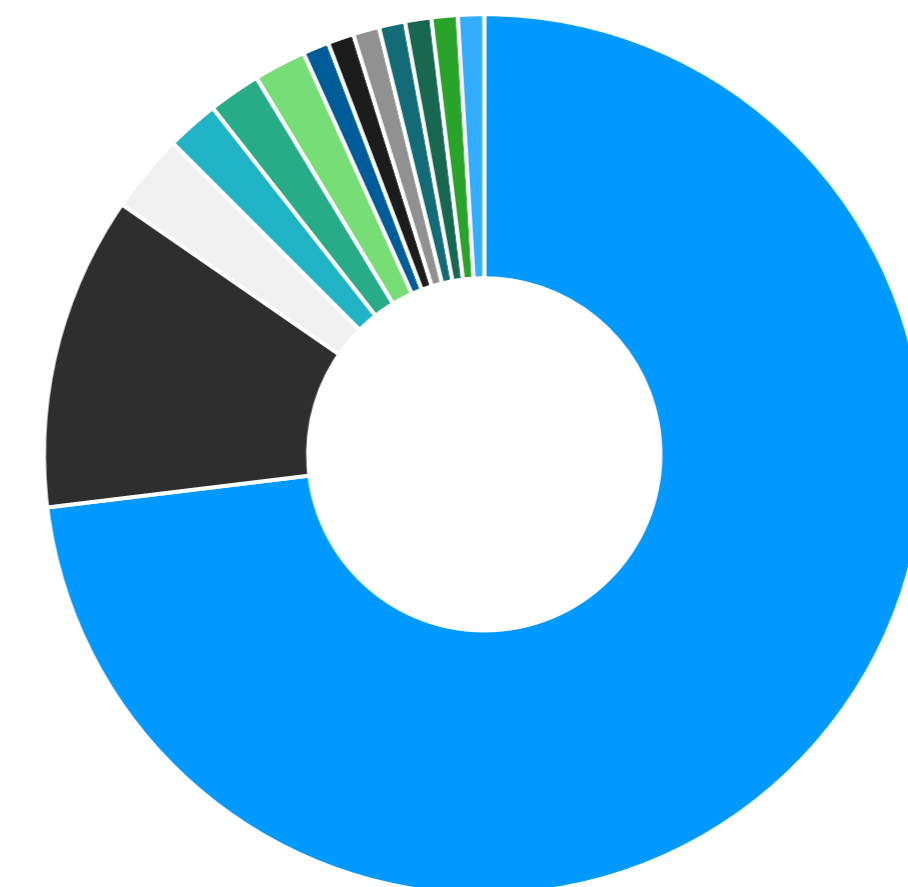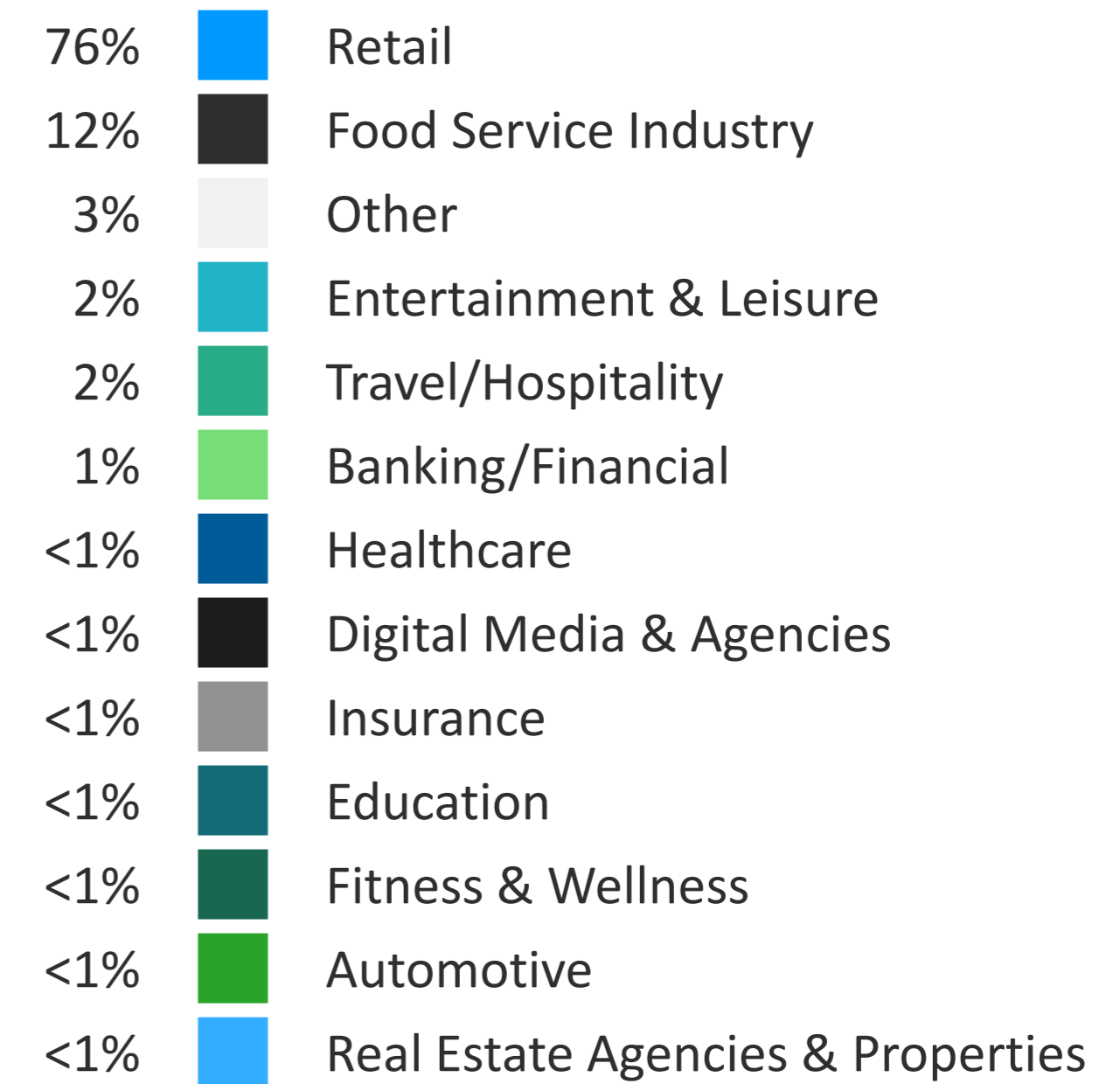
Assistive technologies

Disability	Description	Assistive Technologies	
Vision Loss	**Screen Reading Software** Presents information on screen using synthesized speech or refreshable Braille	JAWS from Freedom Scientific* NVDA from NV Access* Window-Eyes from GW Micro	VoiceOver from Apple* TalkBack from Google* Narrator from Microsoft
Vision Impaired	**Screen Magnification Software** Presents content using larger fonts	Windows Magnifier * Apple Zoom* Apple Pinch/Double Tap* Android Pinch/Triple Tap*	ZoomText from AI Squared MAGic from Freedom Scientific
Hearing Loss	**Captioning** Text representation of audio content		
Motor Skills	**Voice Recognition Software** Controlling a device using voice commands **Hardware Adaptations** Special keyboards, mice, and sip & puff switches	Windows Speech* Apple Speech* Dragon Naturally Speaking from Nuance Communications	Keyboarding*

* Indicates used by SPR for accessibility testing.

Using JAWS Screen Reader

Basic Commands

Interaction	Keystrokes
Say All	Insert + ↓
Increase | Decrease Voice Rate	Page Up | Page Down
Stop Reading	Ctrl
Current Line	Insert + ↑
Previous | Next Word	Insert + < | Insert + >
Prior Line | Next Line	↑ | ↓
Previous | Next Character	< | >
Page Refresh | Hard Page Refresh	F5 | Shift + F5
Navigate Links and Form Elements	Tab *(for next)* and Shift Tab *(for previous)*

Quick Keys

Interaction	Keystrokes
Headings	H
Main Content	Q
Forms	F
Tables	T
Non-Link Text	N
Button	B
Lists	L
Items in a List	I
Headings Level 1-6	1- 6
Bottom of Page	Ctrl + End
Top of Page	Ctrl + Home

Accessibility option is in settings.
Accessibility setting are retained when phone is powered off.

- ✓ **Activate Item:** 1-finger double tap
- ✓ **Locate Item:** Swipe right or left
- ✓ **Next Page**: 3-fingers right or left | on page flick up or down
- ✓ **Scroll Down:** 3-finger flick up
- ✓ **Scroll Up**: 3-finger flick down
- ✓ **Read from Start:** 2-finger flick up
- ✓ **Read from Cursor:** 2-finger flick down
- ✓ **Find Link:** Rotor to links, then swipe up/down
- ✓ **Find Typeable Area:** Rotor to forms, then flick up/down
- ✓ **Enter information:** Swipe to area edit | 2-finger double tap to activate edit or type
- ✓ **Activate Rotor**: 2-fingers on screen |twist like a knob to move between options

Try it ….. to experience it!

VoiceOver   **TalkBack**

Organizations and Guidelines for Accessibility

W3C

World Wide Web Consortium
An international community that develops standards to ensure the web reaches its full potential.

WAI

Web Accessibility Initiative
Strategies, guidelines, resources to make the Web accessible to people with disabilities.

WCAG

Web Content Accessibility Guidelines
Recommendations which explain to developers and authors how to make Web content accessible to people with disabilities.

Section 508

Section 508
Based on WCAG but does not include all WCAG guidelines. Mandated for Federal agencies.

Web Content Accessibility Guidelines (WCAG 2.1)

13 Guidelines | 78 Success Criteria

Principle 1: Perceivable

4 Guidelines

Information and user interface components must be presentable to users in ways they can be perceived.

29 Success Criteria

Principle 2: Operable

5 Guidelines

User interface components and navigation must be operable.

29 Success Criteria

Principle 3: Understandable

3 Guidelines

Information and the operation of the user interface must be understandable.

17 Success Criteria

Principle 4: Robust

1 Guideline

Content must be robust enough that it can be interpreted by a wide variety of user agents, including assistive technologies.

3 Success Criteria

https://www.w3.org/TR/WCAG21/

WCAG success criteria are classified into one of 3 groups dependent on the level of detail compliance required.

Level A   The minimum required to be considered compliant with guidelines.
(31 success criteria)

Level AA   Better compliance, the level in which large organizations should strive for.
(19 success criteria)

Level AAA   Complete compliance, the level in which government agencies are required to be compliant. *(28 success criteria)*

Example Level AAA Guidelines

- Sign Language
- Language Level
- Definitions words, abbreviations, pronunciation
- Help
- Error prevention
- Timeouts and interrupts
- User adjustable text
- Audio
- Motion animation
- Location within website
- Etc.

Examples of Common WCAG Non-compliance Findings

Color Contrast

Page Title, Headings, and Navigation

Videos
- do not play, cannot be paused or closed
- no captioning

Images/Graphics
- reads file names or description
- text embedded in graphic

Functionality
- carousals
- modal windows
- expand/collapse arrows
- sliding scales
- drop down menus
- objects/elements not detected

Data Entry
- Labeling
- Error identification

Compliance to guidelines makes software accessible and easier to use, but usability is also impacted by UX design.

Ease of navigation

Ease of understanding page structure

Ease of finding information

Ease of understanding information

Ease of entering information

How to Test for Accessibility

Manual Tools
User Experience

| JAWS from Freedom Scientific
| NVDA from NV Access
| Window-Eyes from GW Micro
| Narrator from Microsoft
| VoiceOver from Apple
| TalkBack from Google

| Windows Magnifier
| Apple Zoom
| Apple Pinch/Double Tap
| Android Pinch/Triple Tap
| ZoomText from AI Squared
| MAGic from Freedom Scientific

| Windows Speech
| Apple Speech
| Dragon Naturally Speaking from Nuance Communications
| Keyboarding
| WCAG Color Contrast Checker
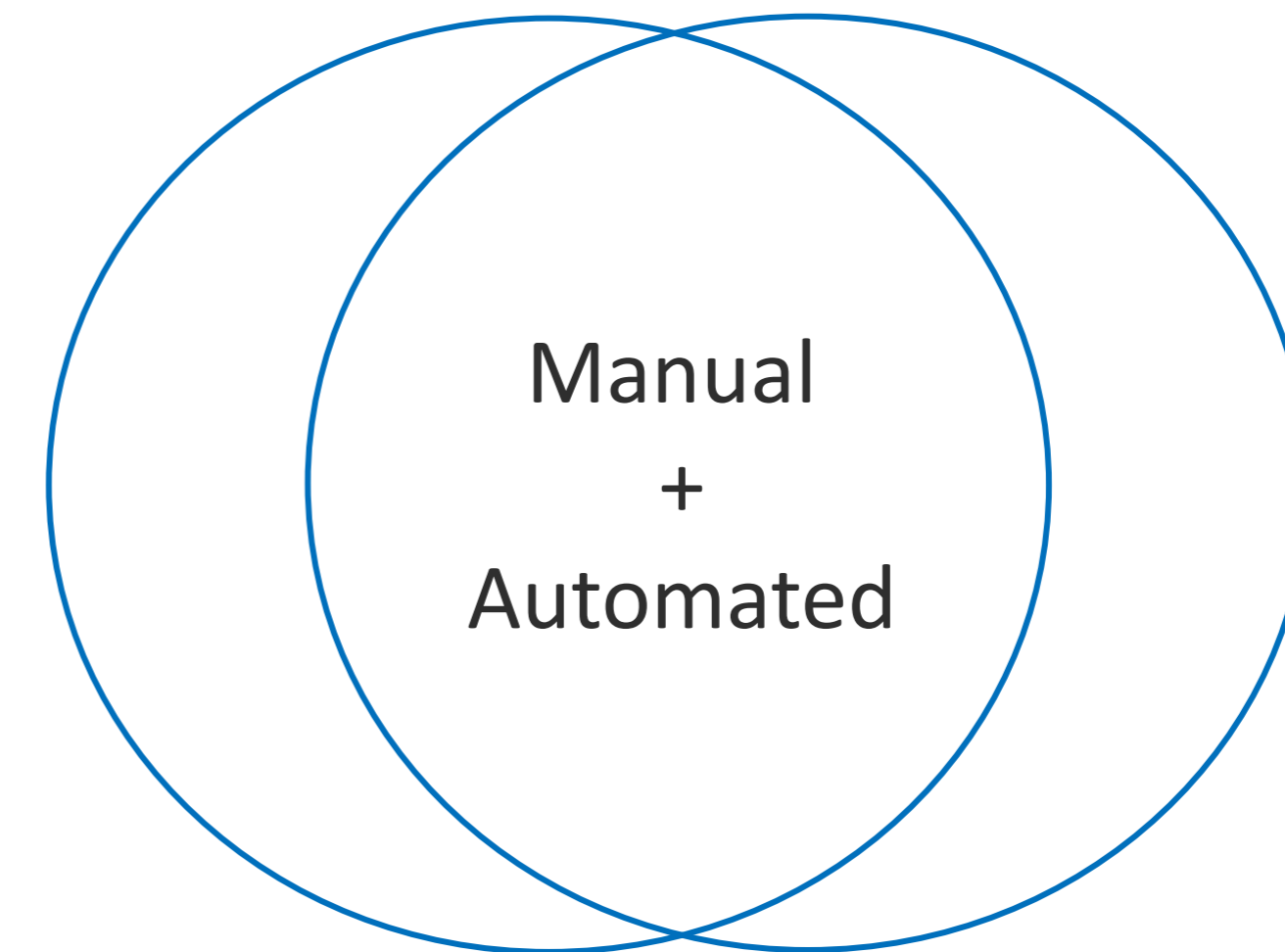
Automated Tools
Browser Extension

| WAVE
| IBM Equal Access
| Siteimprove
| Accessible Web Helper
| Accessibility Insights for Web
| EqualWeb

Automated Tools
Open Source

| FAE
| W3C Markup Validation
| CSS Validator
| AChecker

Automated Tools
Subscription

| SortSite
| Level Access
| PopeTech

Manual
+
Automated

* These are example tools and not an all-inclusive list.

Example Automated Tools Reporting

ID	Rule Summary	Result	V	W	MC	P	H	Score	Status
Link 1	Link text must describe the link target	Violation	1	-	267	-	1	0	NI-R
Link 2	Link text must be unique	Warning	-	28	-	18	-	39	NI
Focus 3	Target focus must be in content window	Manual Check	-	-	268	-	1	0	R

(Number of Elements / Implementation Level)

	Violations	Warnings	Manual Checks	Passed
Number of Rules	4	3	36	27

Rule Category   WCAG Guidelines   Rule Scope

Rule Group	V	W	MC	P	Score	Status
Landmarks	1	-	2	11	85	PI-R
Headings	-	2	-	3	74	PI
Styles/Content	-	-	6	2	25	NI-R
Images	-	-	4	2	49	NI-R
Links	1	1	1	-	13	NI-R
Tables	1	-	-	-	0	R
Forms	-	-	5	4	44	NI-R
Widgets/Scripts	1	-	3	5	56	PI-R
Audio/Video	-	-	1	-	0	R
Keyboard	-	-	5	-	12	NI-R
Timing	-	-	3	-	0	R
Site Navigation	-	-	6	-	0	R
All Rule Groups	4	3	36	27	44	NI-R

(Number of Rules / Implementation Level)

WAVE
web accessibility evaluation tool — powered by WebAIM

Styles: OFF / ON

Summary
Summary | Details | Reference | Structure | Contrast

- 4 Errors
- 3 Contrast Errors
- 140 Alerts
- 193 Features
- 60 Structural Elements
- 697 ARIA

View details ›

ARIA label
An aria-label or aria-labelledby attribute is present.
REFERENCE   CODE

```
</div>
<div class="a-section a-spacing-none quadrant-container quadrant-contain
<a aria-label="PCs & Gaming" class="a-link-normal image-redirect aok-block ima
computers-and-accessories%2522%257D&ref_=US_PEAS22_DO_GW_Desk_QuadCategory_Dea
<div class="a-section a-spacing-none fluid-image-container">
<img alt="PCs & Gaming" src="https://images-na.ssl-images
```

IBM Equal Access Accessibility Checker
Scan

✔ 🚫 50   ⚠ 138   ℹ 180   368 Issues found

Requirements | Element roles | Rules

Issues	Requirements
22	1.1.1 Non-text Content
8	1.3.1 Info and Relationships
1	2.4.1 Bypass Blocks
1	2.4.4 Link Purpose (In Context)
4	2.5.3 Label in Name
5	4.1.1 Parsing
16	4.1.2 Name, Role, Value

Scan summary
October 12, 2022 at 09:13 AM
Scanned page: h...

Current Status
96%
Percentage of elements with no detected violations or items to review

Violations
50
Accessibility failures that need to be corrected

Needs review
138
Issues that may not be a violation; manual review is needed

Recommendations
180

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How to Achieve Digital Accessibility

AWARENESS	REQUIREMENTS	UX DESIGN	DEVELOPMENT	TEST	DEPLOYMENT

ACCESSIBILITY REQUIREMENTS
Add accessibility requirements into the project's scope and requirements/user stories. Create awareness of accessibility guidelines.

ACCESSIBLE CODE
Use accessibility developer guidelines and best practices. Perform self-assessment code reviews. Remediate non-compliance prior to testing.

ACCESSIBILITY AUDIT
After the app is launched, perform periodic accessibility audits to detect any non-compliance.

ACCESSIBLE UX DESIGN
Prepare UX design in compliance to accessibility guidelines. Perform an accessibility review of prototype screens and/or wireframes for early detection of non-compliance.

ACCESSIBILITY TESTING
During quality assurance (QA) testing or user acceptance testing (UAT), leverage assistive technology to test the app against accessibility guidelines and evaluate usability. Report non-compliance as defects and correct.

Digital Accessibility Program

Strategy and Roadmap	Evaluation of current accessibility practices and recommendations for a holistic accessibility program.
Program Implementation	Rollout of the recommendations for the accessibility program to teams.
Independent Audit	Test sample pages within website/application for compliance to WCAG. Report non-compliance issues.
Usability Review	Evaluation of pages for usability by users of screen readers. Report usability ratings and key findings impacting usability.
VPAT Report	Voluntary Product Accessibility Template (VPAT) based on accessibility audit.
Accessibility Awareness	One hour session about digital accessibility for all stakeholders.
Accessibility Training	Training session on the WCAG guidelines using examples from the accessibility audit results.

Q & A