

Connnecting the Accessibility Dots

Eric Eggert

Eric Eggert is a Web Developer and Teacher who works with Knowbility and the W3C on improving the Web for People with Disabilities, and everyone else.





Sagittarius



Connecting arbitrary dots that fits one's own view.

Sagittarius



Carina



Let's change perspectives!

Our rough plan for today:

10h–13h

- This.
- Intros.
- Disabled People.
- Guidelines.
- Assistive Tech.

14h–17h

- Planning & Managing.
- Q&A.
- Discussion.
- The how and why of different solutions.
- W3C Resources.

Who are you?

Disabled People & Guidelines & Assistive Technologies

You cannot talk about **accessibility**
without talking about **disabilities.**



E.J. Mason (#GithubDropICE)

@codeability



Love 2 b called "differently abled" because it suggests that I have some kind of paranatural ability beyond the ken of mortal man.

And I do, but you can still just call me "disabled". Promise.

11:39 PM · Nov 15, 2019 · [Twitter Web App](#)

10 Retweets **102** Likes





NETFLIX

MARVEL
DAREDEVIL
A NETFLIX
ORIGINAL SERIES





Talking & Planning

Talking & Planning

Graphic Design (of an image of a website)

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS

Content

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS

Content
Iterations

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS Performance
Content
Iterations

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS
Content
Iterations
Hotfixes

Performance
Security

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS

Content

Iterations

Hotfixes

Security
Data protection

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS
Content

Iterations

Hotfixes

Quality Control

Accessibility

Security
Data Protection

Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS
Content

Iterations

Hotfixes

Quality Control

Accessibility

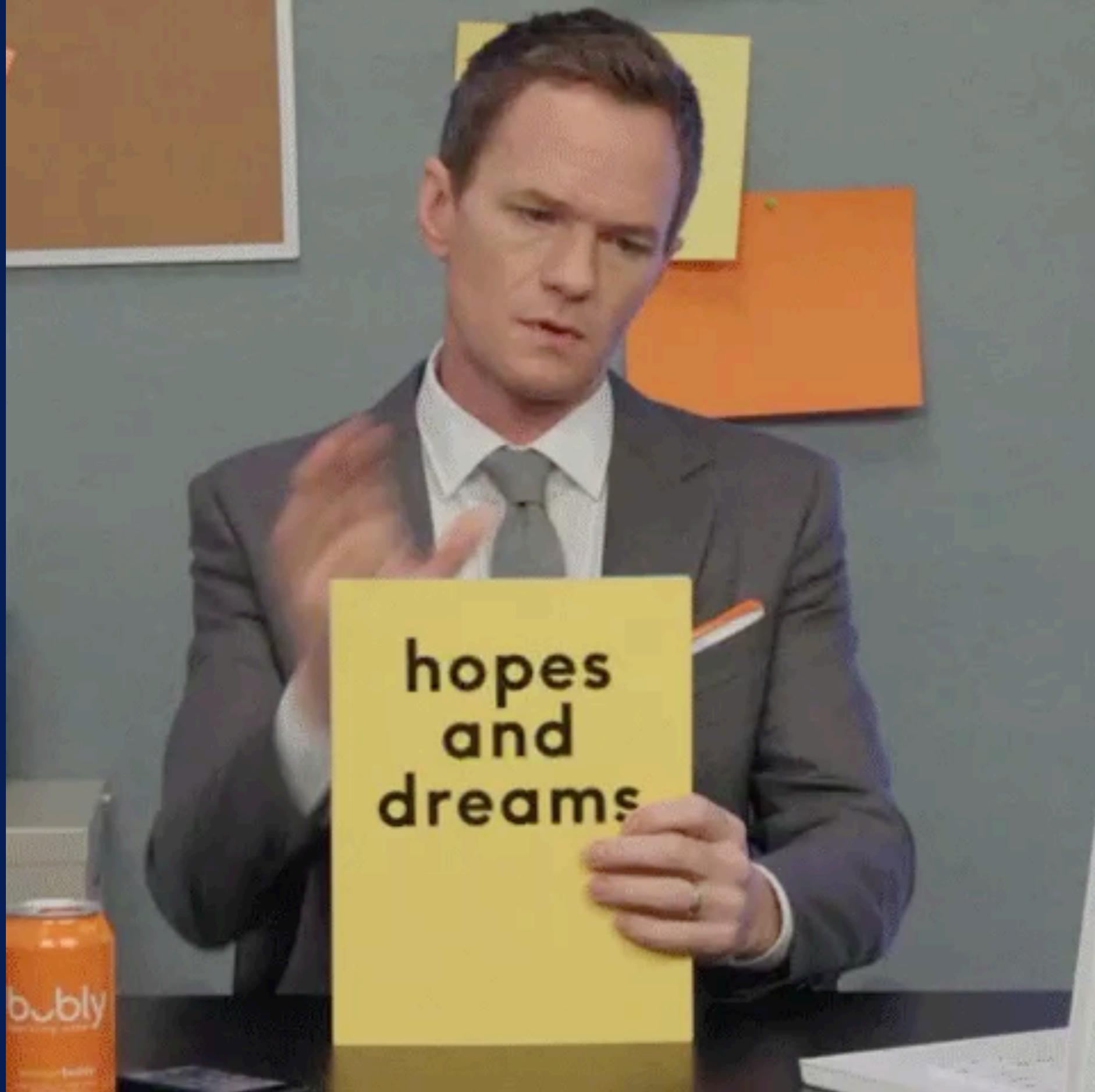
Security
Data Protection

Accessibility
is a sign
of good quality.

“Designing inclusive software results in improved usability and customer satisfaction.”

— Microsoft’s app developer guide

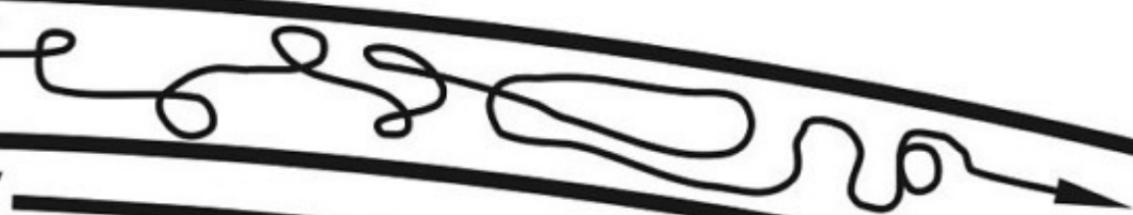
Accessibility must be a
foundational value



hopes
and
dreams

bubly

Pace Layers

FASHION 

COMMERCE 

INFRASTRUCTURE 

GOVERNANCE 

CULTURE 

NATURE 

SURFACE

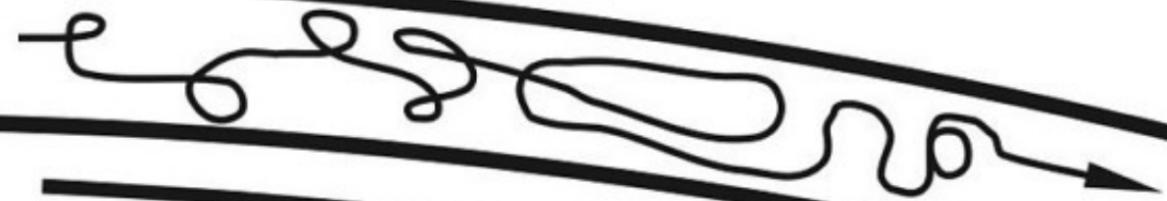
SKELETON

STRUCTURE

SCOPE

STRATEGY

JS+



CSS



HTML



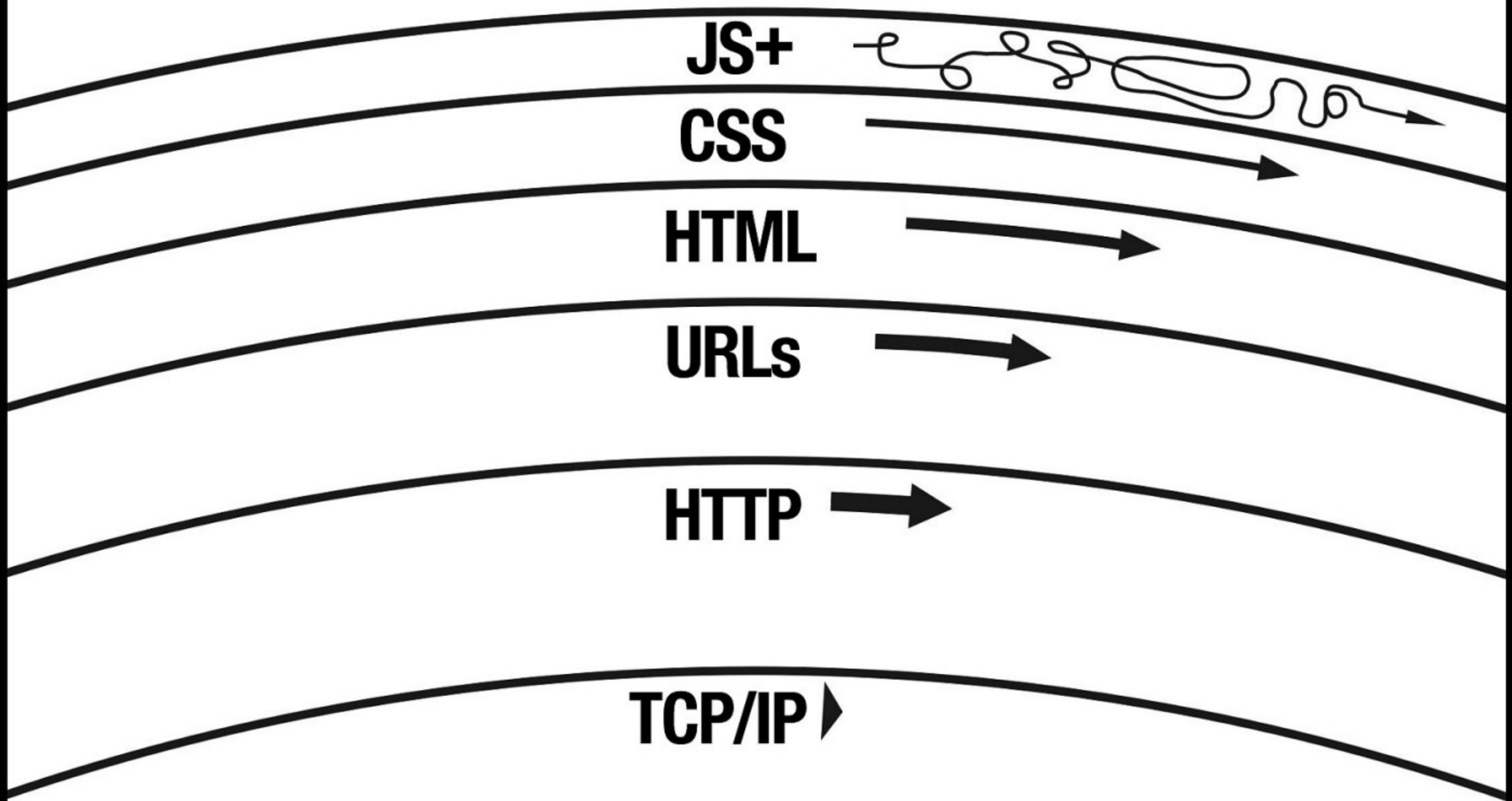
URLs



HTTP



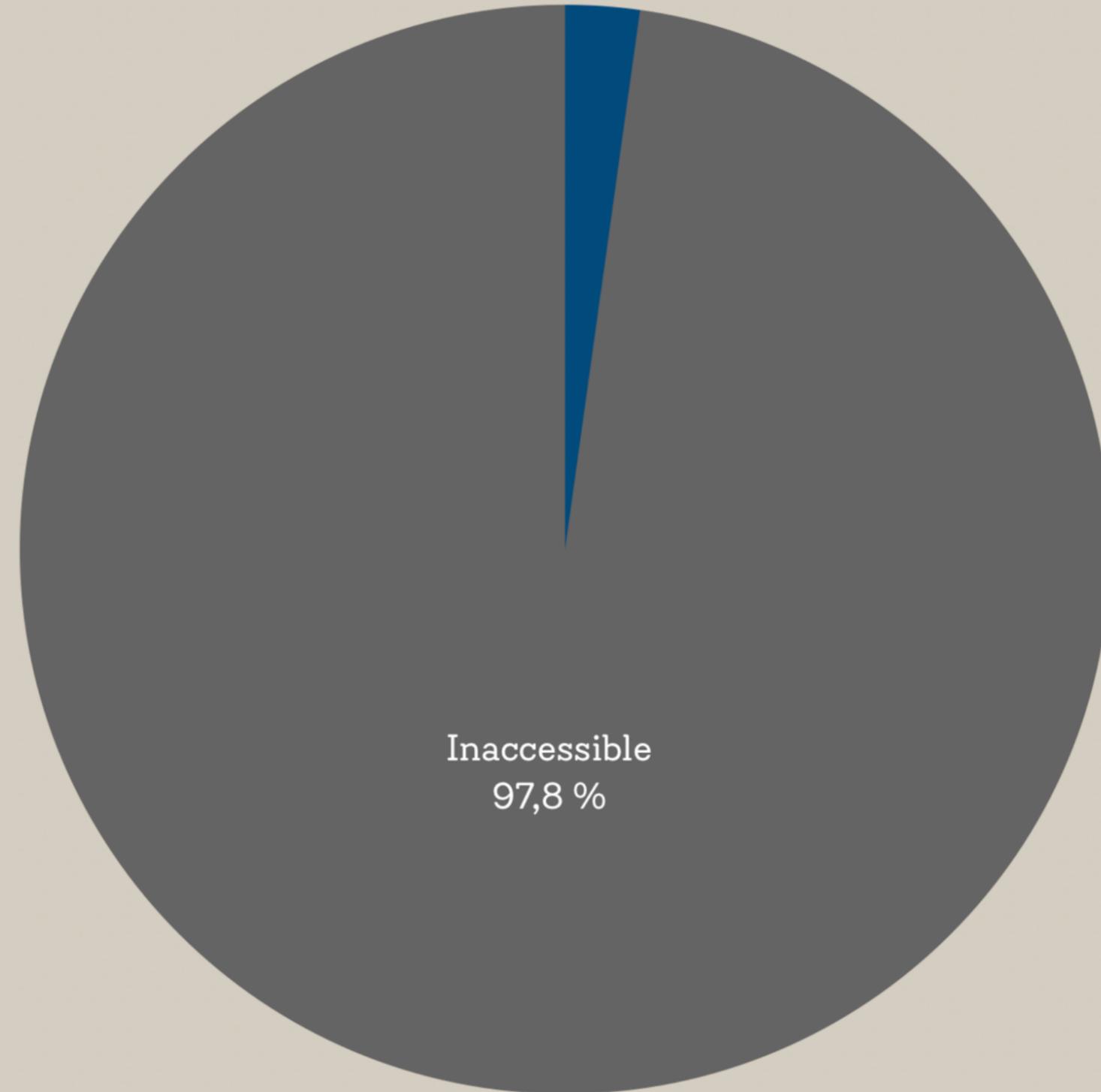
TCP/IP ▶



Accessible
Web Development
is Complicated

Accessible?

2,2 %



Observations

- 60% of the 1 million home pages had ARIA present.
- Home pages with ARIA present averaged 11.2 more detectable errors than pages without ARIA.
- Pages with a valid HTML5 doctype had significantly more page elements (average of 844 vs. 605) and errors (average of 61.9 vs. 53.3) than those with other doctypes.
- 2.1M layout tables were detected compared to only 114k data tables.

More Complex

==

Less Accessible

Taming that complexity
comes with
more complexity

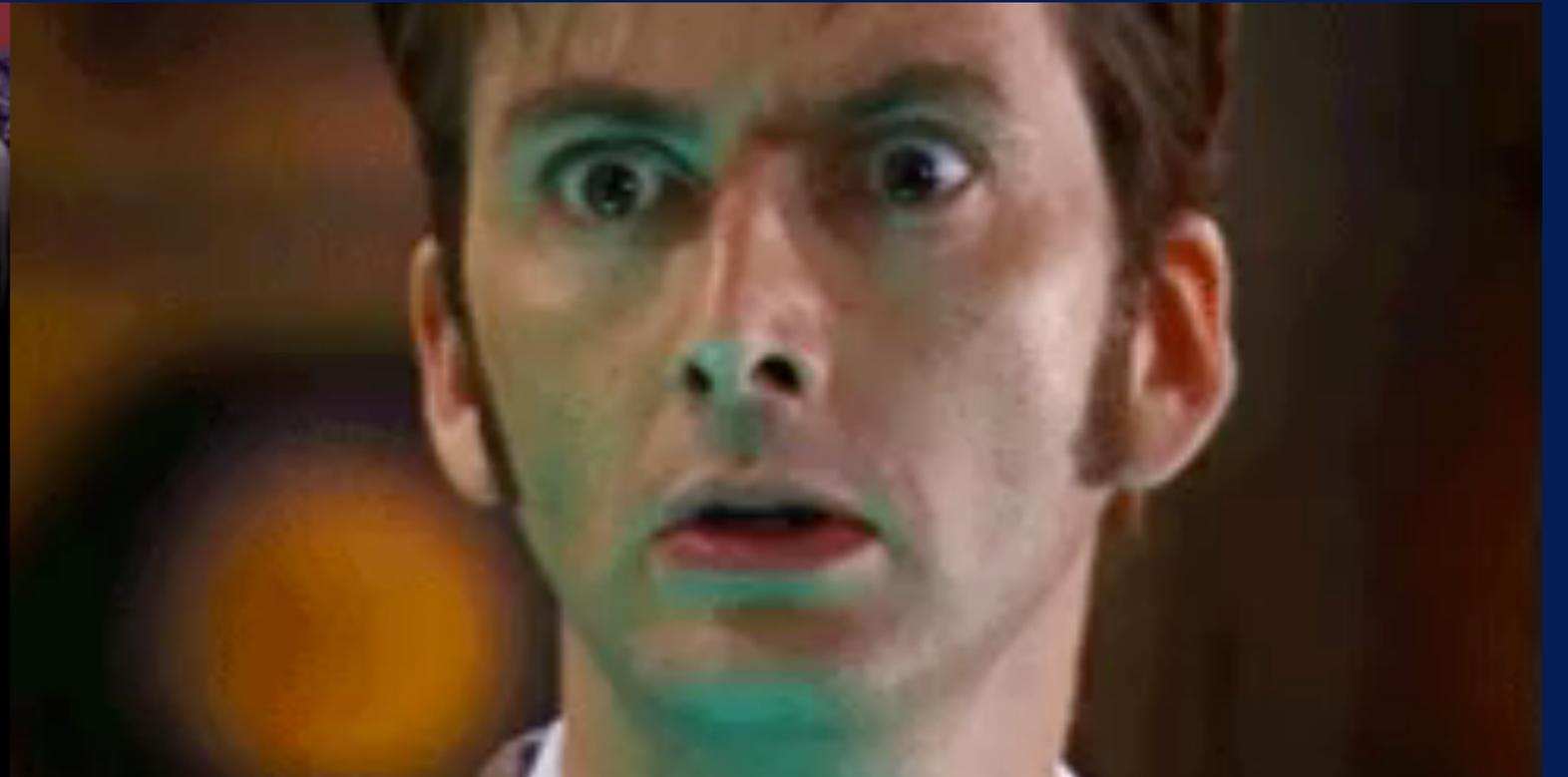
I'm too nice.

BBC
AMERICA
RICA

Screen Reader Differences

*“VoiceOver and Safari
remove list element
semantics when
list-style: none is used.”*

— **Scott O’Hara:** “Fixing” Lists



“This was a purposeful change due to rampant ‘list’-itis by web developers.”

— James Craig, Apple, bugs.webkit.org

What does it mean for me
as a web developer that
Safari is not reading lists
when they don't look like a list?

Nothing.

A Timeline

2014: First Commit

2015: Additional Code

..

No Changes

..

2019: The Web Notices

“Customers seem much happier in the 3 years since this change went in.”

— James Craig, Apple, bugs.webkit.org

NO!



The same is true
for screen readers:
**They don't all need to
produce the same output.**

 General Verbose Speech Navigation Web Sound Visuals Commanders Braille Activities

Speech

Braille

Text

Announcements

Hints

Default Speech Verbosity: Medium  

Control	^	Verbosity	Description
App		Default	Name
Button		Default	Name, Status, Type
Column View		Default	Name, Status, Type
Combo Box		Default	Name, Status, Type
Disclosure Triangle		Default	Name, Status, Type
Dock Item		Default	Name, Status
Drawer		Default	Name, Status, Type
Heading		Default	Status, Type, Name
Image		Default	Name, Status, Type
Incrementor		Default	Name, Status, Type
Layout Area		Default	Name, Status, Type
Layout Item		Default	Name, Status, Type
Level Indicator		Default	Name, Status, Type



VoiceOver Utility

Search

General

Verbosity

Speech

Navigation

Web

Sound

Visuals

Commanders

Braille

Activities

Speech

Braille

Text

Announcements

Hints

Punctuation: Some

Repeated punctuation: First 3 Times

While typing speak: Characters and Words

When moving the cursor: Speak text that the cursor passes

When text attributes change: Do Nothing

When encountering a misspelled word: Speak Attributes

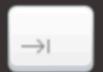
When encountering a link/attachment: Speak

Read numbers as: Words

When reading a capital letter: Change Pitch

When deleting text: Change Pitch



 General Verbosity Speech Navigation Web Sound Visuals Commanders Braille Activities

Voices

Pronunciation

Text	Substitution	Application	Ignore Case
:(trown	All Apps	<input checked="" type="checkbox"/>
:)	smiley	All Apps	<input checked="" type="checkbox"/>
!	exclaim	All Apps	<input type="checkbox"/>
?	question	All Apps	<input type="checkbox"/>
"	quote	All Apps	<input type="checkbox"/>
(leftparen	All Apps	<input type="checkbox"/>
)	rightparen	All Apps	<input type="checkbox"/>
&	and	All Apps	<input type="checkbox"/>
<	less	All Apps	<input type="checkbox"/>
>	greater	All Apps	<input type="checkbox"/>
802.11b	8 oh 2 dot eleven b	All Apps	<input checked="" type="checkbox"/>
802.11g	8 oh 2 dot eleven g	All Apps	<input checked="" type="checkbox"/>
GIF	giff	All Apps	<input type="checkbox"/>
GUI	goeey	All Apps	<input type="checkbox"/>
qty	quantity	All Apps	<input checked="" type="checkbox"/>

There is
no Control.

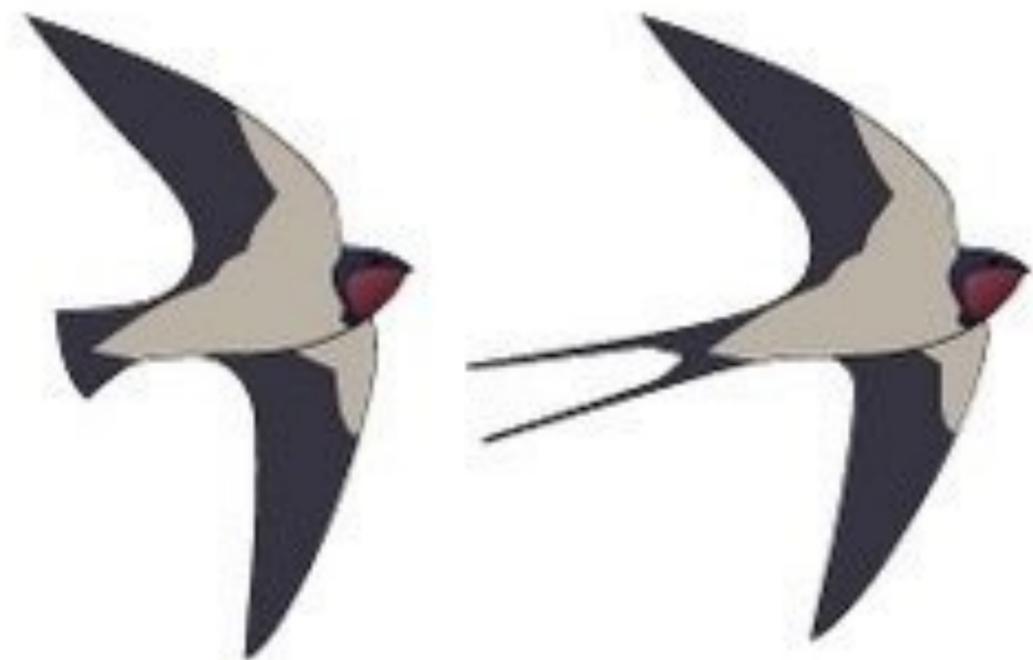


Other Differences

Go <figure>

Although 47 of the 74 worldwide swallow species are found in Africa,¹ only two species are named after the continent: the West African Swallow (*Hirundo domicella*) and the South African Swallow (*Hirundo spilodera*), also known as the South African Cave Swallow.

Since the range of the South African Swallow extends only as far north as Zaire,² I felt fairly confident that this was the non-migratory African species referred to in previous discussions of the comparative



LEFT: South African Swallow
RIGHT: European Swallow

JAWS has the best support for announcing native figures and their captions, though support is not perfect or consistent depending on the browser and **JAWS's verbosity settings.**

**IE11 requires the use of
role="figure" and an aria-label
or aria-labelledby pointing to the figcaption
to mimic native announcements.**



Edge¹ won't announce the presence of a **figure** role at all, regardless if ARIA is used or not.

¹ EdgeHTML-Version as published in 2018.

Chrome and Firefox offer similar support, however JAWS (with default verbosity settings)
+ Chrome will completely ignore a figure (including the content of its figcaption) if an image has an empty alt or is lacking an alt attribute.

Testing **NVDA** version 2018.4.1 with
IE11, Edge, Firefox 64.0.2 and Chrome 71,
there was **no trace of figures.**

```
<figure role="figure" aria-label="Caption for the figure.">
  ←!— figure content. if an image, provide alt text →
  <figcaption>
    Caption for the figure.
  </figcaption>
</figure>
```

←!—

aria-label for macOS VoiceOver + Chrome
role="figure" for IE11.

IE11 needs an accessible name (provided by aria-label).
If not for the fact VO + Chrome doesn't support an
accessible name from aria-labelledby, that attribute
would have been preferred / pointed to an ID on
the <figcaption>.

→

Presently, mobile screen readers won't announce figures, nor Edge unless paired with Narrator (sort of), or any browser paired with NVDA.

Thanks, Scottt!²

²[How do you figure? | scottohara.me](https://scottohara.me)

ARIA can help,
but not in
every situation.

Accessibility is **not**
only Screen Readers

Most non-Screen-Reader
assistive technology does
not work well with ARIA.

Movies playing near Chicago, IL



The Meg
Thriller Action



May 22
Thriller Action



Crazy Rich
Asians
Swing Comedy



Christopher
Robin
Drama Family



Mission:
Impossible -
Fallout
Action Thriller



Alpha
Drama Action



Gender Wars
Humor Drama



Black Panther
Drama Action



The Spy Who
Dumped Me
Action Comedy

Showtimes for The Meg

Start scrolling down

AMC Cinemas

Today

Tomorrow

Sat, Aug 18

Sun, Aug 19

All times starting Afternoon Evening Night

AMC Cine-In Theatres Block 37 - AMC

Started 4:15pm - 10:00pm

30 7:00pm

ShowPlace ICON at Roosevelt Collection with ICON X - AMC



The Meg

2017 - 2018 - Movie Poster Images | 14 total

Nuance released the lucky version 13 of [Dragon Naturally Speaking](#). I've been doing some preliminary testing and here's what Dragon 13 supports (so far) in terms of ARIA:

- `role="button"`
- `role="link"`
- `role="radio"`
- `role="checkbox"`
- `aria-label`

That's just in about 30 mins of testing, so there's definitely more to test, but this is a huge step.

I'm a real link | As am I

I'm a placeholder link (no href)

I'm an ARIA link made out of a div

I'm an ARIA link made out of a button

I'm a **paragraph of text** with an ARIA link within me. Where I be?

I'm a real link | As am I

I'm a placeholder link (no href)

I'm an ARIA link made out of a div

I'm an ARIA link made out of a button

I'm a paragraph of text with an ARIA link within me. Where I be?

Normal Button

aria-disabled button

Actually Disabled Button

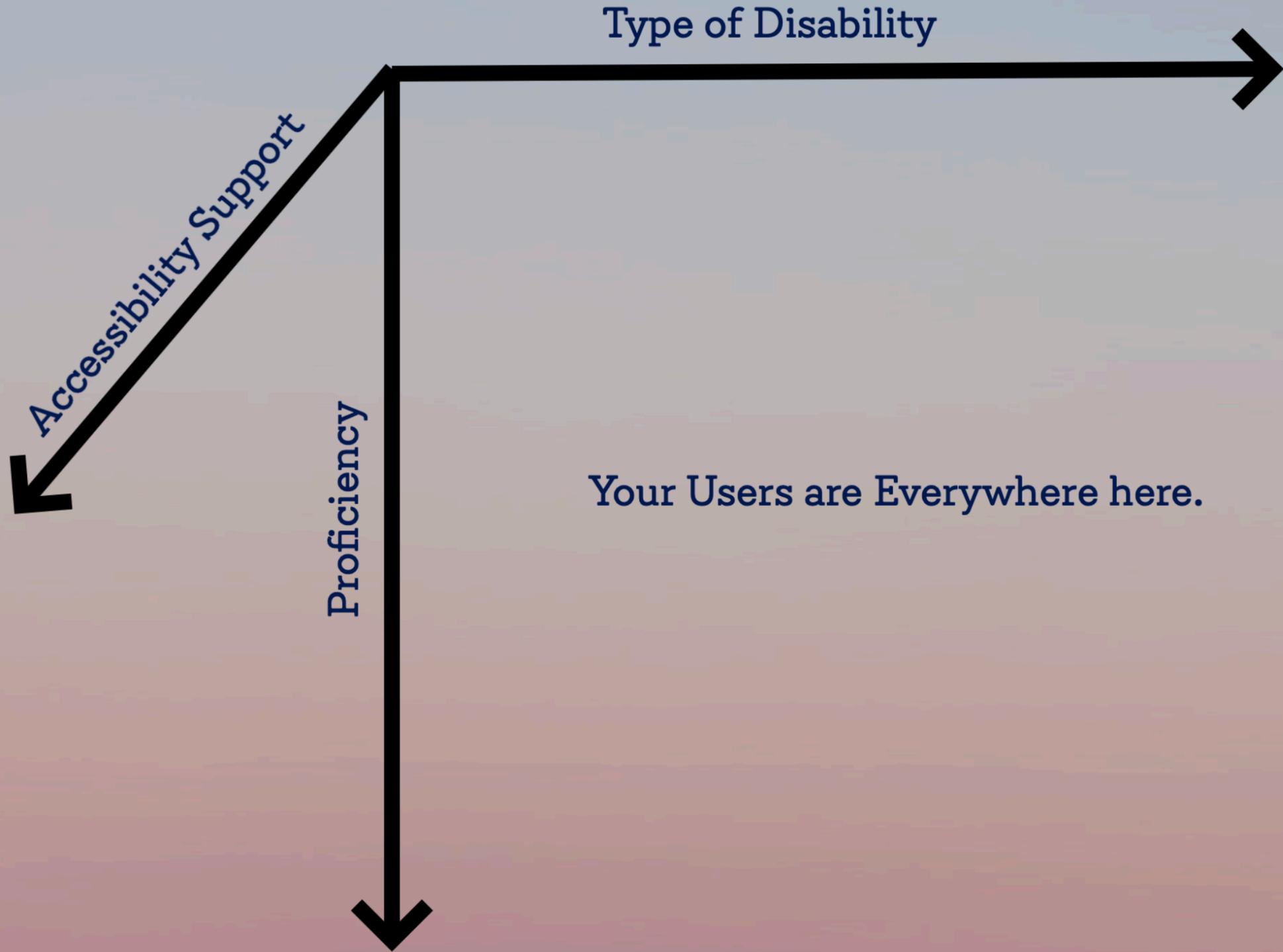
Users!

Knowledge Levels
Vary Greatly

Users often don't know
what their computers
can do for them.

Other Users hack their
assistive technology to
work with inaccessible
sites.

Some users write
style sheets and JavaScripts
to change websites
to their needs.



Type of Disability

Accessibility Support

Proficiency

Your Users are Everywhere here.

Test with Diverse Users

Give Users Agency

Allow use of assistive technology that suits a particular user's needs.

Try not to **prescribe**
how to use a component.

Use HTML & CSS to
describe elements.

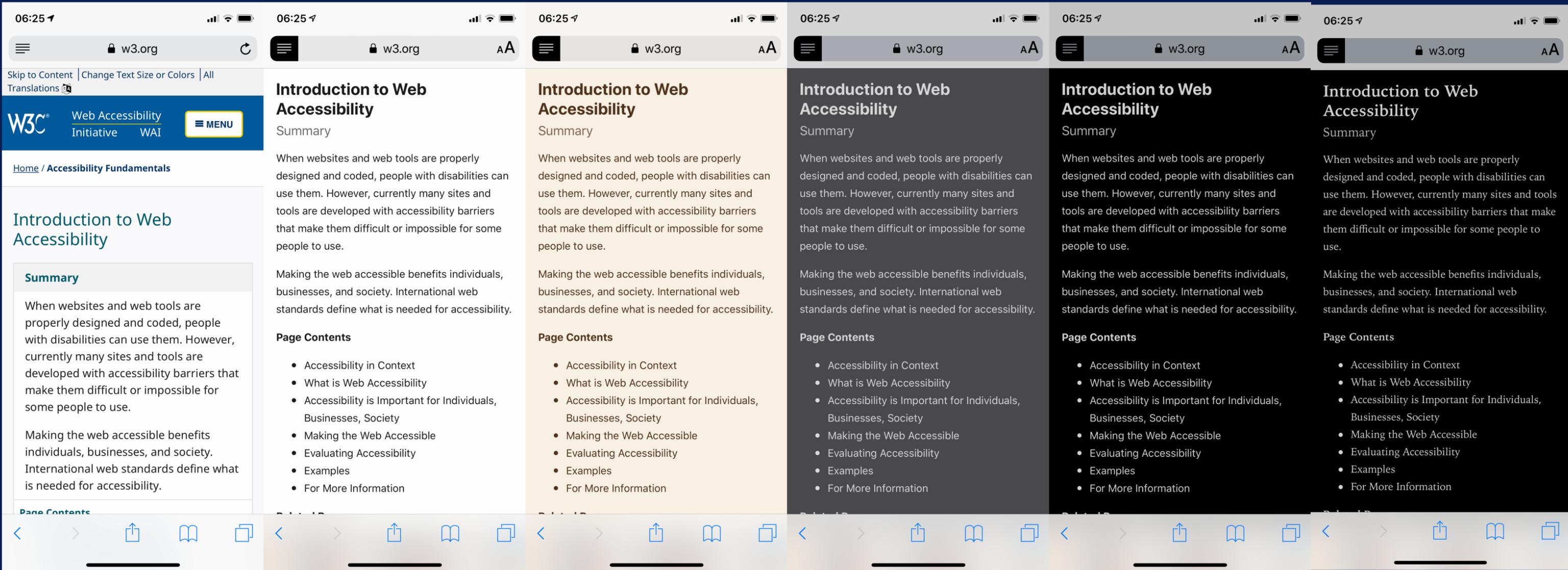
Don't expect any
proficiency from users.

Don't break conventions!

**Users get a lot more
tools to use!**

Reader

Modle



Introduction to Web Accessibility

Summary

When websites and web tools are properly designed and coded, people with disabilities can use them. However, currently many sites and tools are developed with accessibility barriers that make them difficult or impossible for some people to use.

Making the web accessible benefits individuals, businesses, and society. International web standards define what is needed for accessibility.

Page Contents

Introduction to Web Accessibility

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When websites and web tools are properly designed and coded, people with disabilities can use them. However, currently many sites and tools are developed with accessibility barriers that make them difficult or impossible for some people to use.

Making the web accessible benefits individuals, businesses, and society. International web standards define what is needed for accessibility.

Page Contents

- Accessibility in Context
- What is Web Accessibility
- Accessibility is Important for Individuals, Businesses, Society
- Making the Web Accessible
- Evaluating Accessibility
- Examples
- For More Information

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06:30



w3.org



Introduction to Web Accessibility

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When websites are designed and created, they are developed with the goal of making them difficult to use.

Making the web accessible for businesses, and standards defining

Page Contents

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- For More Information

A

A



Athelas

Charter

Georgia

Iowan



Palatino

San Francisco

Seravek

Times New Roman



Reader Mode

Native Support:

- Safari (since 2010, can set to default since 2015)
- Firefox (2015)
- Edge (2015)
- Chrome (soon)



Aa



[w3.org](https://www.w3.org)

Introduction to Web Accessibility

w3c_wai

7-9 minutes

Page Contents

Accessibility in Context

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

The Web is fundamentally designed to work for all people, whatever their hardware, software, language, location, or ability. When the Web meets this goal, it is accessible to people with a diverse range of hearing, movement, sight, and cognitive ability.

Thus the impact of disability is radically changed on the Web because the Web removes barriers to communication and interaction that many people face in the physical world. However, when websites, applications, technologies, or tools are badly designed, they can create barriers that exclude people from using the Web.

Accessibility is essential for developers and organizations that want to create high-quality websites and web tools, and not exclude people from using their products and services.

The image shows a browser window with the URL `https://www.w3.org/WAI/fundam`. The page title is "Web Accessibility". A text-to-speech (TTS) overlay is active, displaying playback controls (play/pause, stop, next) and a volume slider. The TTS interface also shows "Voice: Default" and a duration of "7-9 minutes". The page content includes a "Page Contents" section with a heading "Accessibility in Context". A quote is displayed in a light blue box: "The Web is fundamentally designed to work for all people, whatever their hardware, software, language, location, or ability. When the Web meets this goal, it is accessible to people with a diverse range of hearing, movement, sight, and cognitive ability." Below this, a paragraph explains that the Web changes the impact of disability by removing communication barriers, but poorly designed websites can create barriers. The page concludes with a bold statement: "Accessibility is essential for developers and organizations that want to create high-quality websites and web tools, and not exclude people from using their products and services."

Introduction to Web Accessi... New Tab

https://www.w3.org/WAI/fundam

w3.org

Web Accessibility

7-9 minutes

Page Contents

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Accessibility is essential for developers and organizations that want to create high-quality websites and web tools, and not exclude people from using their products and services.

Aa
Sans-serif
Serif
- +
→ ← ← →
≡ ≡
Light Dark Sepia

Web Accessibility

The power of the Web is in its universality.
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The Web is fundamentally designed to work for all people, whatever their hardware, software, language, location, or ability. When the Web meets this goal, it is accessible to people with a diverse range of hearing, movement, sight, and cognitive ability.

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Accessibility is essential for developers and organizations that want to create high-quality websites and web tools, and not exclude people from using their products and services.

More Website Settings



medium.com/s/story/how-a-tv-sitcom-triggered-the-downfall-of-western-civilization-

outline ▾



misc ▾

POWER TO...



SVG Aut

When visiting this website:

- Use Reader when available
- Enable content blockers

Page Zoom: 100 %

Auto-Play: Never Auto-Play

Pop-up Windows: Block and Notify

Camera: Ask

Microphone: Ask

Location: Ask

V Sitcom

Civili

- General
 - Reader
 - Content Blockers
 - Auto-Play**
 - Page Zoom
 - Camera
 - Microphone
 - Location
 - Notifications
 - Pop-up Windows
- Plug-ins
 - WebEx64 General Plu...
Version 1.1.0

Allow the websites below to automatically play media:

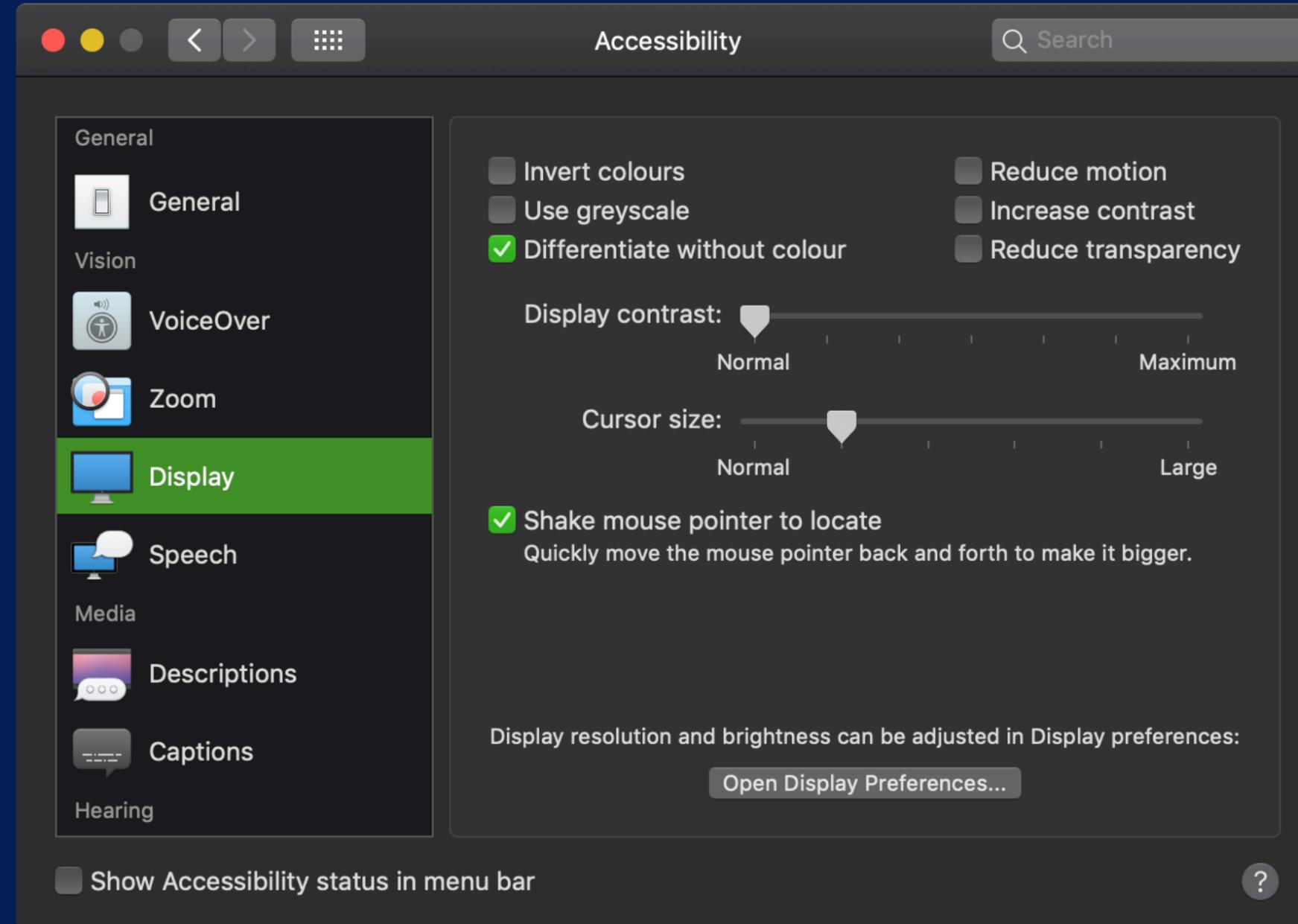
Currently Open Websites	
duckduckgo.com	Never Auto-Play
giphy.com	Stop Media with Sound
knowbility.org	Never Auto-Play
lynda.com	Never Auto-Play
medium.com	Never Auto-Play
noti.st	Never Auto-Play
slides.com	Allow All Auto-Play
talks.yatil.net	Never Auto-Play
w3c.github.io	Never Auto-Play
Configured Websites	
apple.com	Stop Media with Sound
ct-com-wci-bff-tst.us-south.containers.ap...	Allow All Auto-Play
<input type="button" value="Remove"/>	When visiting other websites: Never Auto-Play



OS

As in Operating System

OS Settings



prefers-reduced-motion
Media Query

```
@media (prefers-reduced-motion: reduce) {  
  * {  
    transition: none !important;  
    animation: none !important;  
  }  
}
```

Support

prefers-reduced-motion media query [↗](#)

CSS media query based on a user preference for preferring reduced motion (animation, etc).

IE	Edge	Firefox	Chrome	Safari	iOS Safari	Opera Mini	Chrome for Android	Android Browser	Samsung Internet
9	16	64	72	11.1	11.4			4.4	7.4
10	17	65	73	12	12.1			4.4.4	8.2
11	18	66	74	12.1	12.2	all	74	67	9.2
	75	67	75	TP					

✓ ✗ Partial Support

Global: 16.42% + 0% = 16.42%

On Windows
...it's complicated

 **patrick h. lauke**
@patrick_h_lauke

Thread Reader App
17 tweets - 11 Mar 2019
[patrick_h_lauke/status/1105247881571852293](https://twitter.com/patrick_h_lauke/status/1105247881571852293)

prefers-reduced-motion query now in Chrome Canary



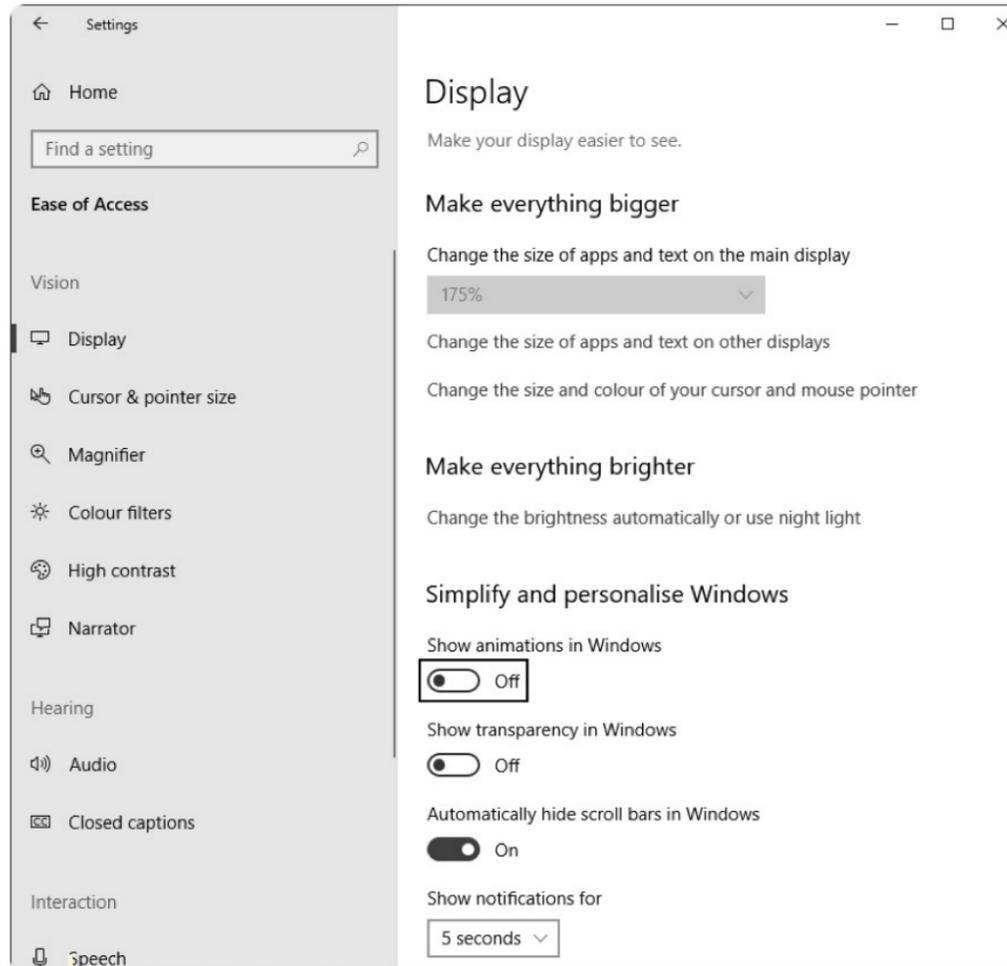
Move Ya! Or maybe, don't, if the user prefers-reduced-motion! | Web | Google Developers
The prefers-reduced-motion media query detects whether the user has requested that the system minimize the amount of animation or motion it uses. This is for users who either require or prefer minimi...
<https://developers.google.com/web/updates/2019/03/prefers-reduced-motion>

<https://developers.google.com/web/updates/2019/03/prefers-reduced-motion>

... and at this stage worth pointing out that on Windows, many users MAY have inadvertently set their accessibility preference, but did so to disable Windows' own animations...

i.e. not because they have a specific desire/need not to see animations in general, but just to disable the subtle animations for apps minimizing/maximizing etc. there's actually two/three settings in Windows (and some seem weirdly interconnected, or maybe i'm imagining things)

there's Settings > Ease of Access > Display > Show Animations - this, to my knowledge, is the big master switch for turning off Windows' own animations AND setting the preference that translates to prefers-reduced-motion opt-in...



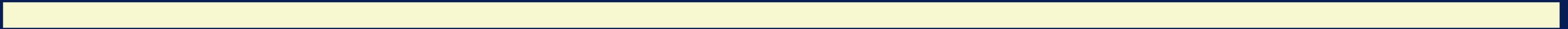
prefers-color-scheme
Media Query

```
:root {
  --color: #333;
  --bgcolor: #eee;
}

@media (prefers-color-scheme: dark) {
  :root {
    --color: #eee;
    --bgcolor: #333;
  }
}

html {
  color: var(--color);
  background-color: var(--bgcolor);
}
```

DEEMMO



**We³ also get a lot
more tools to use!**

³ Designers & Developers

Media Queries Level 5(?)

inverted-colors⁴

→ none

→ inverted

⁴ Planned in [Media Queries Level 5](#)

prefers-reduced- transparency⁴

→ no-preference

→ reduce

⁴ Planned in Media Queries Level 5

prefers-contrast⁴

→ no-preference

→ high

→ low

⁴ Planned in [Media Queries Level 5](#)

forced-colors⁴

→ none

→ active

⁴ Planned in [Media Queries Level 5](#)

Environment MQs⁴

⁴ Planned in [Media Queries Level 5](#)

light-level⁴

→ dim

→ normal

→ washed

⁴ Planned in Media Queries Level 5

environment-blending⁴

→ opaque

→ The document is rendered on an opaque medium, such as a traditional monitor or paper. Black is dark and white is 100% light.

→ additive

→ The display blends the colors of the canvas with the real world using additive mixing. Black is fully transparent and white is 100% light.

For example: a head-up display in a car.

→ subtractive

→ The display blends the colors of the canvas with the real world using subtractive mixing. White is fully transparent and dark colors have the most contrast.

For example: an LCD display embedded in a bathroom mirror.

⁴ Planned in [Media Queries Level 5](#)

Scalable Vector Graphics

- Can adapt to the viewport (or embed size).
- Can use the font color of the text.
- Can have “real” text in it.

<details> & <summary>

```
<details id="examples">
```

```
  <summary>
```

```
    <h2 id="examples">Examples</h2>
```

```
  </summary>
```

```
  <div>
```

```
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing  
    elit. Doloribus non amet perferendis quasi similique  
    impedit maxime, iusto fuga magni. Similique sint a  
    expedita esse alias voluptate illum porro placeat  
    est?</p>
```

```
  </div>
```

```
</details>
```

```
<details id="examples" open>
  <summary>
    <h2 id="examples">Examples</h2>
  </summary>
  <div>
    <p>Lorem ipsum dolor sit amet, consectetur adipiscing
      elit. Doloribus non amet perferendis quasi similique
      impedit maxime, iusto fuga magni. Similique sint a
      expedita esse alias voluptate illum porro placeat
      est?</p>
  </div>
</details>
```

An Accordion in

5 Lines of JS⁵

⁵ OK, jQuery in this instance.

Nice :focus Styles

→ JavaScript

→ We don't need JS.

→ Thanks `currentColor`!

:focus-within

Thank You!

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