

# Connecting 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

---



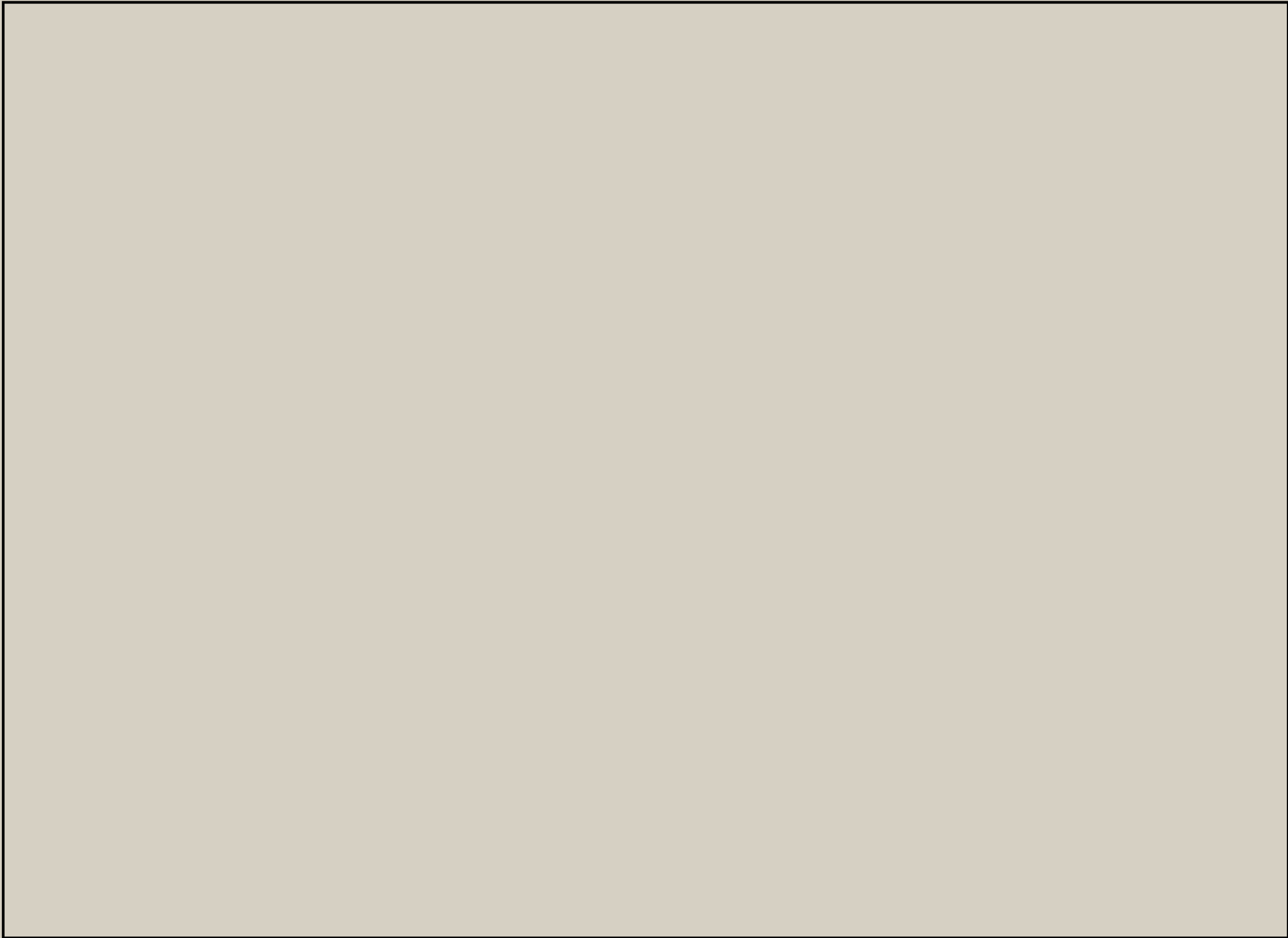




NETFLIX

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

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HTML/CSS/JavaScript

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Content

Talking & Planning

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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

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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  
etc.



Talking & Planning

Graphic Design (of an image of a website)

HTML/CSS/JavaScript

CMS

Content

Iterations

Hotfixes

Quality Control

Accessibility

Security  
Data Protection  
etc.

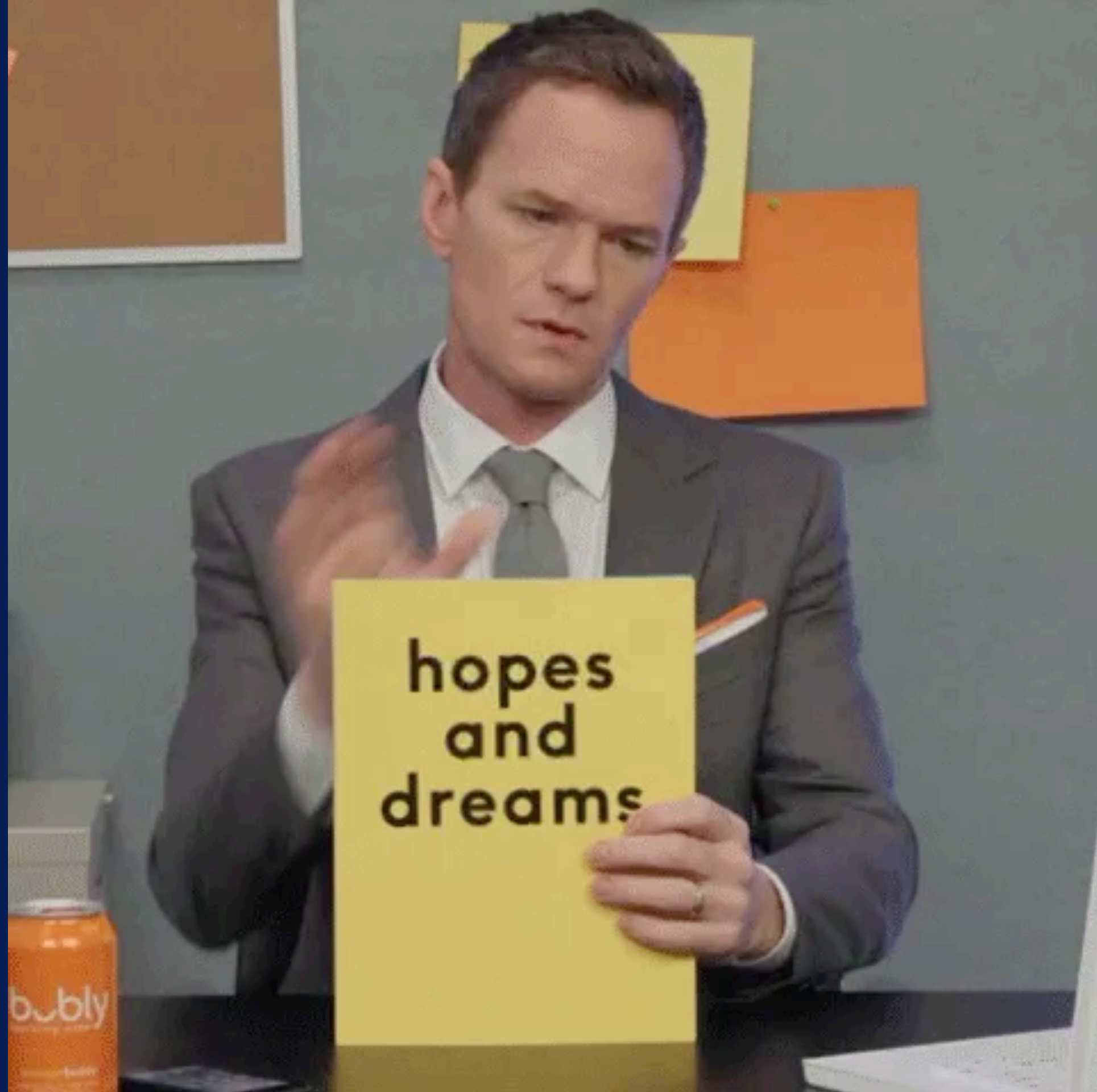
Accessibility  
is a sign  
of good quality.

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

*— Microsoft’s app developer guide*



Accessibility must be a  
**foundational** value



# Pace Layers



*FASHION*



*COMMERCE*



*INFRASTRUCTURE*



*GOVERNANCE*



*CULTURE*



*NATURE*





**SURFACE  
SKELETON  
STRUCTURE**

**SCOPE**

**STRATEGY**

**JS+**

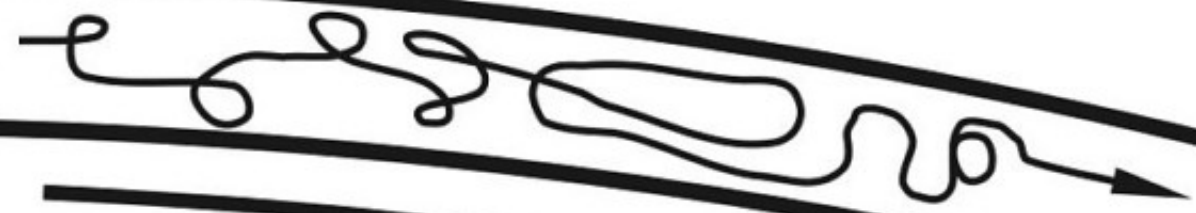
**CSS**

**HTML**

**URLs**

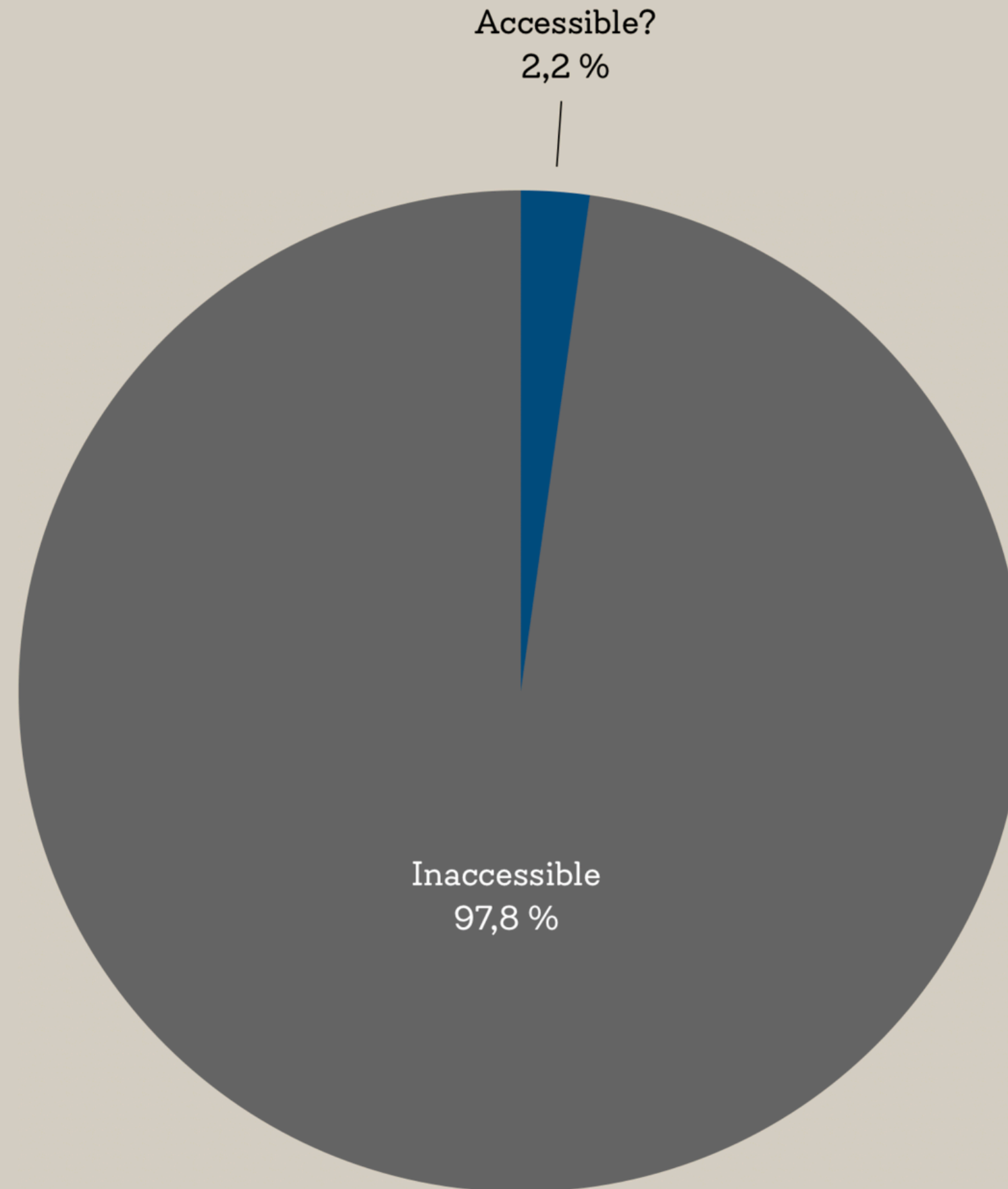
**HTTP**

**TCP/IP**



Accessible  
Web Development  
is Complicated





# 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.

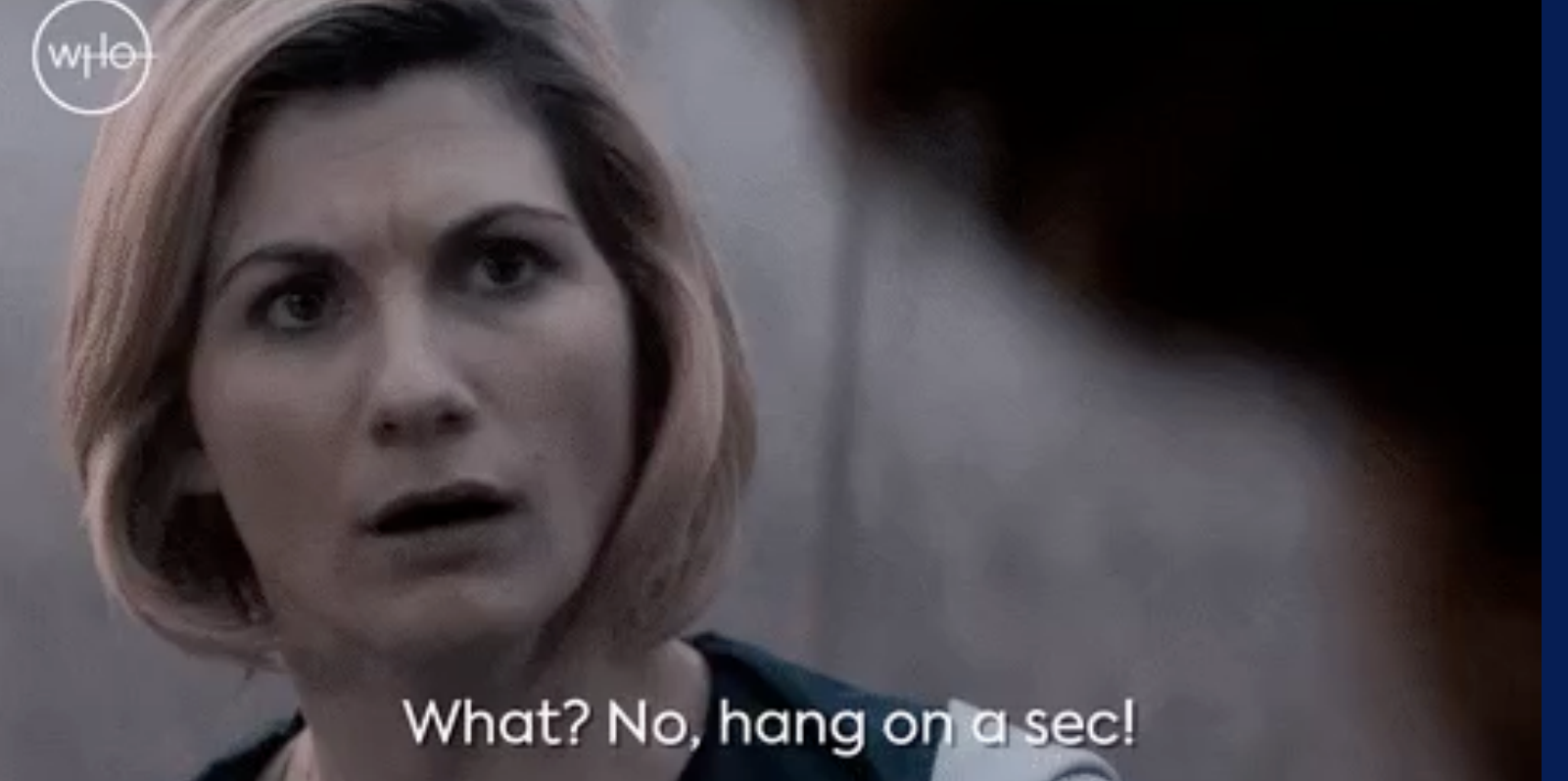
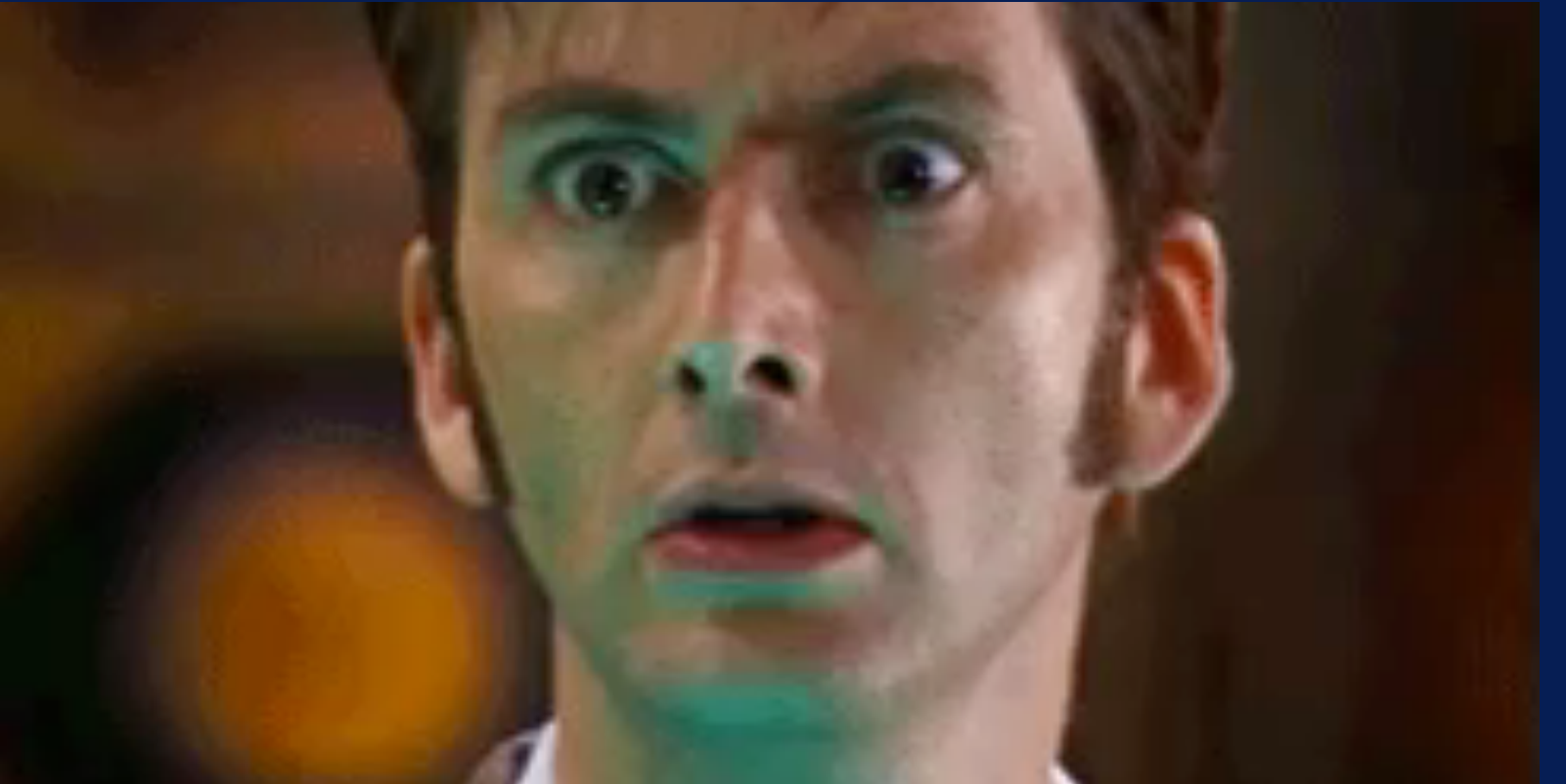
BBC  
AMERICA  
RICA



# 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](https://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.”*

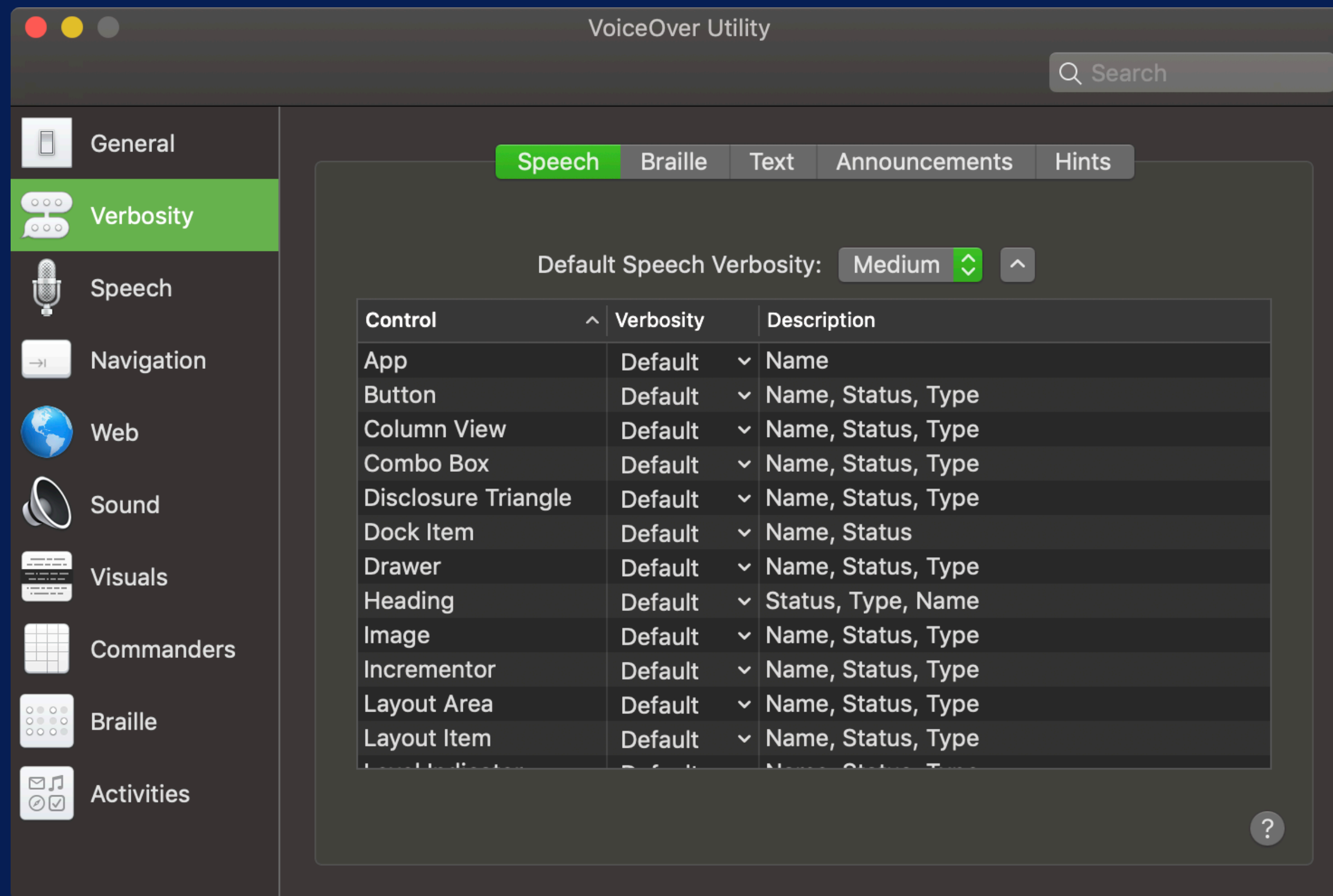
*— James Craig, Apple, [bugs.webkit.org](https://bugs.webkit.org)*

*No!!*

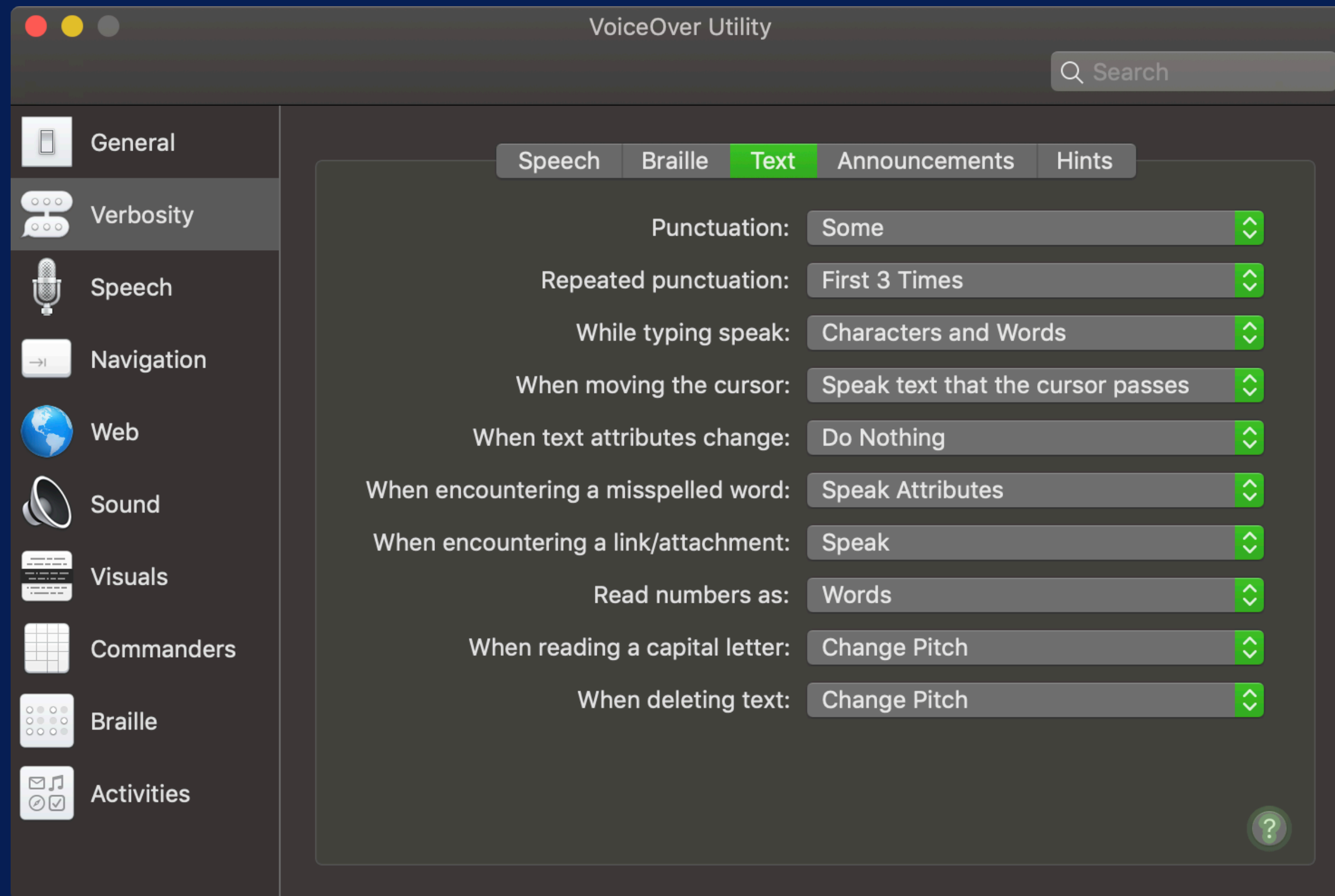


The same it true  
for screen readers:  
**They don't all need to  
produce the same output.**





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



VoiceOver Utility

Search

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	gooy	All Apps	⇅	<input type="checkbox"/>
qty	quantity	All Apps	⇅	<input checked="" type="checkbox"/>

+

-

?

There is  
no Control.





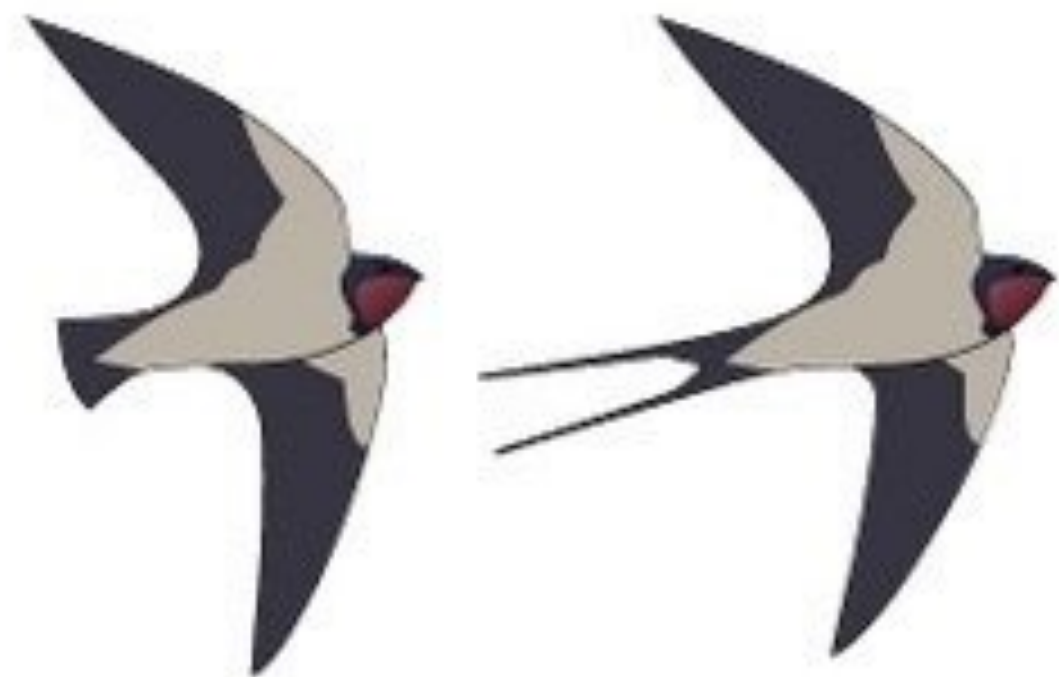


# Other Differences

Go <figure>

Although 47 of the 74 worldwide swallow species are found in Africa,<sup>1</sup> 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,<sup>2</sup> I felt fairly confident that this was the non-migratory African species referred to in previous discussions of the comparative



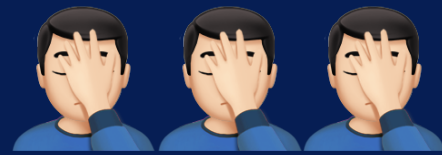
LEFT: South African Swallow

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.





**Edge<sup>1</sup> won't announce** the presence of a **figure** role at all, regardless if ARIA is used or not.

<sup>1</sup> 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, Scott!<sup>2</sup>

<sup>2</sup> How do you figure? | [scottohara.me](http://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.



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

---

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

Normal Button

aria-disabled button

Actually Disabled Button

Users!!

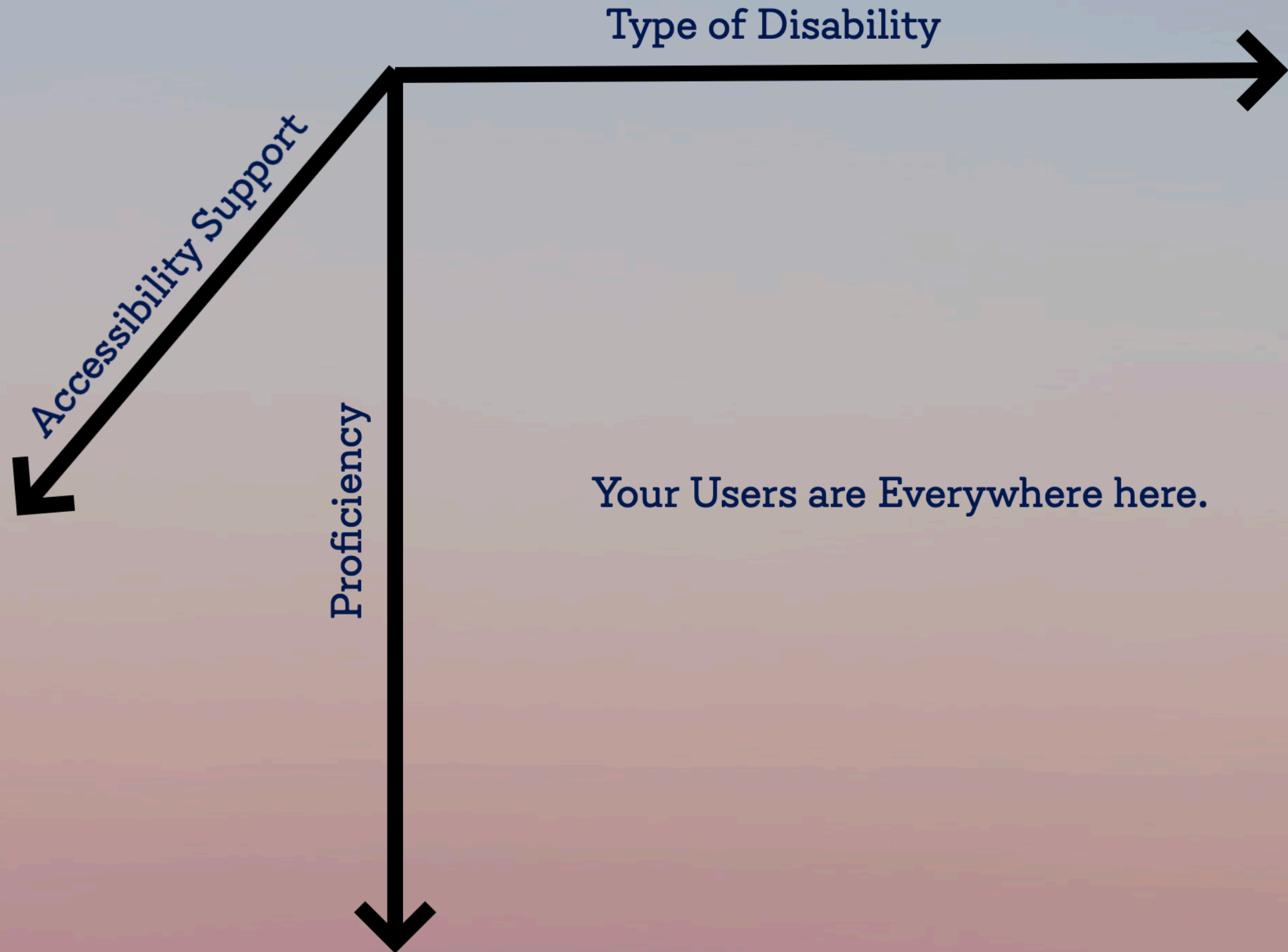
Knowledge Levels  
Vary Greatly

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.



# 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.

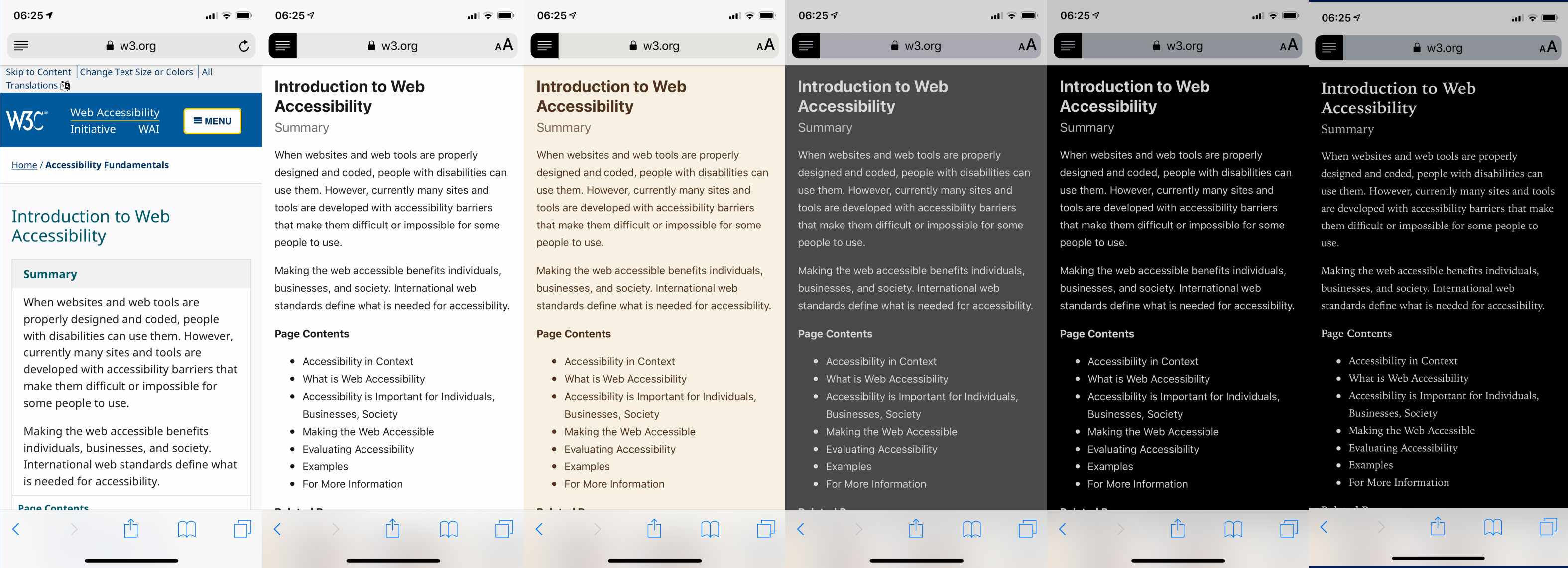
Don't break conventions!

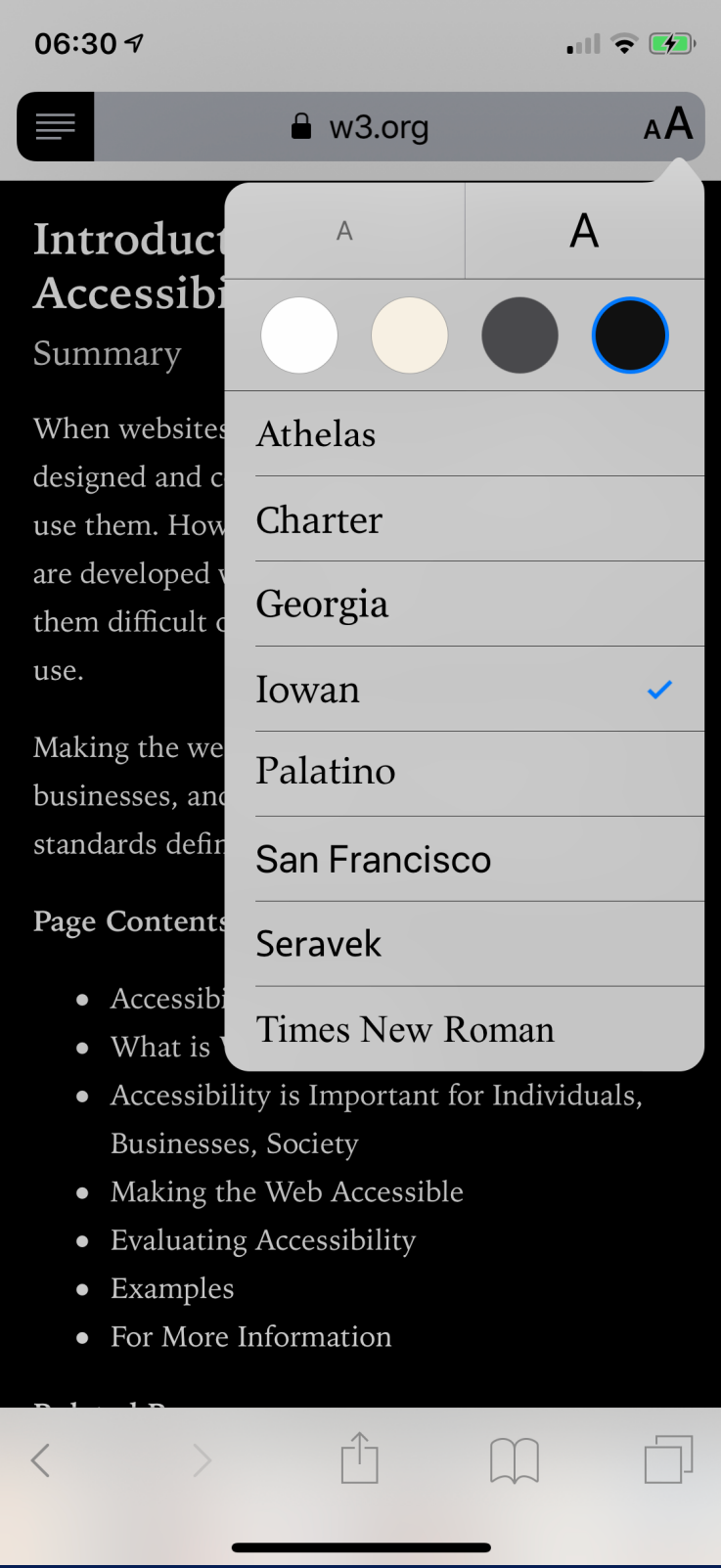
**Users get a lot more  
tools to use!**

Reader

Model







# Reader Mode

Native Support:

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

Aa

[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.**

Aa

w3.org

<<

■

>>

Voice: Default ▾

7-9 minutes

# Web Accessibility

## 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

Aa

Sans-serif

Aa

Serif

—

+

→ ←

← →

≡

≡

Light

Dark

Sepia

# Web Accessibility

## Text

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.**



# More Website Settings



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

outline ▾



misc ▾

S

POWER TO...



SVG Aut

s

Ta

...

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

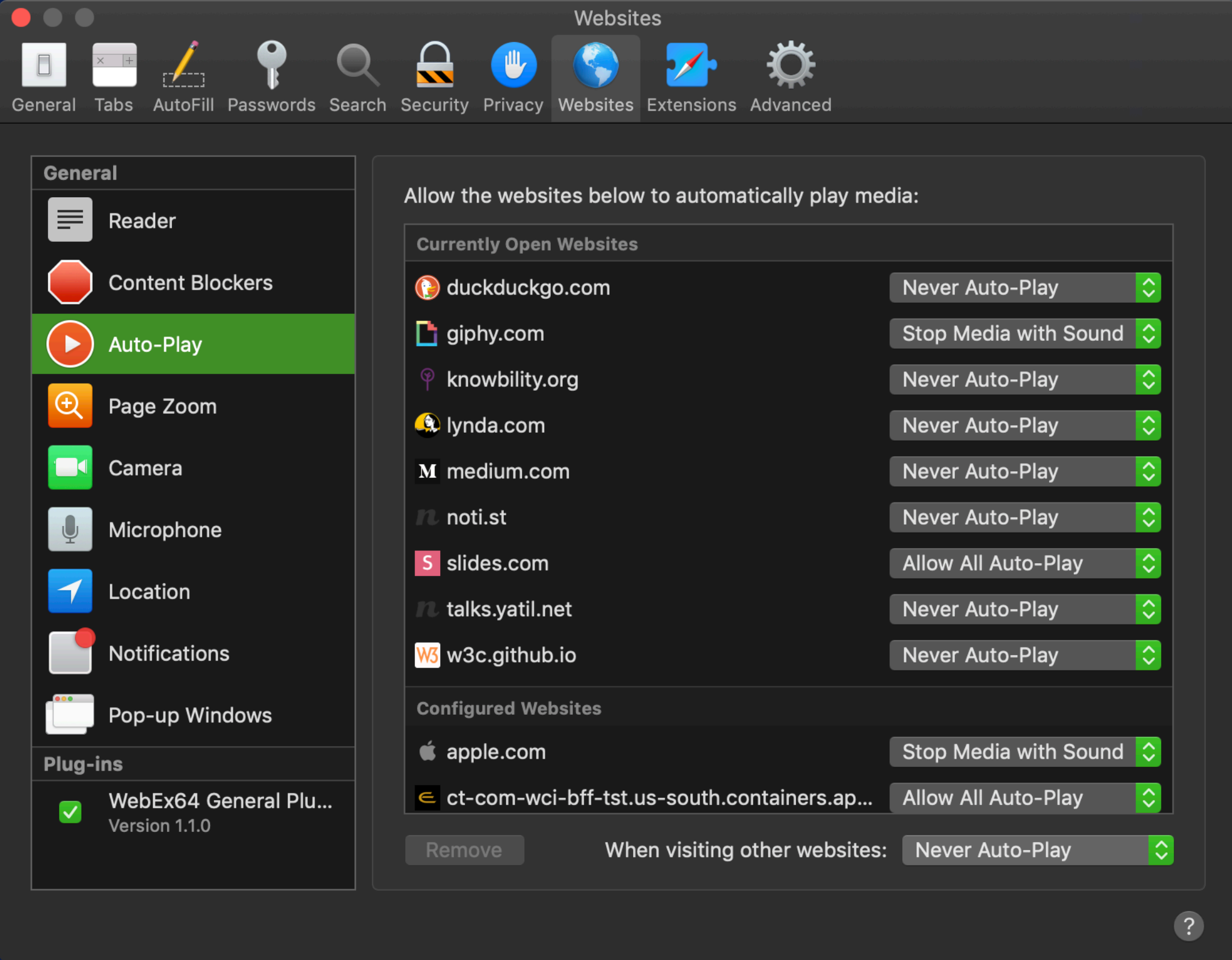
Microphone: Ask

Location: Ask

V Sitcom

Civili

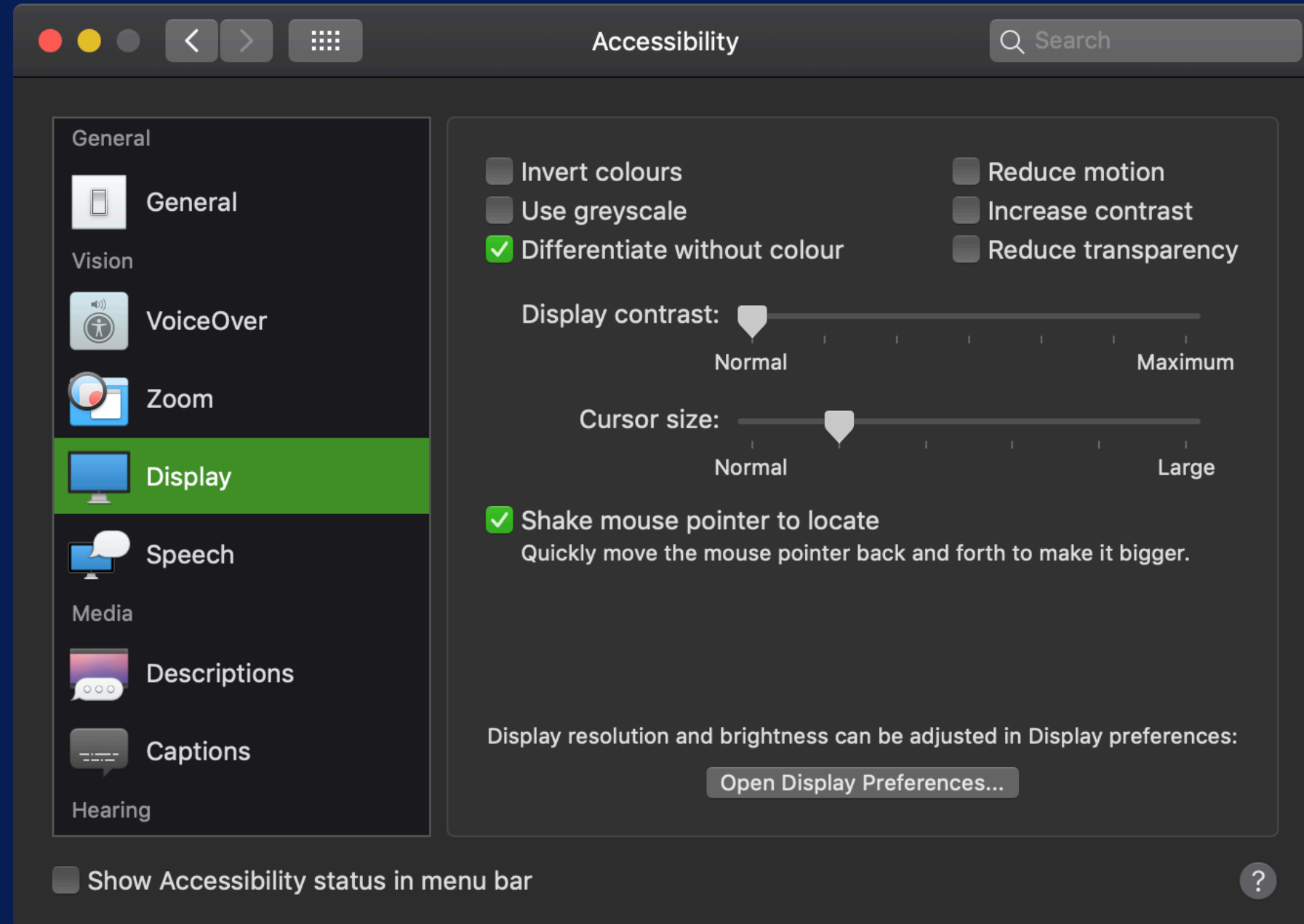
d



# 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%

Data from [caniuse.com](https://caniuse.com) | Embed from [caniuse.bitsofco.de](https://caniuse.bitsofco.de)

[Enable accessible colours](#)

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



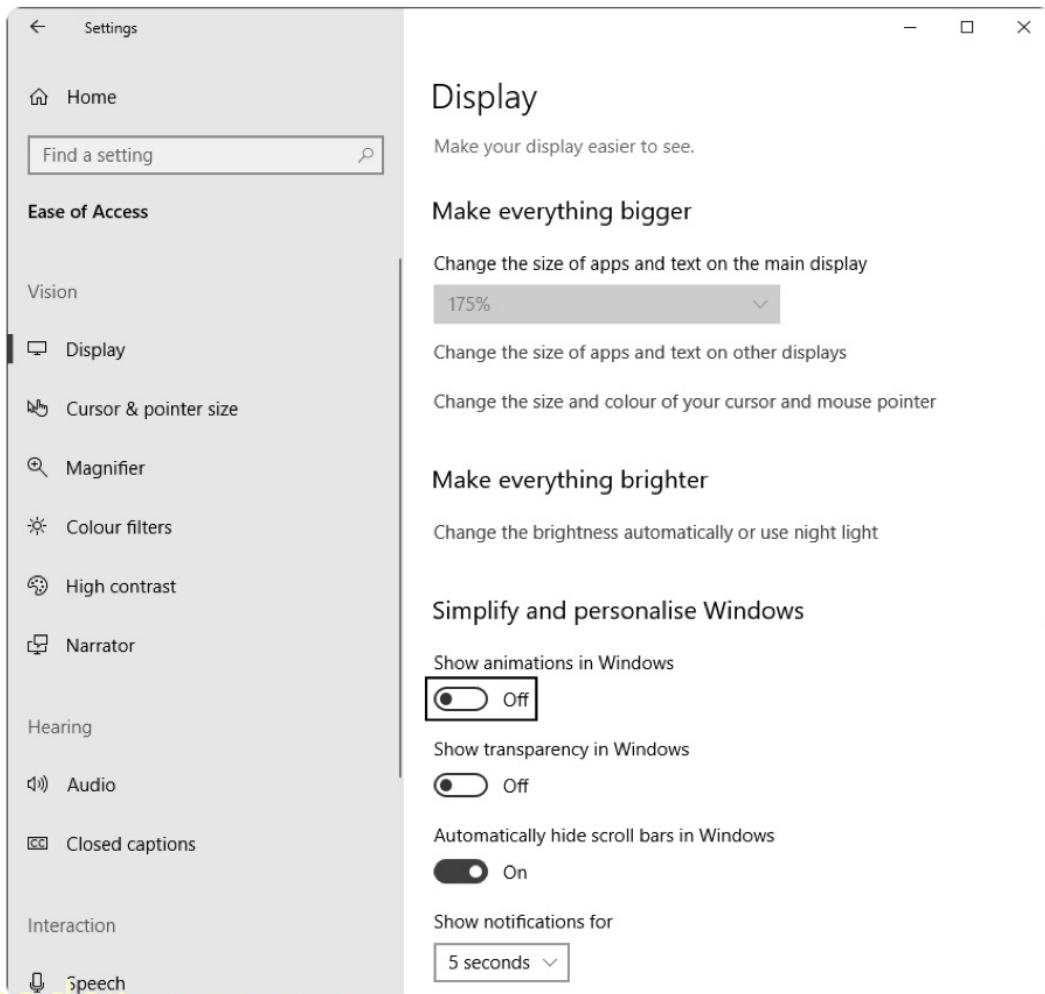
**Move Ya! Or maybe, don't, if the user prefers-reduced-motion! | Web | Google Developers**  
The prefers-reduced-motion media query detects whether the user has requested that the system minimize the amount of animation or motion it uses. This is for users who either require or prefer minimi...  
<https://developers.google.com/web/updates/2019/03/prefers-reduce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

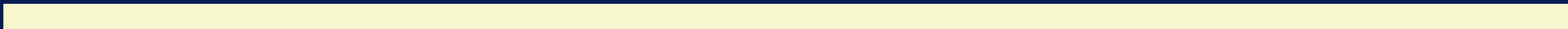
there's Settings > Ease of Access > Display > Show Animations - this, to my knowledge, is the big master switch for turning off Windows' own animations AND setting the preference that translates to prefers-reduced-motion opt-in...



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);  
}
```

DEMO



**We<sup>3</sup> also get a lot  
more tools to use!**

<sup>3</sup> Designers & Developers



Media Queries Level 5(?)

# inverted-colors<sup>4</sup>

→ none

→ inverted

<sup>4</sup> Planned in Media Queries Level 5

# prefers-reduced-transparency<sup>4</sup>

→ no-preference

→ reduce

<sup>4</sup> Planned in Media Queries Level 5

# prefers-contrast<sup>4</sup>

→ no-preference

→ high

→ low

<sup>4</sup> Planned in Media Queries Level 5

# forced-colors<sup>4</sup>

→ none

→ active

<sup>4</sup> Planned in Media Queries Level 5

# Environment MQs<sup>4</sup>

<sup>4</sup> Planned in Media Queries Level 5

# light-level<sup>4</sup>

→ dim

→ normal

→ washed

<sup>4</sup> Planned in Media Queries Level 5



# environment-blending<sup>4</sup>

→ 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.

<sup>4</sup> 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 adipisicing  
    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 adipisicing  
      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 JS<sup>5</sup>

<sup>5</sup> OK, jQuery in this instance.

# Nice :focus Styles

- JavaScript
- We don't need JS.
- Thanks `currentColor`!



:focus-within

# Thank You!

Eric Eggert

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E-Mail: [mail@yatil.net](mailto:mail@yatil.net)

Social: [@yatil](#)