Accessibility & Multi-Screen Design

Getting Started

Eric Eggert

- Web Developer & Trainer
- **2005–2010** Freelancer
- **2011+** Co-Founder @ outline
- **2013–2016** Web Accessibility Specialist @ W3C/WAI
- **2016+** 50/50 Web Accessibility Expert @ Knowbility & W3C/WAI Fellow

Disclaimer

This course is not a W3C course.

Views expressed are my own.

Dies ist kein W3C-Kurs.

Alle Ansichten sind meine Eigenen.

Dates & Times[1]

Day	Date	Topic
Thu	2019-06-06	**Getting Started**
Thu	2019-06-13	**Images**
Wed	2019-06-19	**Checking**
Thu	2019-06-27	**Audio/Video/Animation**
Async	2019-06-29	**Responsive/Accessible Future**

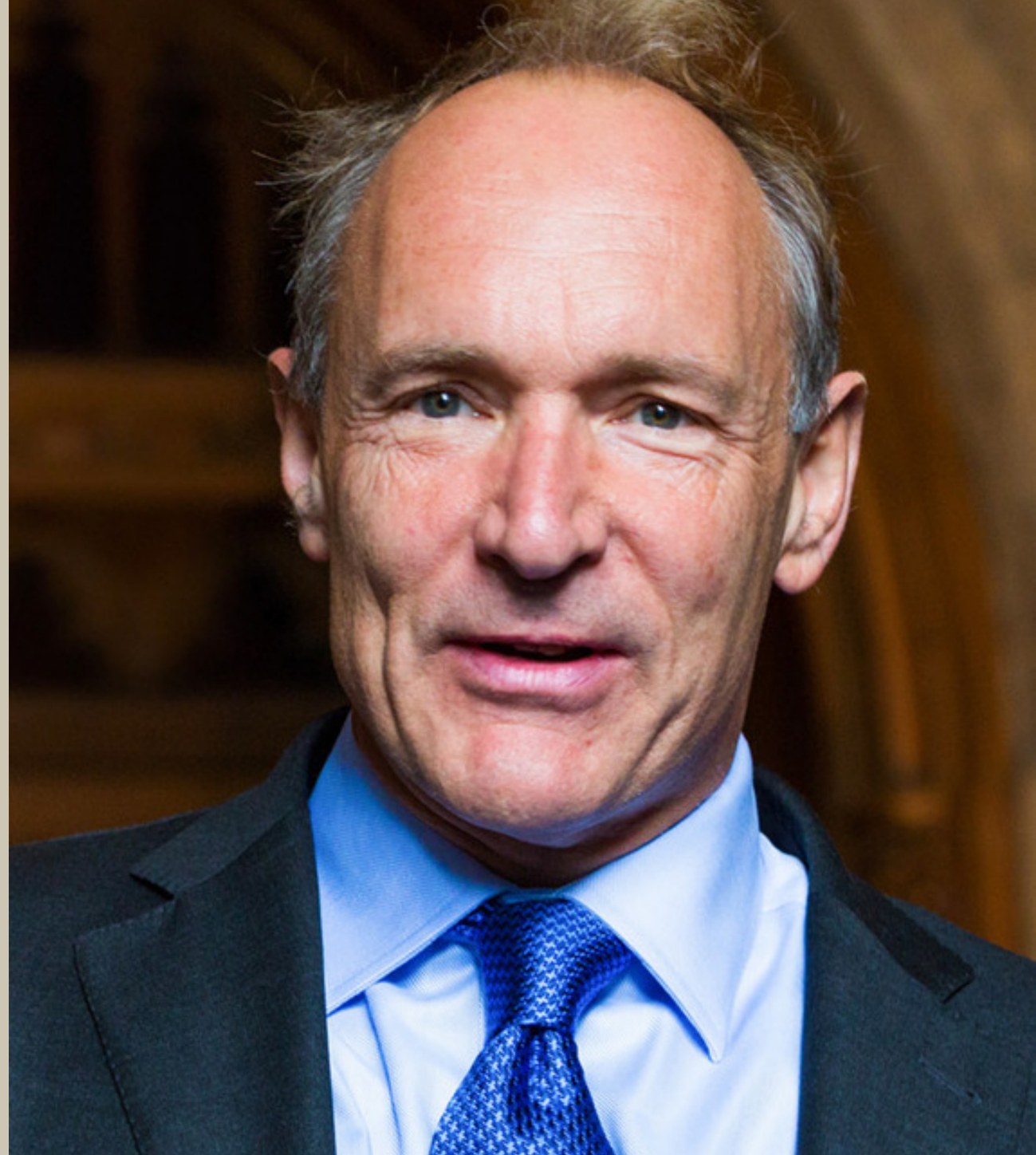
[1] cos.accessibility.rocks

Who invented the Internet?

Cats & Wikipedia & Porn & Business & Youtube & Science

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

— Tim Berners-Lee



Web Standards

WWW Standards Bodies

- **W3C:** World Wide Web Consortium
- **WHATWG:** Web Hypertext Application Technology Working Group
- **Ecma International** (*née* European Computer Manufacturers Association)
- **ISO:** International Organization for Standardization

Technologies

HTML5

```
<h1 class="fancy">This is a heading</h1>
```

- HTML5 developed by WHATWG as an alternative to W3C's XHTML2
- Until Recently: Development in parallel in WHATWG („Living Standard") and in the HTML Working Group of W3C („Snapshots")
  - Discussion over the direction of the specification
  - Serious differences, including the addition of a Image Description Extension in the W3C version
- Now: Working Together 🤞

CSS

```
.fancy { font-family: fantasy; }
```

W3C's CSS Working group is working on a dozen modules.

Things we got recently: Grids, Flexbox, Masking, (Web)Fonts, Animations, Transforms, Transitions, …

ECMA Script[2]

```
document.querySelector('body').style.backgroundColor =
    'rebeccapurple';
```

- In the beginning just for client-side use cases
- Now a universal programming language
- Also on the server using node.js

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[2] *AKA JavaScript, ActionScript*

W3C Process[3]

1. Publication of the *First Public Working Draft*
2. Publication of zero or more revised *Working Drafts*
3. Publication of a *Candidate Recommendation*
4. Publication of a *Proposed Recommendation*
5. Publication as a *W3C Recommendation*
6. Possibly, Publication as an *Edited* or *Amended Recommendation*

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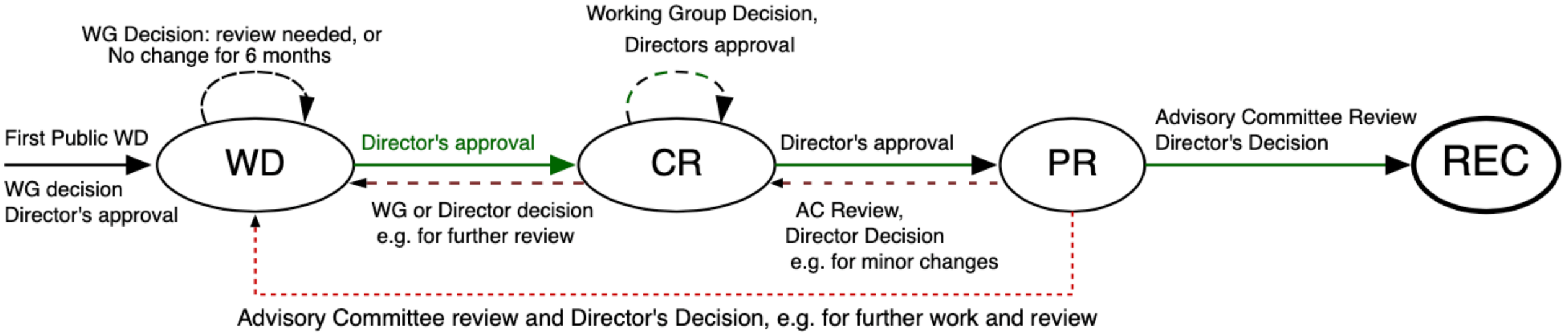
[3] World Wide Web Consortium Process Document – #6.1.1 Recommendations and Notes


WG Decision: review needed, or
No change for 6 months
Working Group Decision,
Directors approval
First Public WD
WG decision
Director's approval
WD
Director's approval
CR
Director's approval
PR
Advisory Committee Review
Director's Decision
REC
WG or Director decision
e.g. for further review
AC Review,
Director Decision
e.g. for minor changes
Advisory Committee review and Director's Decision, e.g. for further work and review

Accessibility & Multi-Screen Design

Accessibility ...

- In German: „Barrierefreiheit"
- People with Disabilities
- Access content
- Adapt the web to one's needs
- Understand and interact with websites

… and Multi-Screen Design …

- Show contents optimized for all devices
- Everything needs to look good although you don't know what device will access the content
- Performance
- Progressive Enhancement

… are very similar things.

Just looked at in different ways.

Accessibility and Multi-Screen Design are *very similar things*.

The Business Case for Digital Accessibility

The Business Case for Digital Accessibility | Web Accessibility Initiative (WAI) | W3C

The Business Case for Digital Accessibility

Accessibility can:

- **Drive Innovation:** Accessibility features in products and services often solve unanticipated problems.
- **Enhance Your Brand:** Diversity and inclusion efforts so important to business success are accelerated with a clear, well-integrated accessibility commitment.
- **Extend Market Reach:** The global market of people with disabilities is over 1 billion people with a spending power of more than $6 trillion. Accessibility often improves the online experience for all users.
- **Minimize Legal Risk:** Many countries have laws requiring digital accessibility, and the issue is of increased legal concern.

Percentage of People with Disabilities: **15.3%**

1.1 billion people

People with Disabilities by Age Group

Age	%
16–24	6%
25–34	9%
35–44	11%
45–54	17%
55–64	23%
65–74	26%
75–84	31%
85+	38%

Internet Use by Age Group

Age	2009	2015	2018
14–19	97.5%	100.0%	100.0%
20–29	95.2%	97.7%	99.5%
30–39	89.4%	94.2%	98.8%
40–49	80.2%	91.9%	98.5%
50–59	67.4%	83.2%	96.6%
60–69	39.1%	67.2%	82.4%
70+	15.9%	38.4%	64.7%

Internetnutzer* in Deutschland 1997 bis 2018 in Prozent, “mindestens selten genutzt” | ARD/ZDF-Onlinestudie

Make the web accessible for *your future selves.*

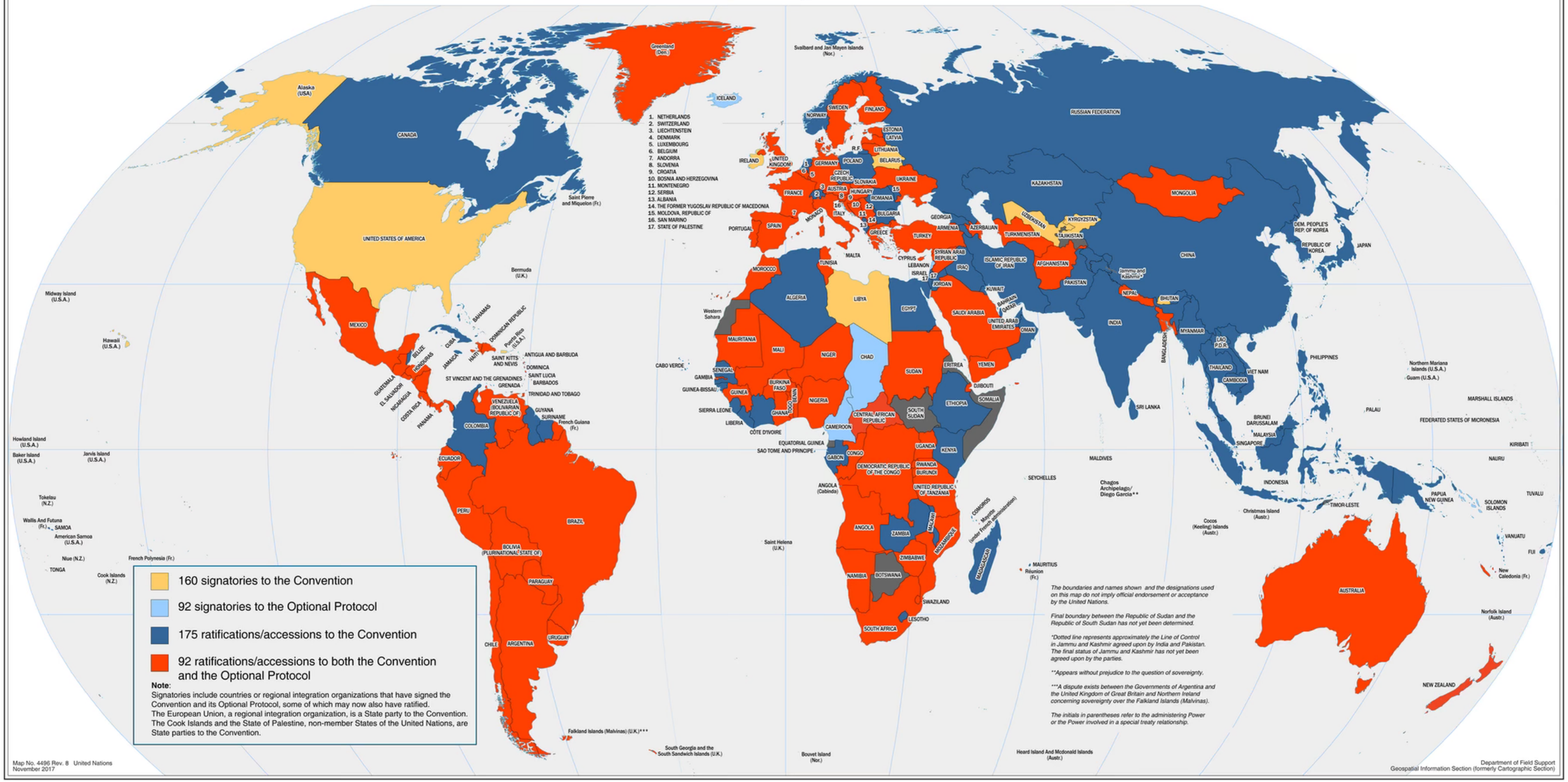
Convention on the **Rights of Persons with Disabilities**

or: "CRPD"

CRPD and Optional Protocol Signatures and Ratifications

Not Signed | Signed Convention | Signed Convention & Protocol | Ratified Convention | Ratified Convention & Protocol

As of 19 September 2017



Map No. 4496 Rev. 8 United Nations
November 2017

Department of Field Support
Geospatial Information Section (formerly Cartographic Section)

CRPD & COS

- Equal opportunities and nondiscrimination, Article 5
- Access to justice, Article 13
- Inclusive education, Article 24
- Participation in political and public life, Article 29

Convention on the Rights of Persons with Disabilities (CRPD)

W3C Accessibility Standards

Standard	Version
Web Content Accessibility Guidelines (WCAG)	2.1 REC
Authoring Tools Accessibility Guidelines (ATAG)	2.0 REC
User Agent Accessibility Guidelines (UAAG)	2.0 NOTE
Website Accessibility Conformance Evaluation Methodology (WCAG-EM)	1.0 NOTE
Accessible Rich Internet Applications (WAI-ARIA)	1.1 REC

Web Content Accessibility Guidelines 2.1

includes:

- Mobile Accessibility Task Force (Mobile A11Y TF)
- Cognitive and Learning Disabilities Accessibility Task Force (Cognitive A11Y TF)
- Low Vision Accessibility Task Force (LVTF)

WCAG 2.1 Supporting Docs

- How to Meet WCAG 2
- Easy Checks
- Evaluation Tools List
- How People with Disabilities Use the Web
- Before and After Demo (BAD)
- Web Accessibility Tutorials

EN 301 549

“Accessibility requirements suitable for public procurement of ICT products and services in Europe”

Principles from WCAG 2

1. Perceivable
2. Operable
3. Understandable
4. Robust

1. Perceivable

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

1. Perceivable

Text Alternatives

Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language.

1. Perceivable

Time-based Media

Provide alternatives for time-based media.

(Captions, Transcripts, Audio Descriptions)

1. Perceivable

Adaptable

Create content that can be presented in different ways (for example simpler layout) without losing information or structure.

1. Perceivable

Distinguishable

Make it easier for users to see and hear content including separating foreground from background.

2. Operable

User interface components and navigation must be operable.

2. Operable

Keyboard Accessible

Make all functionality available from a keyboard.

2. Operable

Enough Time

Provide users enough time to read and use content.

2. Operable

Seizures and Physical Reactions

Do not design content in a way that is known to cause seizures or physical reactions).

2. Operable

Navigable

Provide ways to help users navigate, find content, and determine where they are.

2. Operable

Input Modalities

Make it easier for users to operate functionality through various inputs beyond keyboard.

3. Understandable

Information and the operation of user interface must be understandable.

3. Understandable

Readable

Make text content readable and understandable.

3. Understandable

Predictable

Make Web pages appear and operate in predictable ways.

3. Understandable

Input Assistance

Help users avoid and correct mistakes.

4. Robust

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

4. Robust

Compatible

Maximize compatibility with current and future user agents, including assistive technologies.

Principles & Guidelines:

The Spirit of the Law

Success Criteria:

The Letter of the Law

3 Levels:

A — AA — AAA

SCs by Level in WCAG 2.0 and 2.1

WCAG	A	AA	AAA	Sum
2.0	25 SCs	13 SCs	23 SCs	61 SCs
2.1	30 SCs	20 SCs	28 SCs	78 SCs

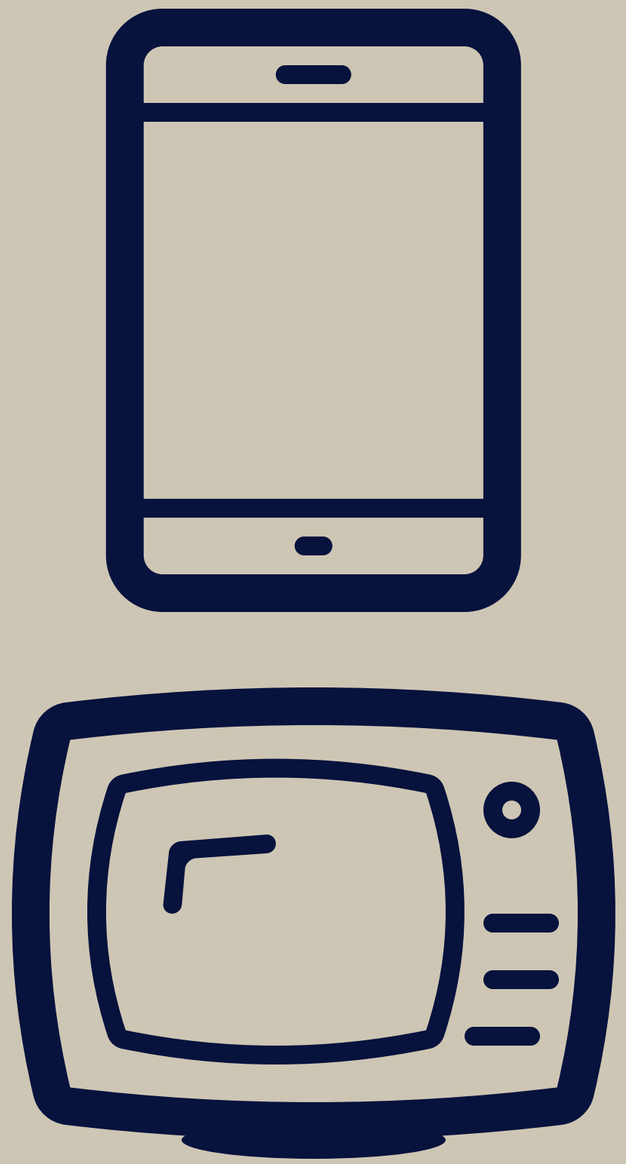

AA+

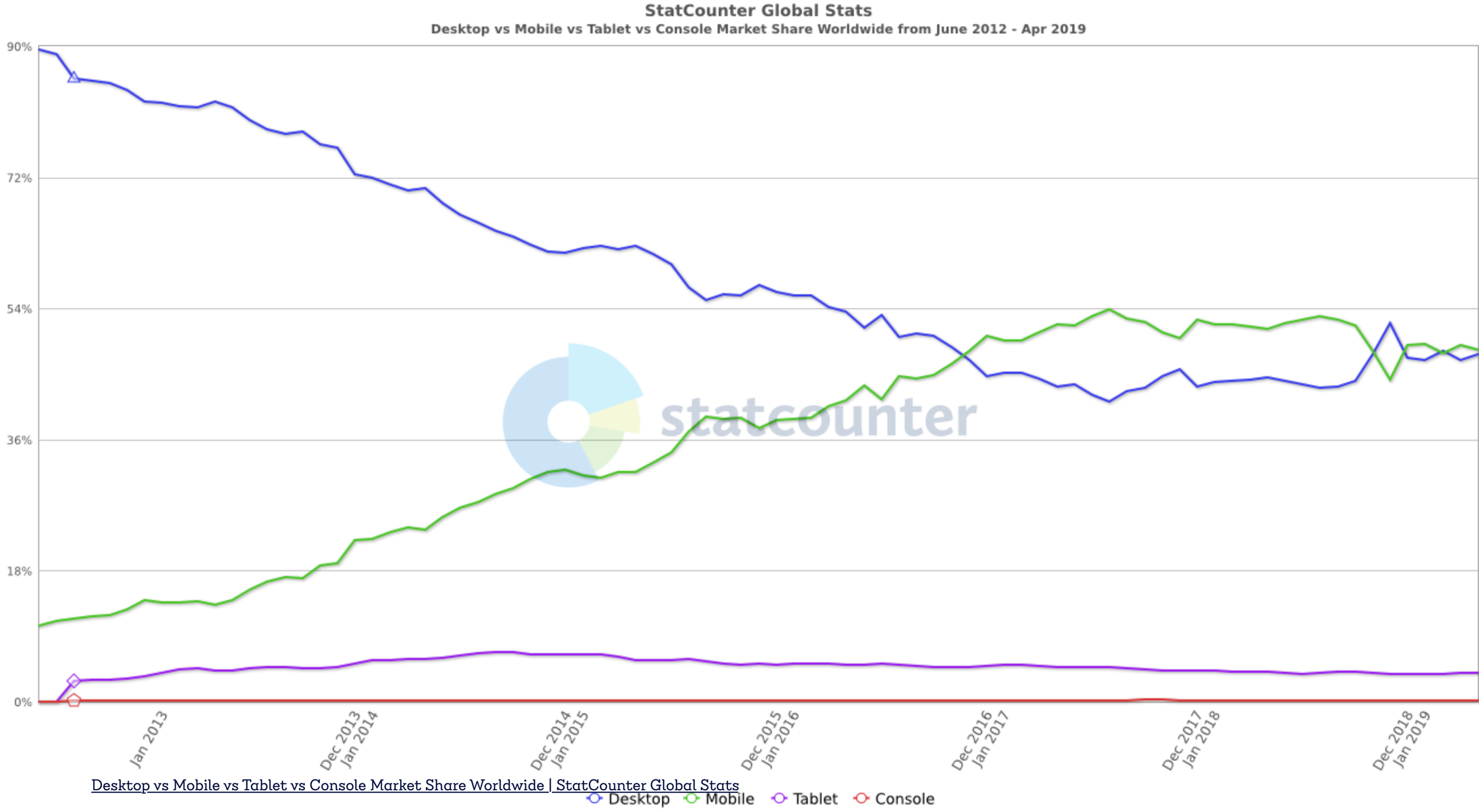
Technically accessible does not necessarily mean usable by people with disabilities.

Building the most inaccessible site possible with a perfect Lighthouse score

Manuel Matuzovic, May 31, 2019

Multi-Screen Design





Desktop vs Mobile vs Tablet vs Console Market Share Worldwide | StatCounter Global Stats

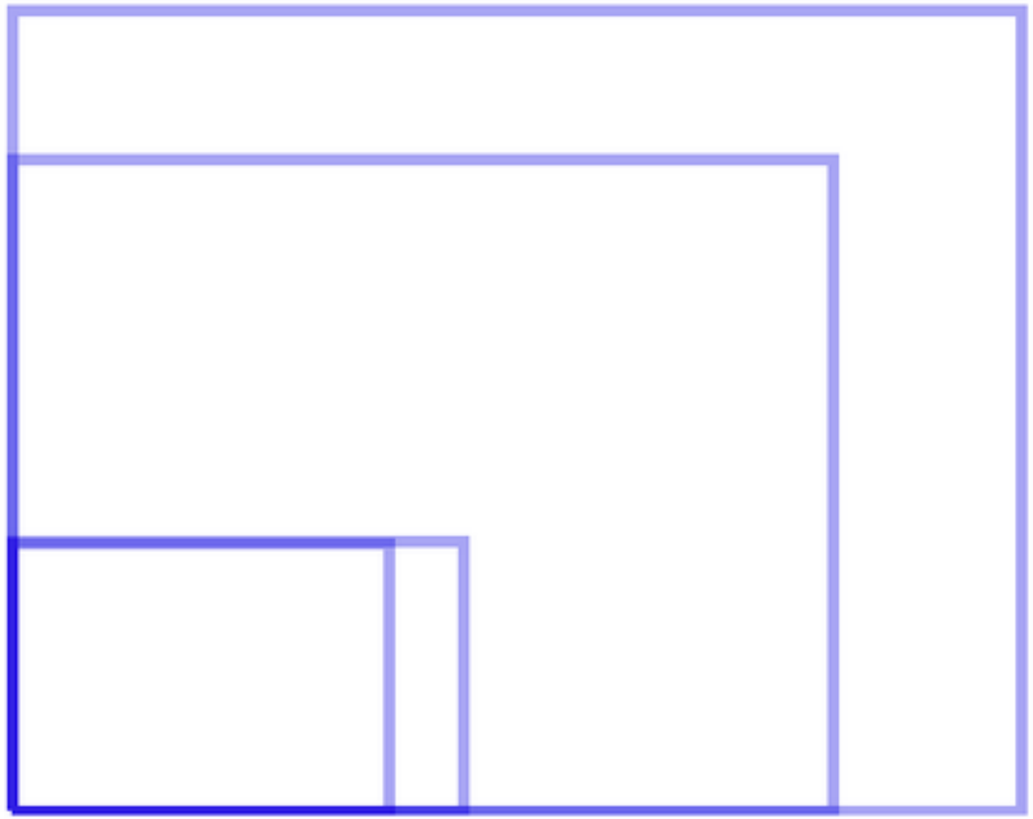
Responsive Web Design

Rather than tailoring disconnected designs to each of an ever-increasing number of web devices, we can treat them as facets of the same experience. We can design for an optimal viewing experience, but embed standards-based technologies into our designs to make them not only more flexible, but more adaptive to the media that renders them. In short, we need to practice responsive web design.

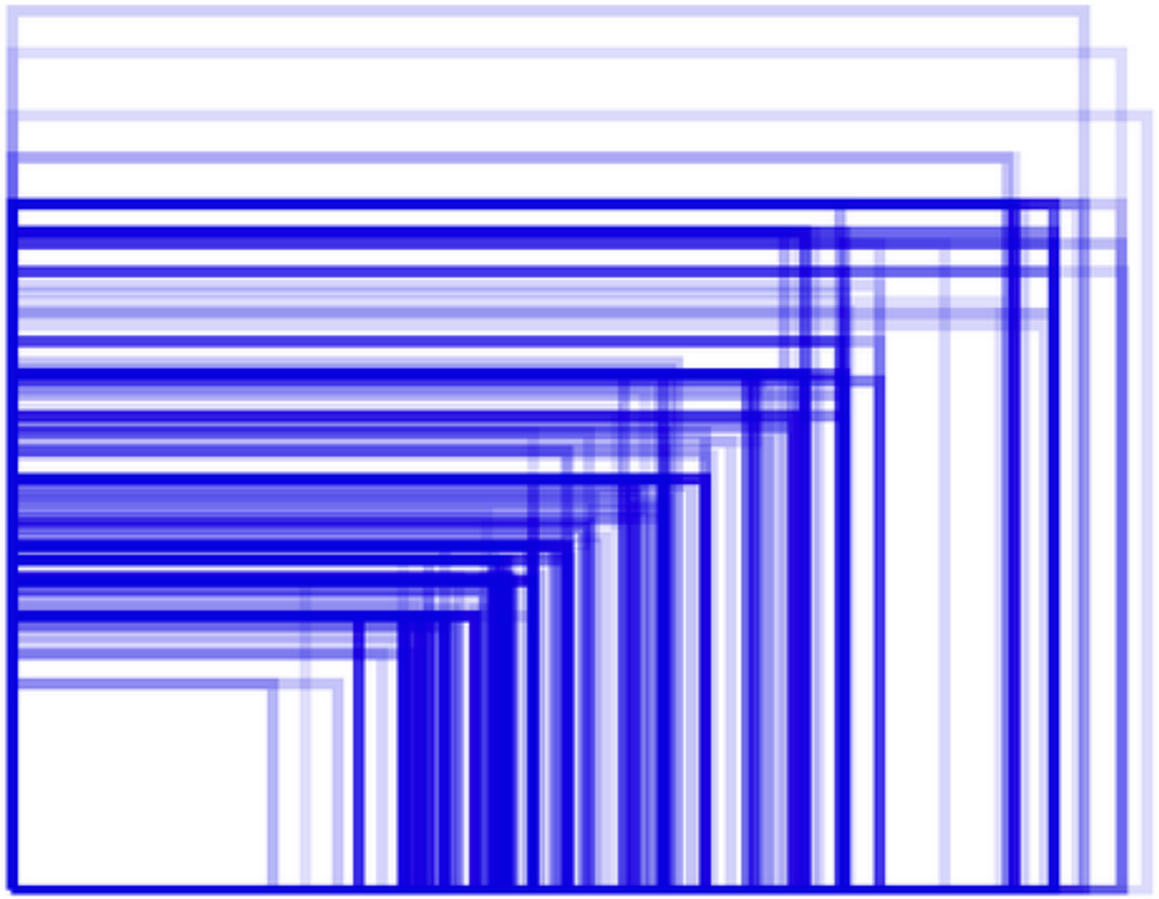
— Ethan Marcotte, Responsive Web Design**, A List Apart,**
May 25, 2010

Source: Devices | Brad Frost | Flickr

iOS device screen sizes



Android device screen sizes



Graphic courtesy of OpenSignal.com

Embrace the web medium

The control which designers know in the print medium, and often desire in the web medium, is simply [...] the limitation of the printed page. We should embrace the fact that the web doesn't have the same constraints, and design for this flexibility.

— **John Allsopp,** A List Apart: A Dao of Web Design,
April 07, 2000

Mobile web stats

- 655 million people used Facebook **exclusively** on their mobile phones – almost 50%[fbsrc]
  (June 2012: 102m/July 2014: 399m[fbsrc2])
- 34.7% of „Black Friday" traffic 2014, 14.6% on tablets
  (Mobile: 2012: 24%, 2011: 14,3%, 2010: 5,5%)

[fbsrc] Nearly half of Facebook's users only access the service on mobile | VentureBeat

[fbsrc2] Facebook's new stats: 1.32 billion users, 30 percent only use it on their phone - The Verge

Facets of the same experience

Rather than tailoring disconnected designs to each of an ever-increasing number of web devices, we can treat them as facets of the same experience. We can *design for an optimal viewing experience*, but embed standards-based technologies into our designs to *make them not only more flexible, but more adaptive to the media* that renders them.

— Ethan Marcotte A List Apart: Responsive Web Design,
May 25, 2010

Basic Concepts of RWD

- Flexible Grid
- Flexible Media
- CSS3 MediaQueries

Media Queries

```
@media screen and (max-device-width: 480px) {
  .column {
    float: none;
  }
}
```

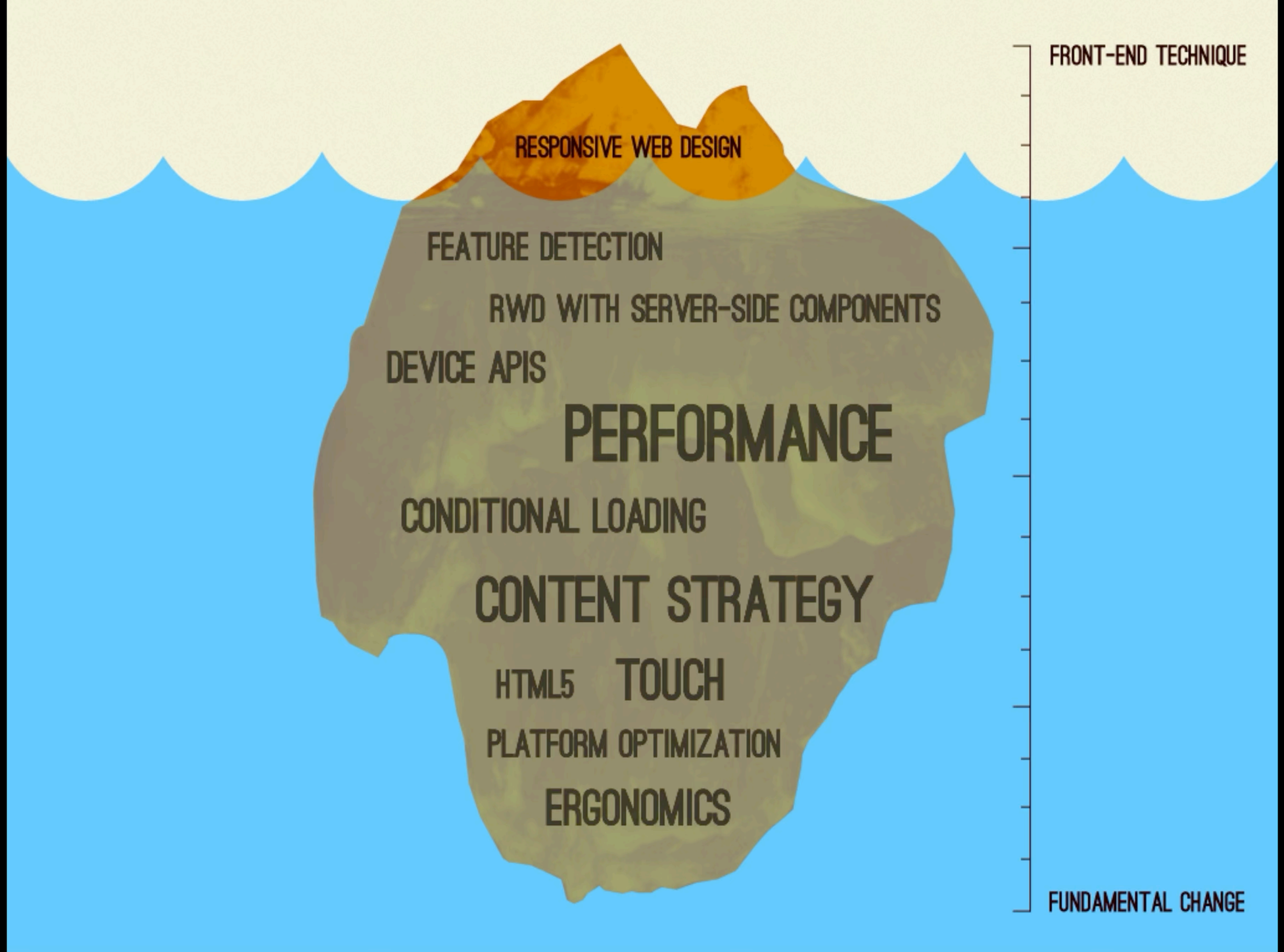
```
.figure {
  float: left;
  margin: 0 3.3175355545023696682% 1.5em 0;    /* 21px / 633px */
  width: 31.121642969984202211%;               /* 197px / 633px */
}
li#f-mycroft, li#f-winter {
  margin-right: 0;
}

@media screen and (max-width: 400px) {
  .figure,
  li#f-mycroft {
    margin-right: 3.3175355545023696682%;    /* 21px / 633px */
    width: 48.341232227488151658%;           /* 306px / 633px */
  }
  li#f-watson, li#f-moriarty {
    margin-right: 0;
  }
}

@media screen and (min-width: 1300px) {
  .figure,
  li#f-mycroft {
    margin-right: 3.3175355545023696682%;    /* 21px / 633px */
    width: 13.902053712480252764%;           /* 88px / 633px */
  }
}
```

DEMO

Examples

- Stripe
- Tatiana Mac
- The Guardian
- A List Apart
- Slate Magazine

THIS IS JUST THE TIP OF THE ICEBERG.


FRONT-END TECHNIQUE
RESPONSIVE WEB DESIGN
FEATURE DETECTION
RWD WITH SERVER-SIDE COMPONENTS
DEVICE APIS
PERFORMANCE
CONDITIONAL LOADING
CONTENT STRATEGY
HTML5
TOUCH
PLATFORM OPTIMIZATION
ERGONOMICS
FUNDAMENTAL CHANGE

Additional Principles

- Ubiquity
- Flexibility
- Performance
- Progressive Enhancement
- Sustainability

Ubiquity


WEB
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WEB
WEB

The One Web

- Thematic consistency
- Same URL, same content

Give the user what they want, when they want it.

71%

of mobile users expect that websites ***load at least as fast*** as on the desktop[loadingstats]

---

loadingstats New Study Reveals the Mobile Web Disappoints Global Consumers | Compuware Corporation

5s

is the maximum time **74%** of mobile users are willing wait for a website to load.

After that they walk away.

2MB

Average weight of web page 💾

86%

of responsive websites weight *as much* in their mobile view as they do in the desktop view

The Website Obesity Crisis

Maciej Cegłowski, 2015

Performance is Invisible

Performance is Design

RWD

≠

one size fits all

Progressive Enhancement

@supports

CSS Feature Queries

CSS Grid Layout (level 1) - CR

Method of using a grid concept to lay out content, providing a mechanism for authors to divide available space for layout into columns and rows using a set of predictable sizing behaviors. Includes support for all `grid-*` properties and the `fr` unit.

Usage % of all users ?

Global	89.78% + 2.58% =	92.36%
unprefixed:	89.78%	
U.S.A.	90.98% + 2.28% =	93.26%
unprefixed:	90.98%	

show more...

Current aligned | Usage relative | Date relative | Apply filters | Show all | ?

IE	Edge *	Firefox	Chrome	Safari	iOS Safari *	Opera Mini *	Chrome for Android	UC Browser for Android	Samsung Internet
			49						
			72		11.4				4
	17	66	73	12	12.1				8.2
2 11	18	67	74	12.1	12.2	all	74	11.8	9.2
	75	68	75	TP					
		69	76						
			77						

Notes | Known issues (3) | Resources (13) | Feedback

See also support for subgrids

1 Enabled in Chrome through the "experimental Web Platform features" flag in chrome://flags

2 Partial support in IE refers to supporting an older version of the specification.

Can I use... CSS Grid Layout (Level 1)

Can I use... CSS Subgrid

CSS Feature Queries - CR

CSS Feature Queries allow authors to condition rules based on whether particular property declarations are supported in CSS using the @supports at rule.

Usage % of all users ?

Global	94.71%
U.S.A.	93.94%
Germany	91.19%

Current aligned | Usage relative | Date relative | Apply filters | Show all | ?

IE	Edge *	Firefox	Chrome	Safari	iOS Safari *	Opera Mini *	Chrome for Android	UC Browser for Android	Samsung Internet
			49						
			72		11.4				4
	17	66	73	12	12.1				8.2
11	18	67	74	12.1	12.2	all	74	11.8	9.2
	75	68	75	TP					
		69	76						
			77						

Notes | Known issues (2) | Resources (7) | Feedback

See also the CSS.supports() DOM API

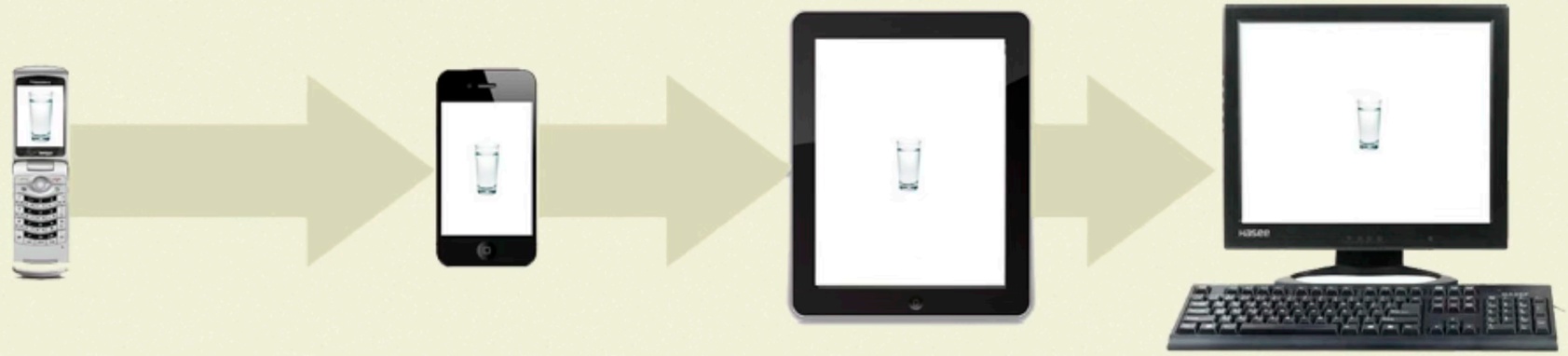
Can I use... CSS Feature Queries

```
.main { width: 45%  ; }
.div1 { float: left ; }
.div2 { float: right; }

@supports (display: grid;) {
    .main {
        display: grid;
        grid-columns-template: 1fr 1fr;
    }
}
```

MOBILE LAST (DEGRADED, SHOE-HORNED, SHORT-SIGHTED, CRAPPY)

MOBILE FIRST (PROGRESSIVELY ENHANCED, FUTURE-FRIENDLY, AWESOME)



Brad Frost: Mobile-First Responsive Web Design

bradfrostweb.com/blog/web/mobile-first-responsive-web-design

Embrace the

unforseeable


play
date
B
A

Summary

1. We don't know what the next trend is.
2. We don't have any control.
3. Base Principles: Flexible Grid and Media, CSS3 MediaQueries
4. Basic Principles: Ubiquity, Flexibility, Performance, Progressive Enhancement, Sustainability

Web Accessibility

Getting Started

Web Accessibility Perspectives

Explore the Impact and Benefits for Everyone

10 Short Video Introductions

How People with Disabilities use the Web

- Stories of Web Users
- Diverse Ability and Barriers
- Tools and Techniques

Tips for Getting Started

- Designing
- Writing
- Developing
- (more in development)

The End