



Designing for Everyone: Building Great Web Experiences for Any Device

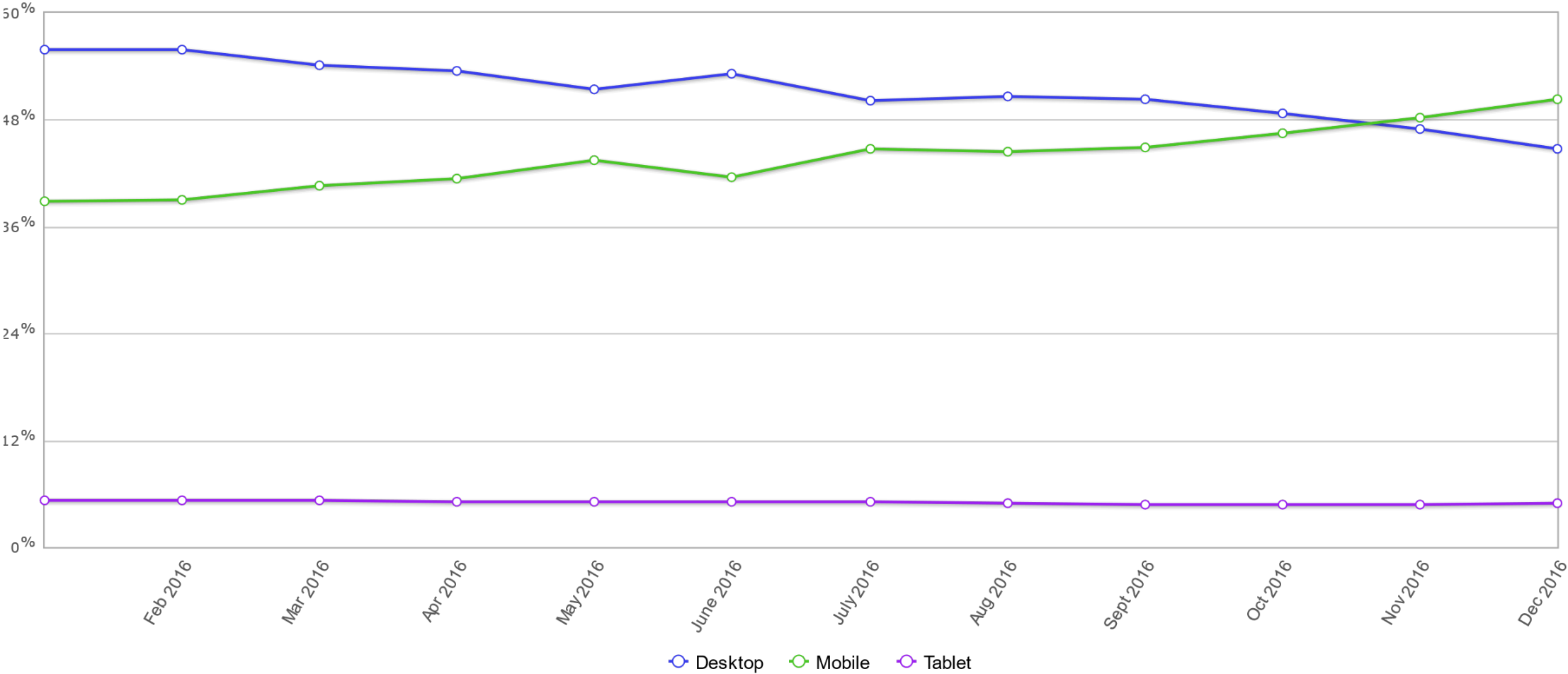
Aaron Gustafson

BRK2411



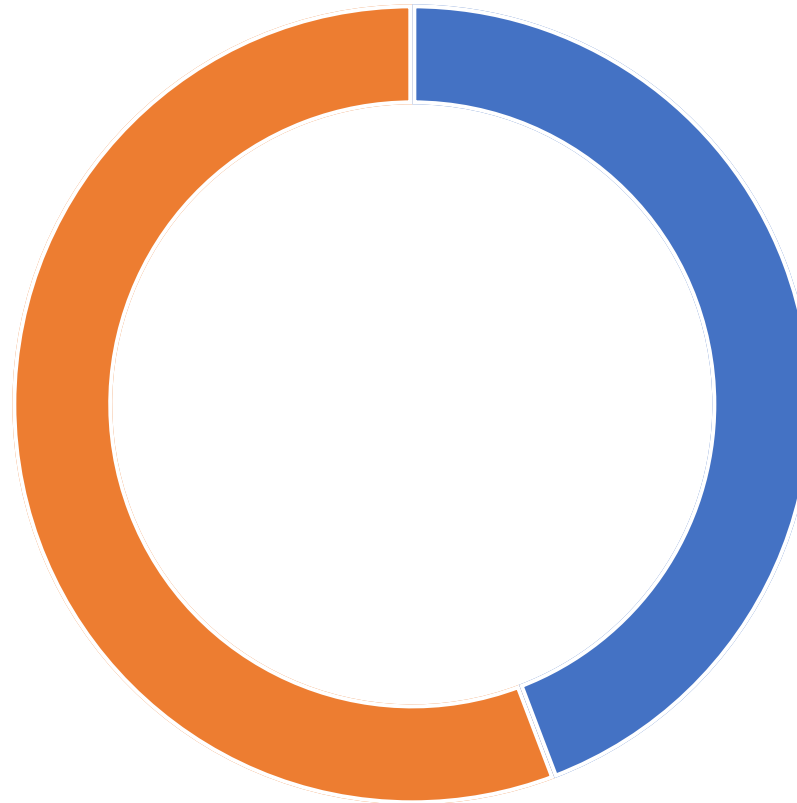
In October of 2016, mobile ate the desktop...

Mobile traffic overtakes desktop globally



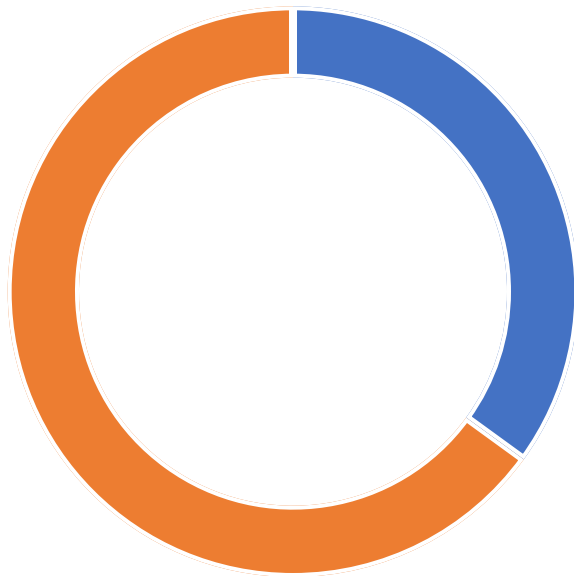
Mobile accounts for 56% of all traffic*

*Based on 77 billion website visits.



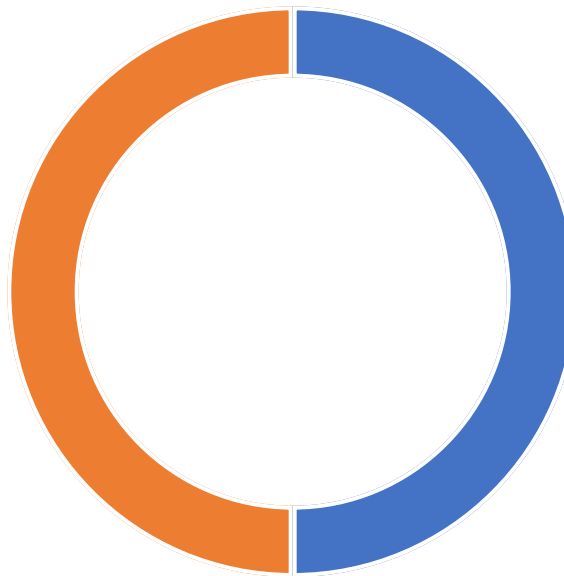
But the numbers differ by industry

Food



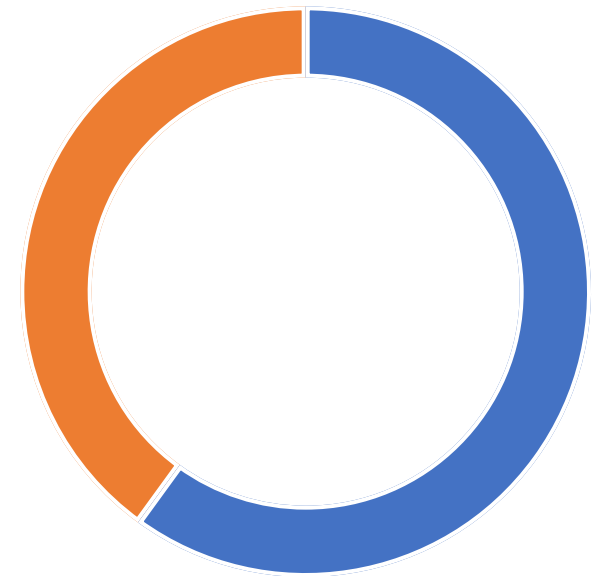
● Desktop ● Mobile

News



● Desktop ● Mobile

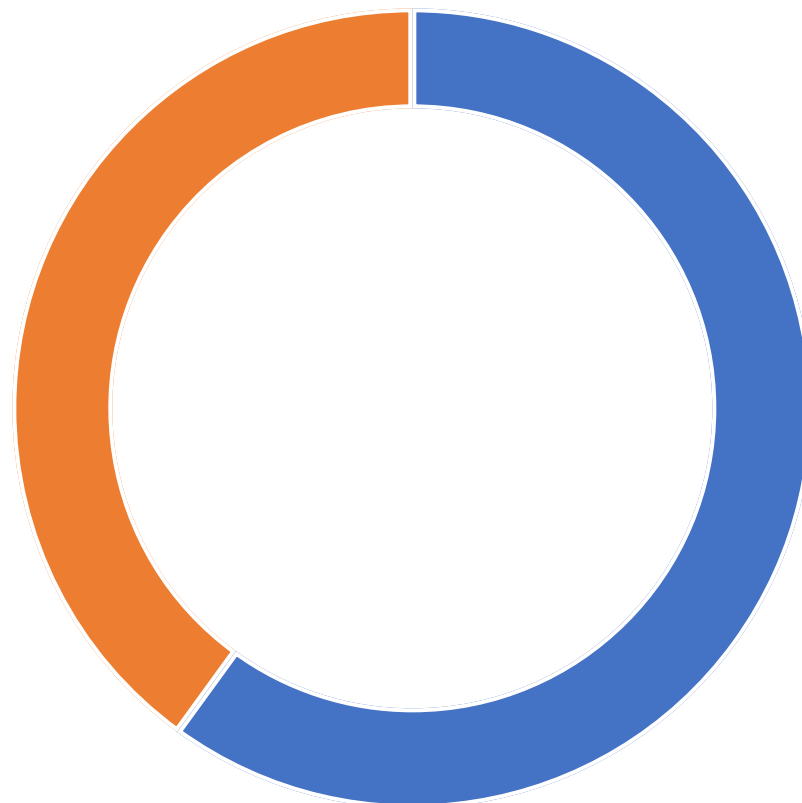
Finance



● Desktop ● Mobile

Desktop users spend more time on sites (60%)*

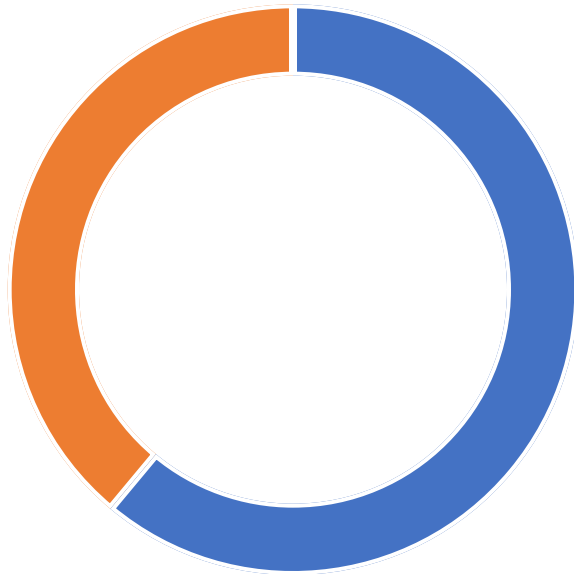
*Based on 39 trillion seconds.



● Desktop
● Mobile

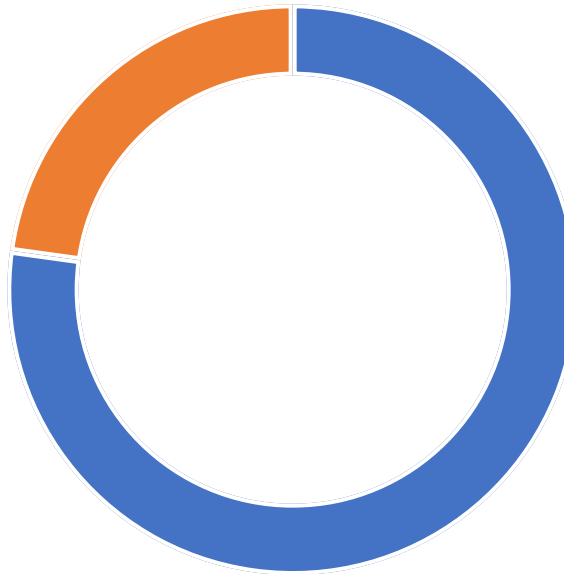
Anywhere from 10-300%

Food



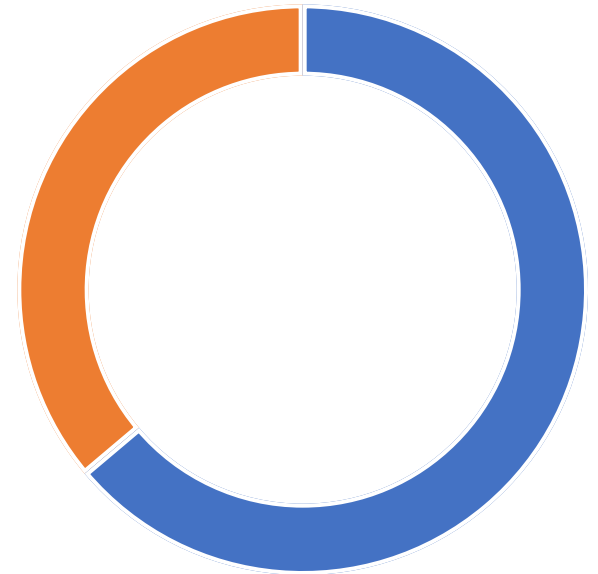
● Desktop ● Mobile

News



● Desktop ● Mobile

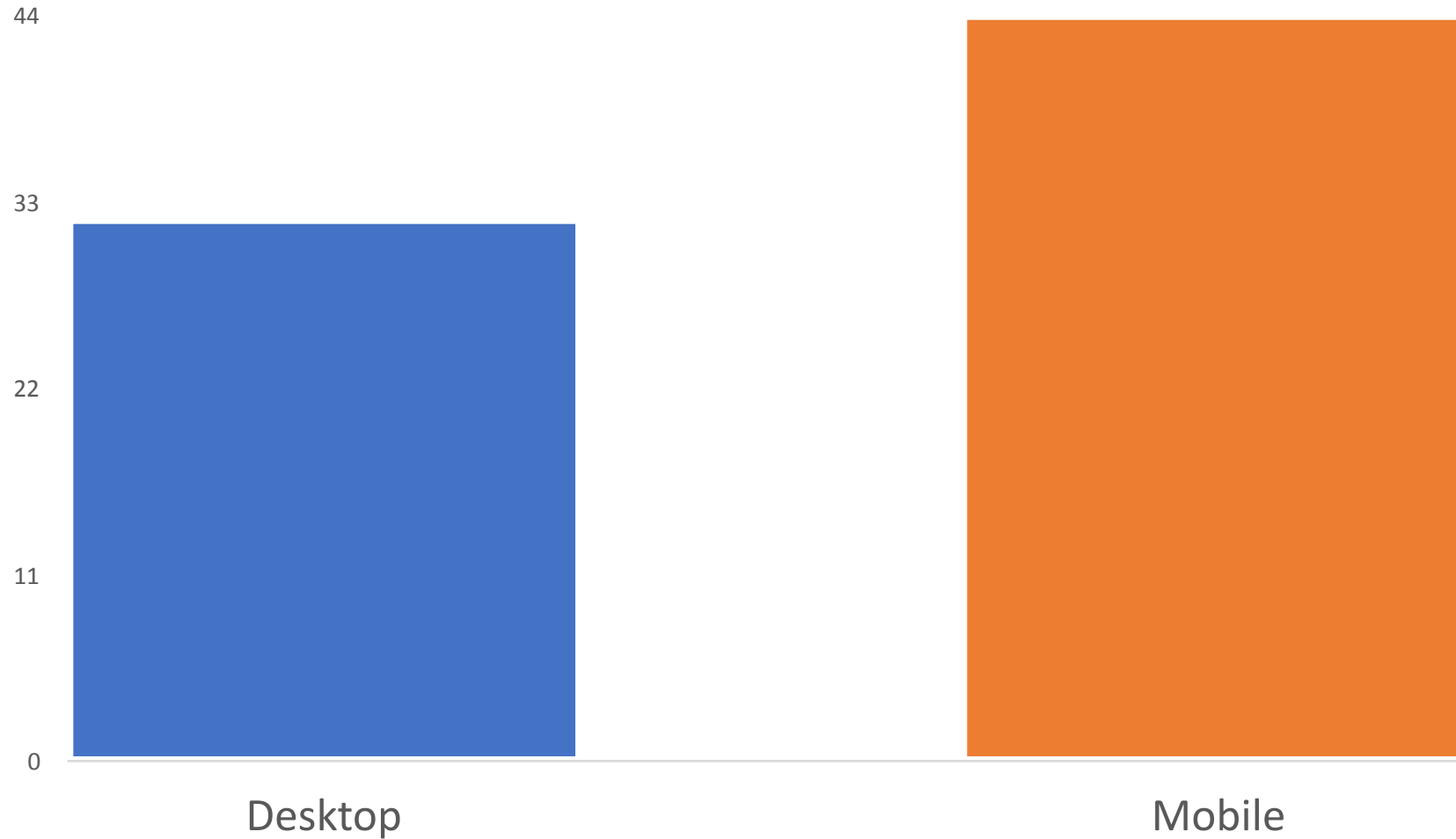
Finance



● Desktop ● Mobile

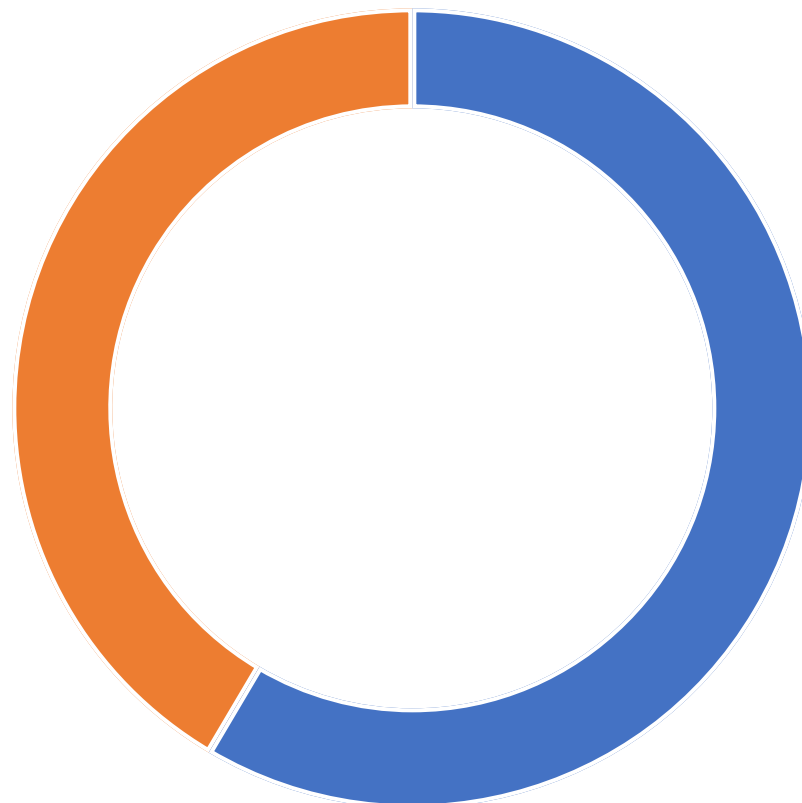
Bounce rates on mobile are 40% higher than desktop*

*Based on 584 billion page views.



Desktop users view more pages (59%)

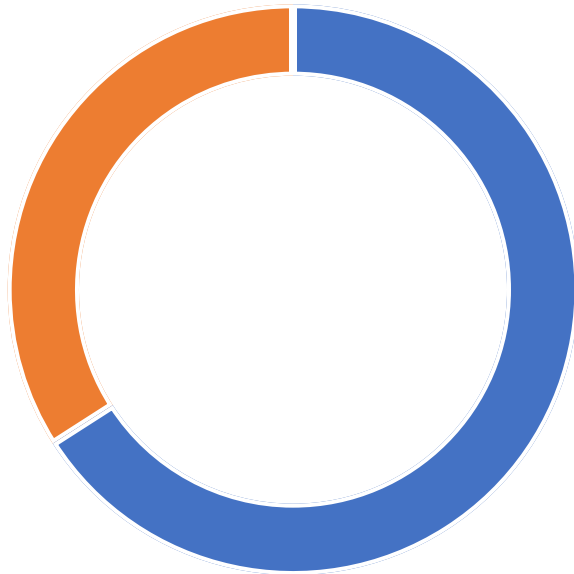
*Based on 584 billion page views.



● Desktop
● Mobile

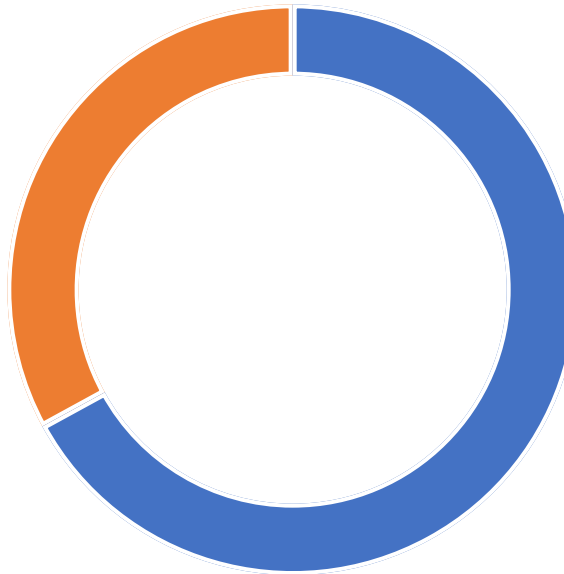
Anywhere from 1.5x to 3x more pages per visit

Food



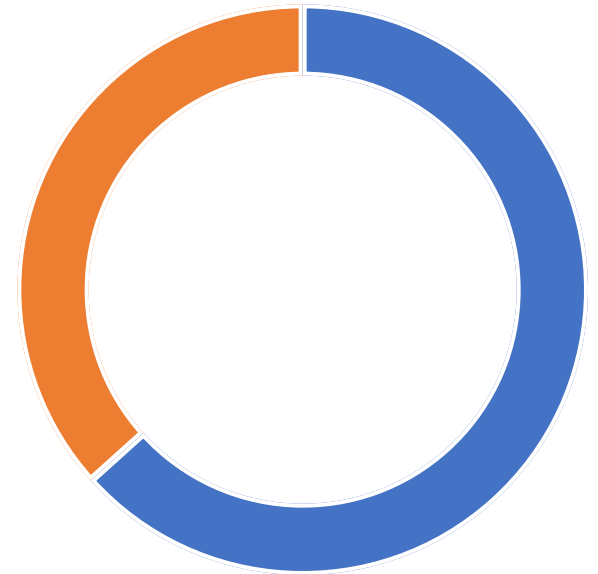
● Desktop ● Mobile

News



● Desktop ● Mobile

Finance

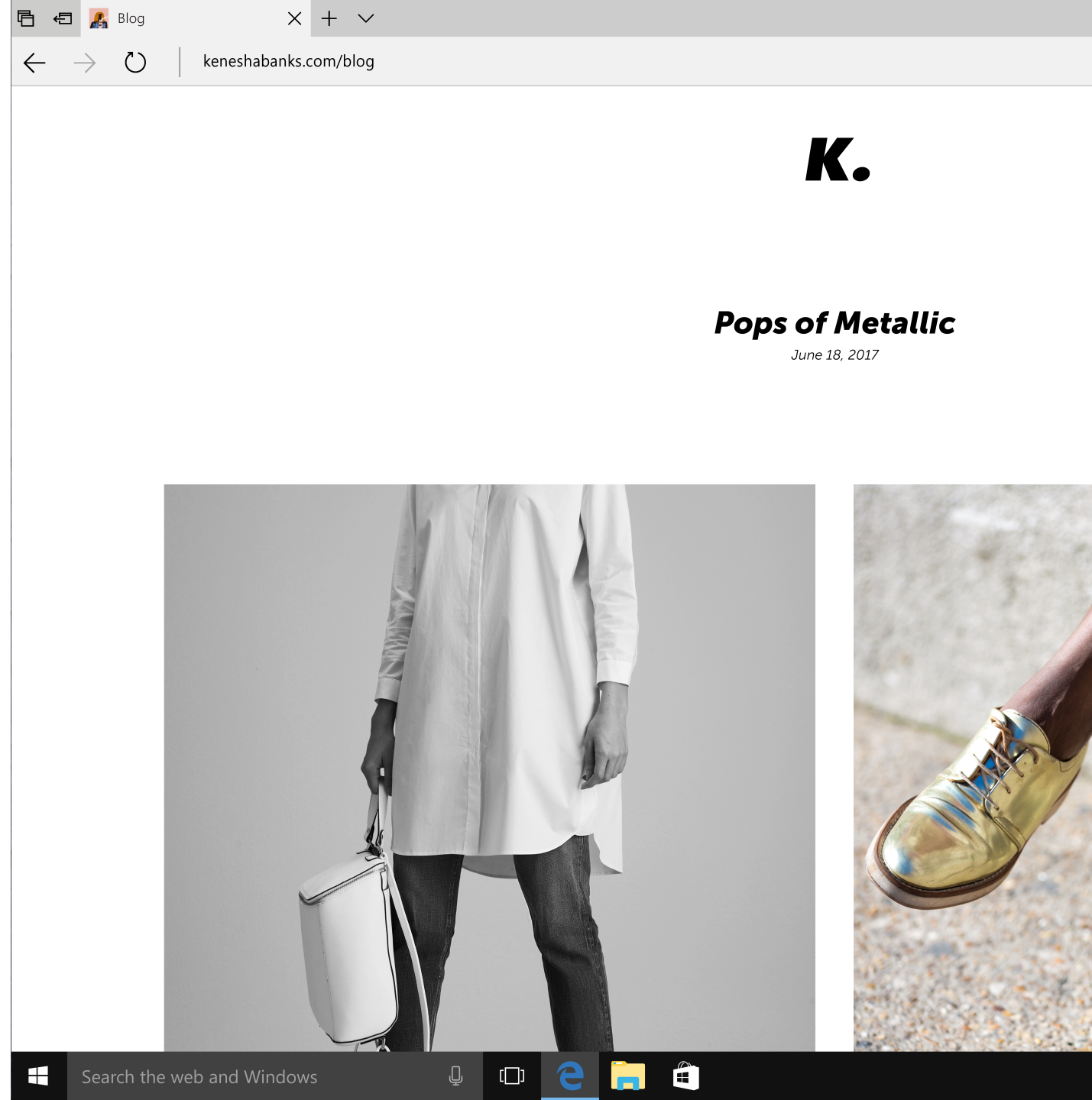


● Desktop ● Mobile

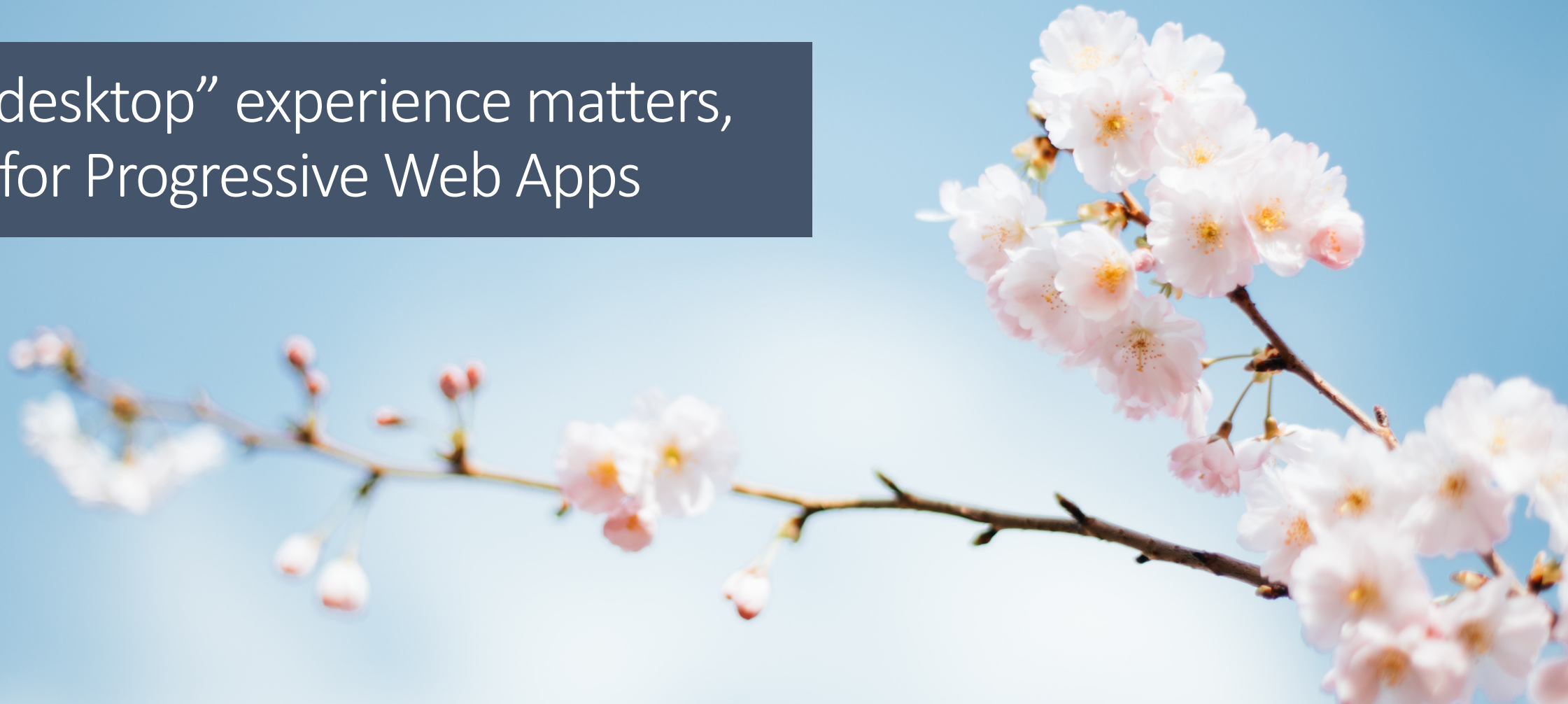
The “desktop” experience matters



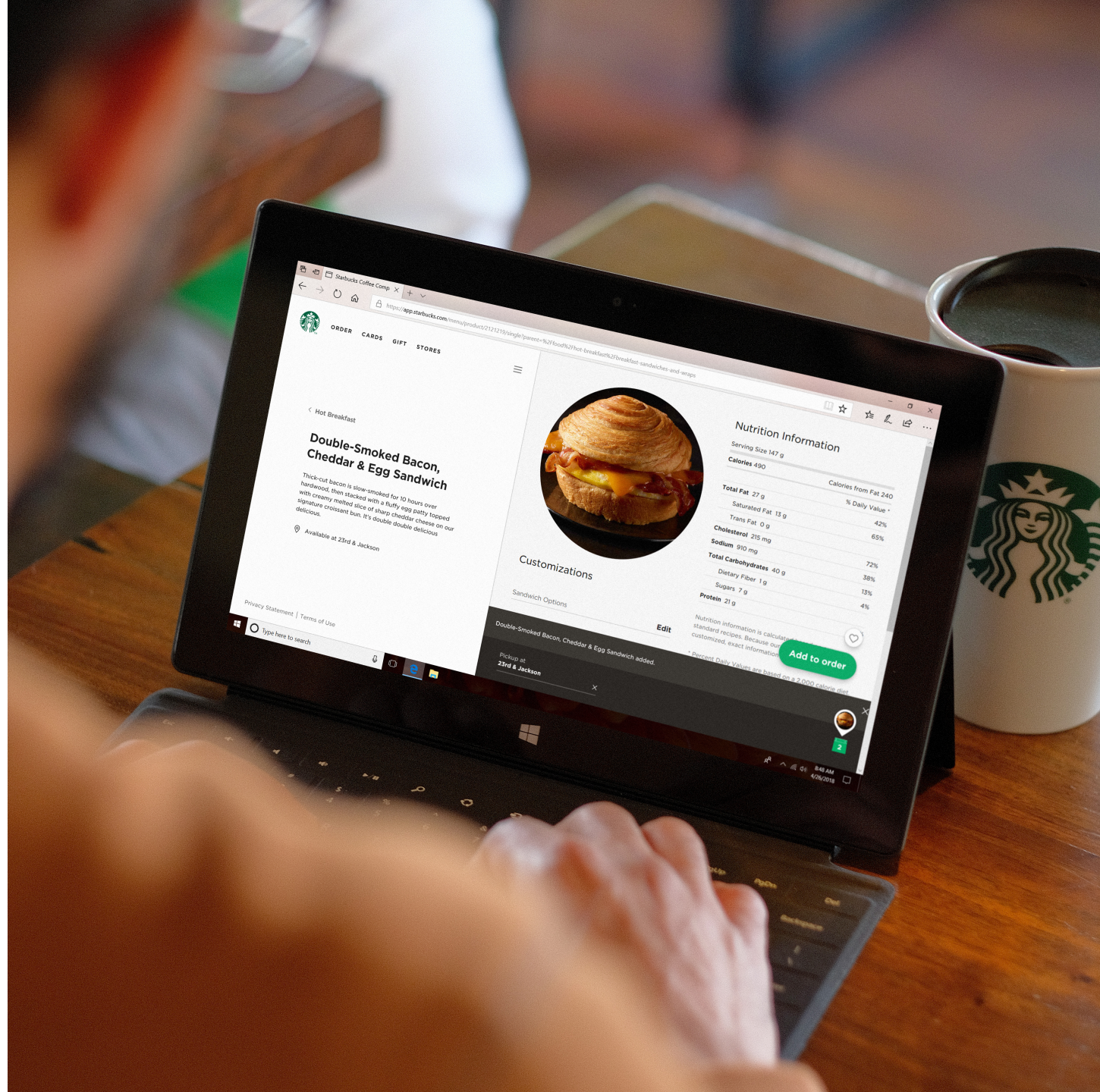
Web browsing is
the #1 user activity
on PCs



The “desktop” experience matters,
even for Progressive Web Apps



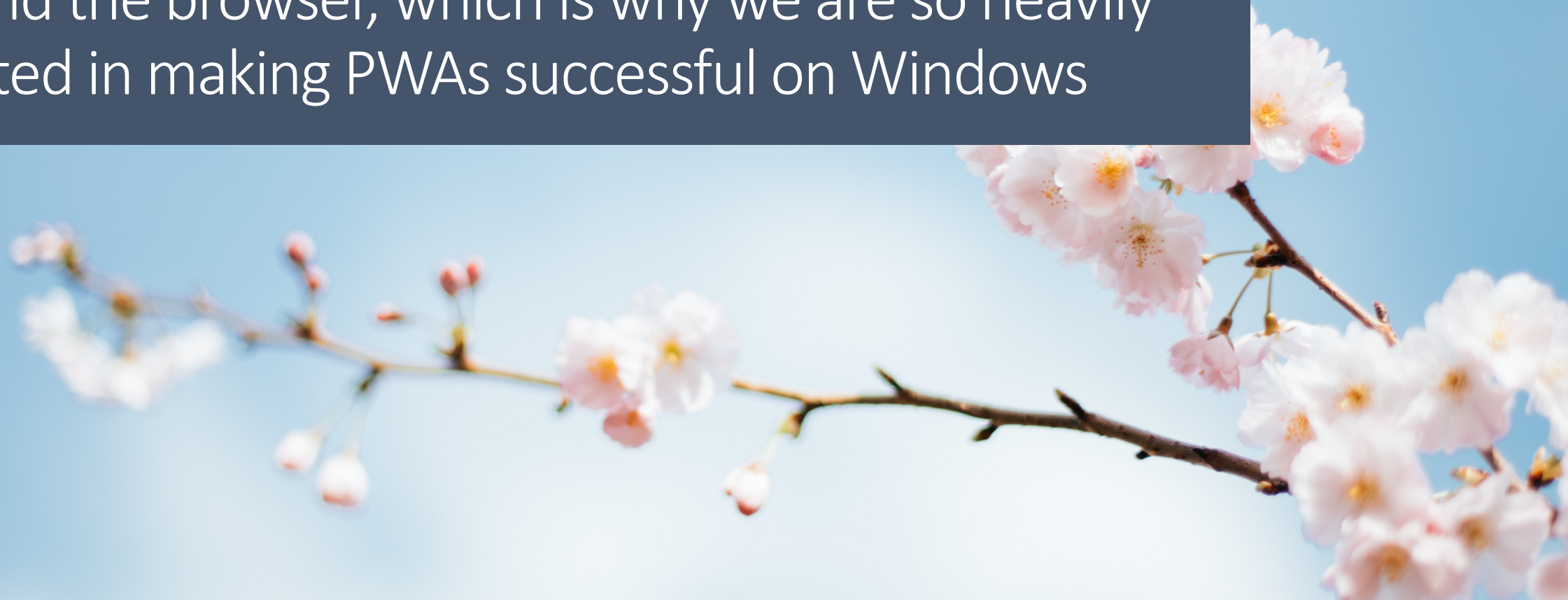
40% of Order Ahead transactions on the Starbucks PWA come from desktop



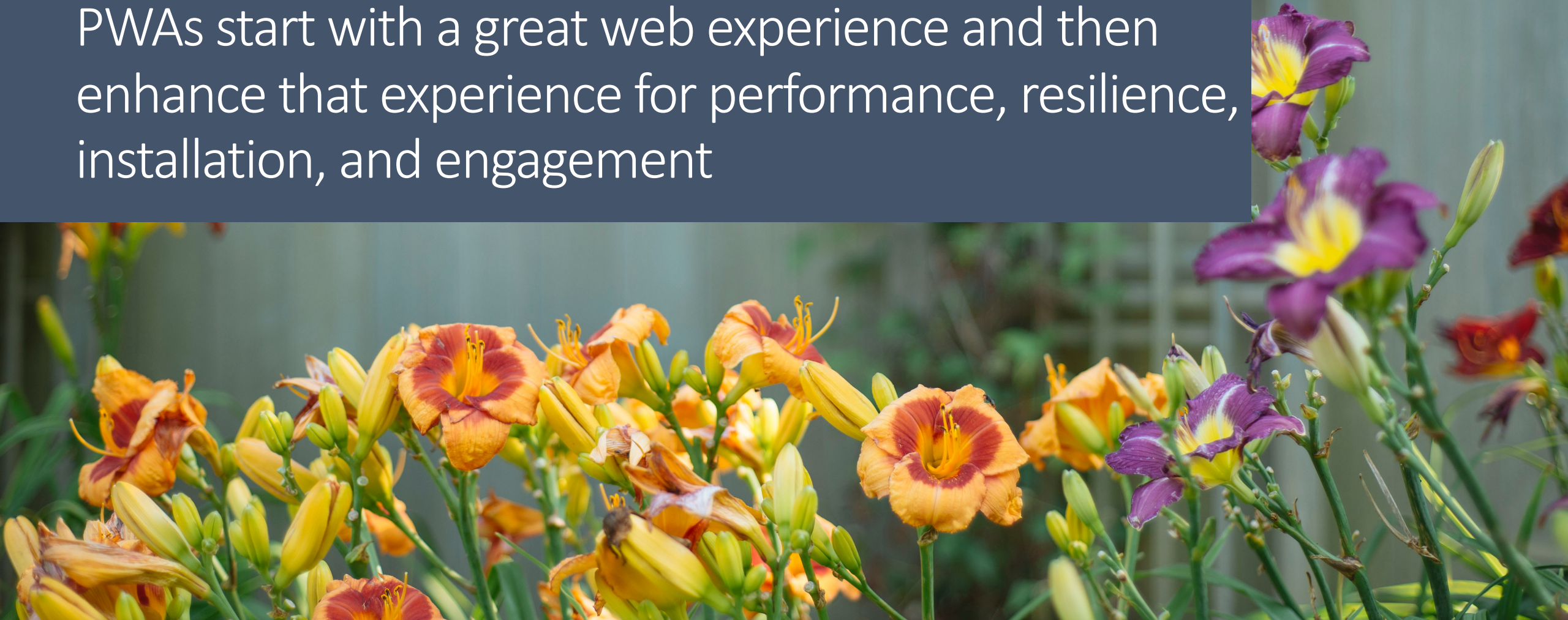
Carnival Cruise Line saw
a 16% opt-in
for Push Notifications
on desktop



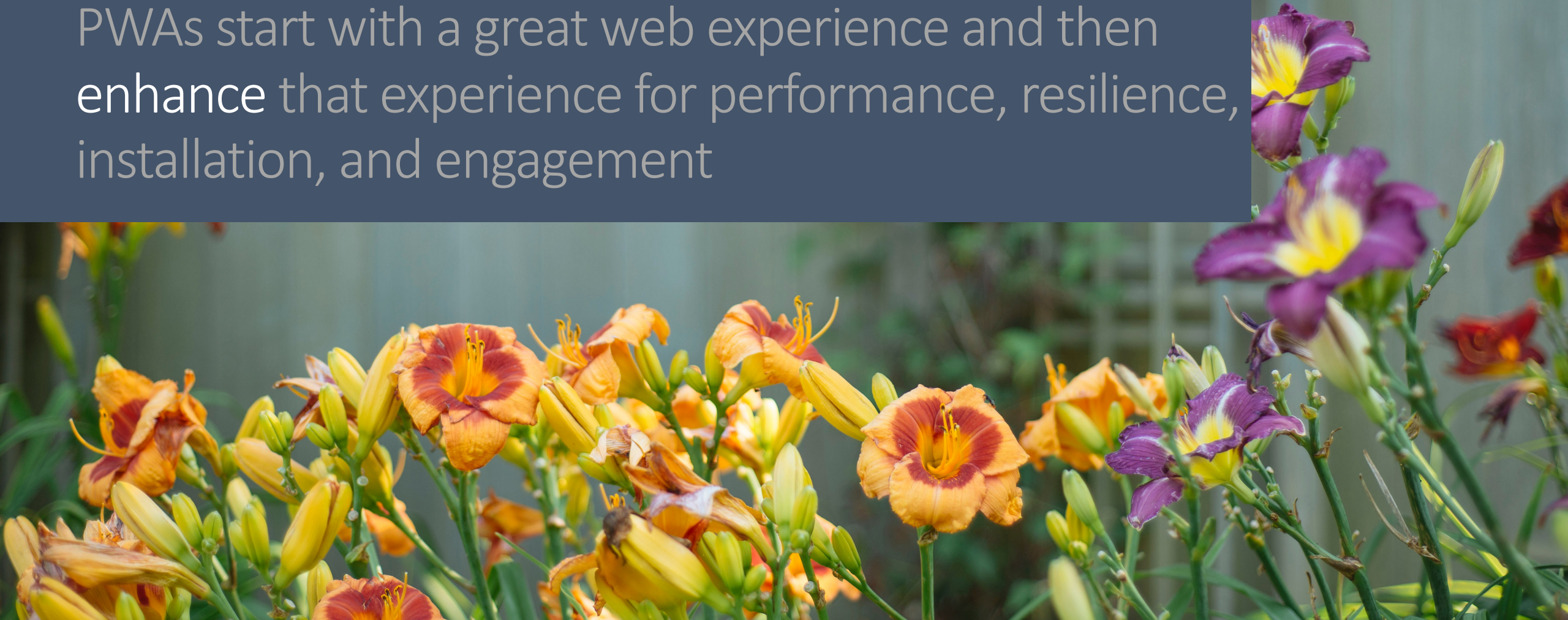
We believe the web can (and should) reach beyond the browser, which is why we are so heavily invested in making PWAs successful on Windows



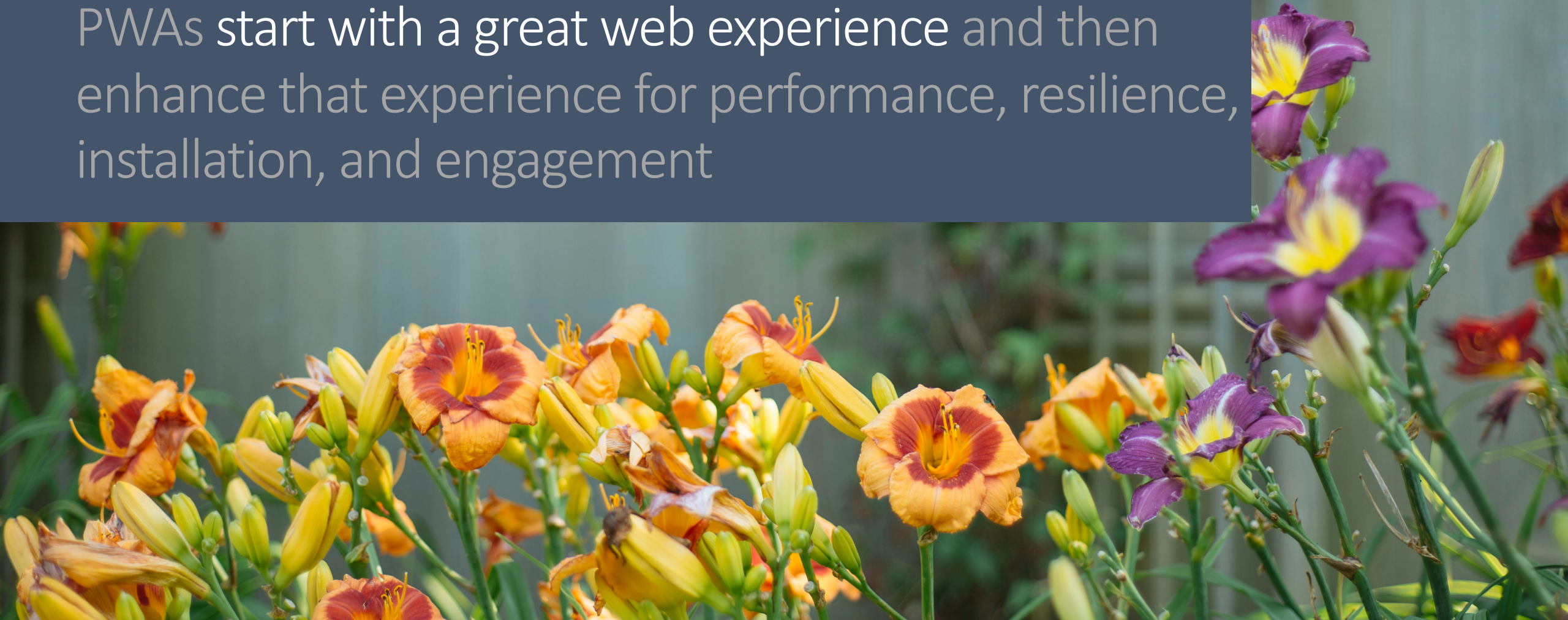
PWAs start with a great web experience and then enhance that experience for performance, resilience, installation, and engagement



PWAs start with a great web experience and then enhance that experience for performance, resilience, installation, and engagement



PWAs start with a great web experience and then enhance that experience for performance, resilience, installation, and engagement



Progressive

/prə'gresiv/

happening or developing gradually or in stages; proceeding step by step



A photograph of a mountain landscape. In the foreground, several purple crocuses with yellow centers are in bloom, growing from a field of dry, yellowish-brown grass. The background shows a valley with patches of snow and distant, snow-capped mountains under a cloudy sky. A dark blue rectangular box is overlaid on the left side of the image, containing white text.

Step 1

Focus on what matters

Consider forbes.com circa 2007

Forbes.com

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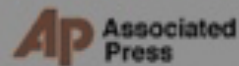
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Associated Press

Book Is Inside Look at War on Terror

By PETE YOST 09.07.07, 3:25 PM ET



WASHINGTON -Vice President Dick Cheney and other Bush administration officials "blew through" legal constraints they didn't like and weakened the presidency with a go-it-alone approach in the war on terror, a former Justice Department official writes in a new book.

In "The Terror Presidency," former assistant attorney general Jack Goldsmith details what he calls "one of the underappreciated stories in the war on terror."

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alistapart.com/article/the-illusion-of-control-in-web-design#comments

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ARTICLES EVENTS TOPICS WRITE FOR US

A LIST APART

The Illusion of Control in Web Design

by [Aaron Gustafson](#) · April 26, 2018

Published in [Code](#)

“Mobile first” thinking

and robust and engaging web experiences. We scrutinize every detail of an end hours getting the animation swing just right. We refactor our tiny fractions of a second off load times. We control absolutely everything we can, but the harsh reality is that we control less than we think.

Last week, two events reminded us, yet again, of how right Douglas Crockford was when he declared the web “the most hostile software engineering environment imaginable.” Both were serious enough to take down an entire site—actually hundreds of entire sites, as it turned out. And both were avoidable.

In understanding what we control (and what we don’t), we will build resilient, engaging products for our users.

What happened?

The first of these incidents involved the launch of Chrome 66. With that release, Google implemented a security patch with serious implications for folks who weren’t paying attention. You might recall that [quite a few questionable SSL certificates issued by Symantec Corporation’s PKI began to surface](#) early last year. Apparently, Symantec had

A Book Apart:
Brief books for people who make websites.

An Event Apart:
3 days of design, code, and content for web & UX designers & devs.

6 comments

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Become a patron

11:27 AM 5/1/2018

A photograph of a mountain landscape with snow patches and purple crocuses in the foreground. A dark blue semi-transparent banner is overlaid on the middle of the image, containing white text. The background shows a range of mountains under a cloudy sky.

Remember that text is the first interface

A scenic landscape photograph featuring a field of purple crocuses in the foreground, growing through dry, yellowish-brown grass. In the background, there are snow-capped mountains under a cloudy sky. A dark blue semi-transparent box is overlaid on the left side of the image, containing white text.

Is there anything missing that would help users be more successful?

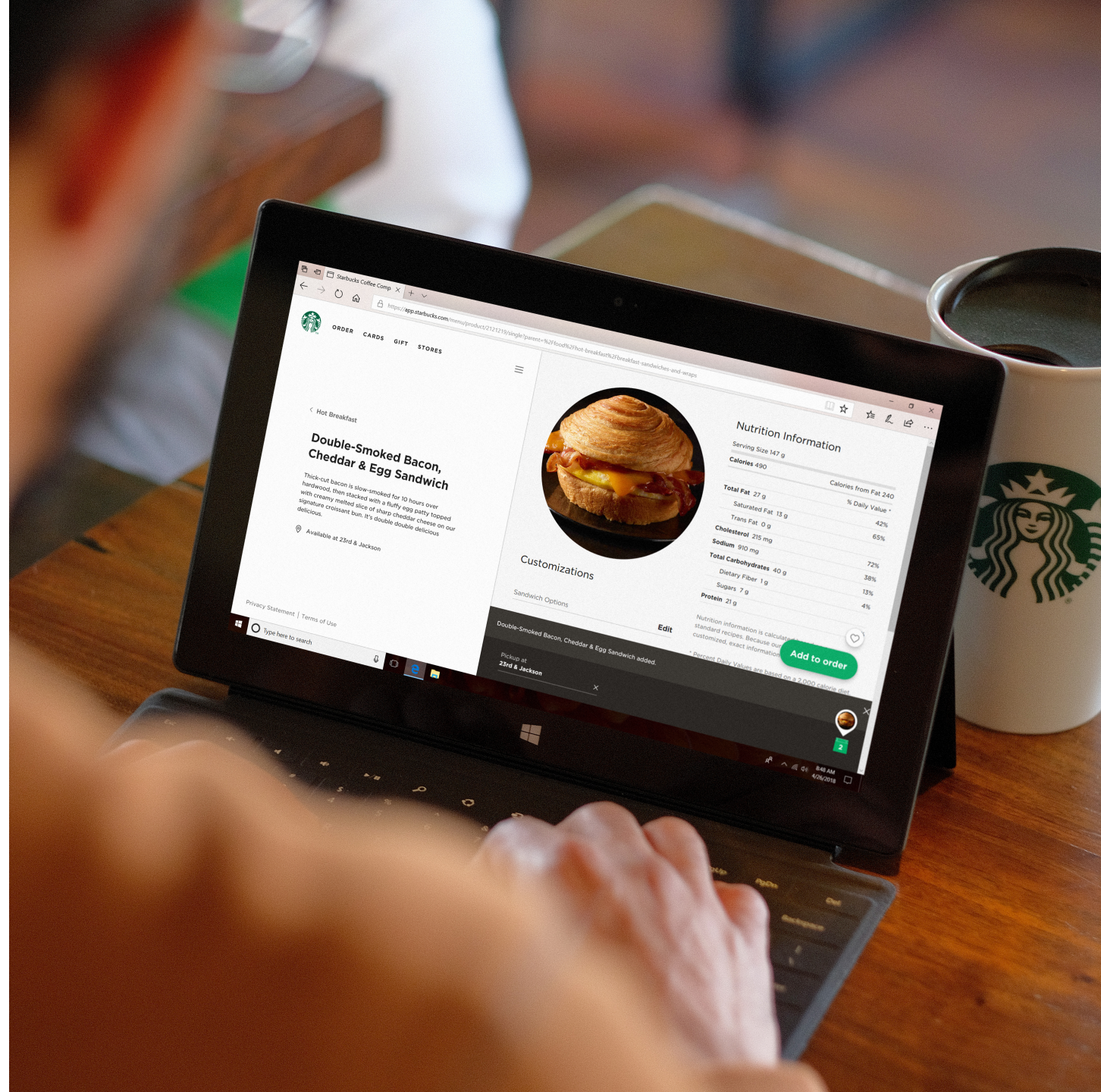
Finding Our Focus

Josh Williams
Starbucks



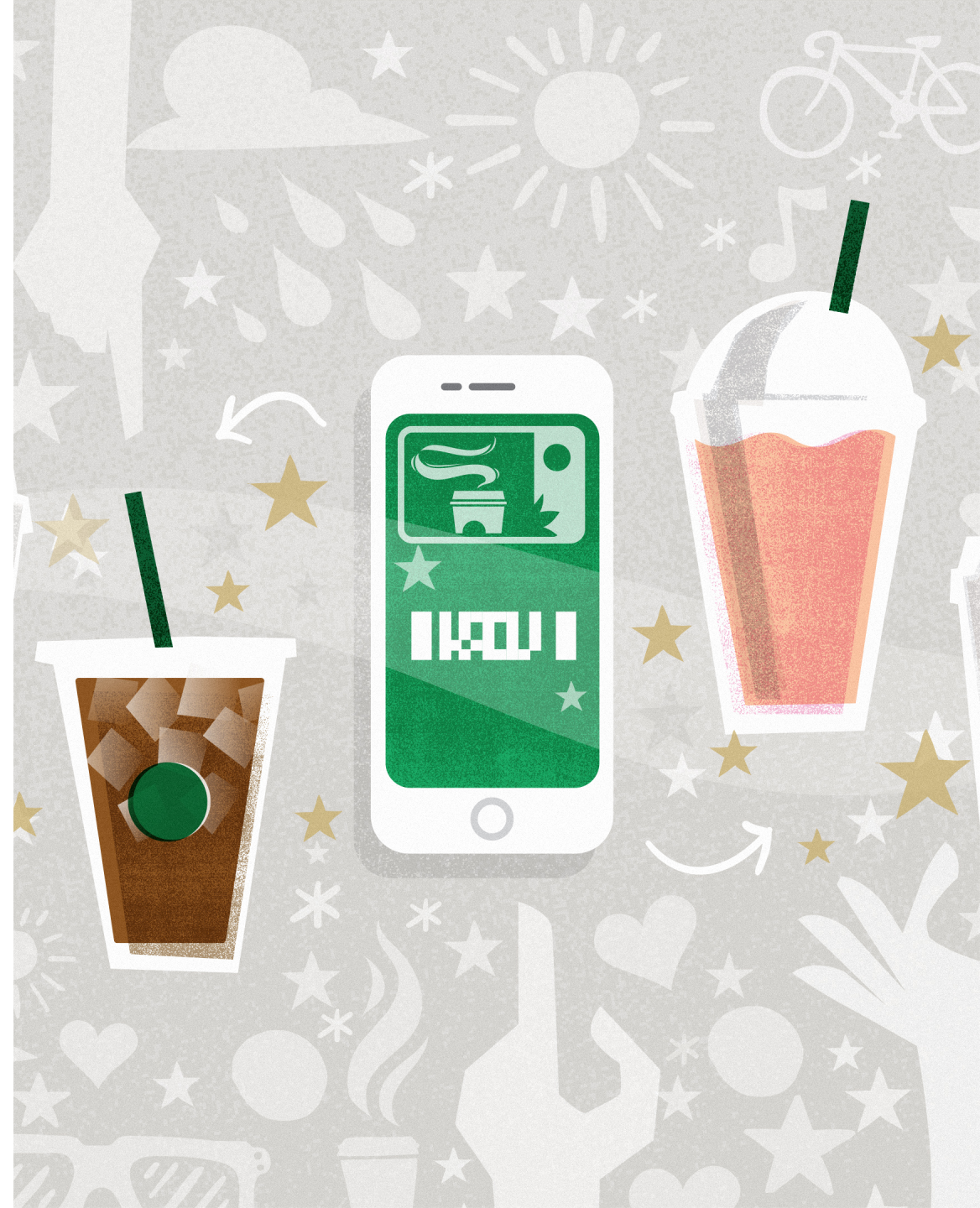
Task first?

Turns out customers like to “do” things with the apps we build



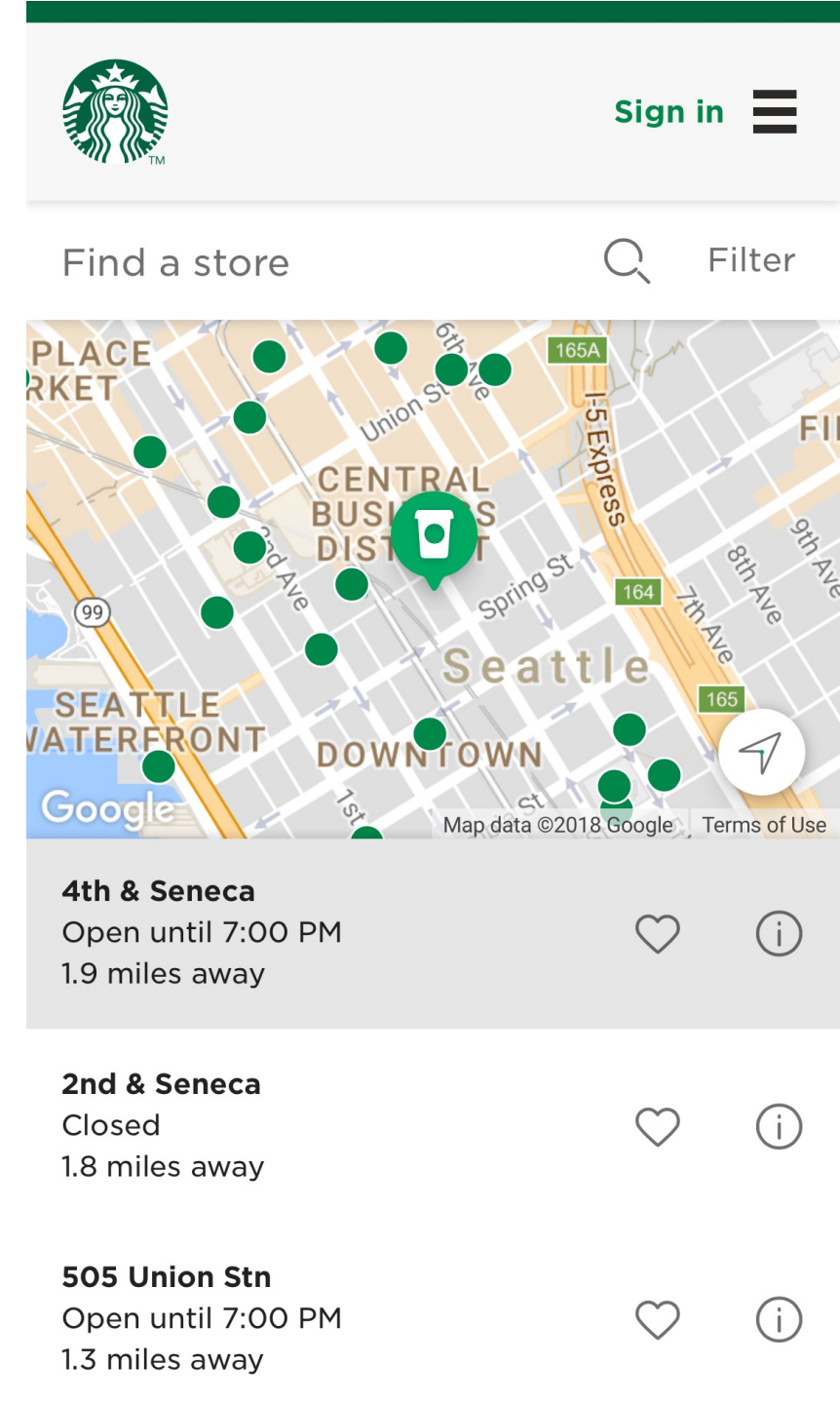
We focused on our
key customer journeys

- 🕒 Enable customers to join the Starbucks Rewards program
- 🕒 Enable customers to transact via Order Ahead and Barcode Pay
- 🕒 Enable customers to track progress towards their earned rewards



Store Locator was our first actual production “PWA” feature

And it was chromed in the previous site



From there, we were able to
add in other key features

🕒 Sign-in and Account Create

🕒 Barcode pay

🕒 eGift and Account management

🕒 etc.





ORDER CARDS GIFT



Good morning, Joshua. ☀️

1238



9 free drink or food Rewards
Collect 12 more Stars for
another Reward

125



125



125



125



125



125



125



125



125



113



Enter a star code



TEAVANA™/MC
SHAKEN ICED TEA
INFUSIONS

Hit refresh on iced tea 🌸

Premium teas with fruit & botanical blends and a little sweetness.

Order

Pay

Finding Our Focus


Josh Williams
Starbucks



The background of the slide is a photograph of a field of yellow flowers, possibly mustard, with thin black stems. The sky is blue with some white clouds. A dark blue rectangular box is positioned in the upper left, containing white text.

Step 2

Use markup that supports the core experience

A photograph of a field of yellow flowers, possibly mustard, under a clear blue sky with some light clouds. The flowers are in the foreground and middle ground, with some in focus and others blurred. A dark blue rectangular box is overlaid on the left side of the image, containing white text.

The words we choose matter,
but the markup we use matters equally

This **div** marks up a piece of self-contained content

```
<div class="entry">
  <div class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</div>
  <div class="entry__meta">
    <div><b>Published</b> 24 May 2017</div>
    <div><b>Reading Time</b> 25 minutes</div>
  </div>
  <div class="entry__content">
    I had the great pleasure of delivering a talk...
    <br><br>
    I do a lot of traveling and it's...
  </div>
</div>
```

There's a tag for that: **article**

```
<article class="entry">
  <div class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</div>
  <div class="entry__meta">
    <div><b>Published</b> 24 May 2017</div>
    <div><b>Reading Time</b> 25 minutes</div>
  </div>
  <div class="entry__content">
    I had the great pleasure of delivering a talk...
    <br><br>
    I do a lot of traveling and it's...
  </div>
</article>
```


This **div** is the title of the blog post

```
<article class="entry">
  <div class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</div>
  <div class="entry__meta">
    <div><b>Published</b> 24 May 2017</div>
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  </div>
  <div class="entry__content">
    I had the great pleasure of delivering a talk...
    <br><br>
    I do a lot of traveling and it's...
  </div>
</article>
```

There's a tag for that: **h1-h6**

```
<article class="entry">
  <h1 class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</h1>
  <div class="entry__meta">
    <div><b>Published</b> 24 May 2017</div>
    <div><b>Reading Time</b> 25 minutes</div>
  </div>
  <div class="entry__content">
    I had the great pleasure of delivering a talk...
    <br><br>
    I do a lot of traveling and it's...
  </div>
</article>
```


These **div** elements define various properties of the post

```
<article class="entry">
  <h1 class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</h1>
  <div class="entry__meta">
    <div><b>Published</b> 24 May 2017</div>
    <div><b>Reading Time</b> 25 minutes</div>
  </div>
  <div class="entry__content">
    I had the great pleasure of delivering a talk...
    <br><br>
    I do a lot of traveling and it's...
  </div>
</article>
```

There's an element for the: **dl**

```
<article class="entry">
  <h1 class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</h1>
  <dl class="entry__meta">
    <dt>Published</dt> <dd>24 May 2017</dd>
    <dt>Reading Time</dt> <dd>25 minutes</dd>
  </dl>
  <div class="entry__content">
    I had the great pleasure of delivering a talk...
    <br><br>
    I do a lot of traveling and it's...
  </div>
</article>
```


Bonus: **time**

```
<article class="entry">
  <h1 class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</h1>
  <dl class="entry__meta">
    <dt>Published</dt> <dd><time>24 May 2017</time></dd>
    <dt>Reading Time</dt> <dd>25 minutes</dd>
  </dl>
  <div class="entry__content">
    I had the great pleasure of delivering a talk...
    <br><br>
    I do a lot of traveling and it's...
  </div>
</article>
```

Bonus: **time**

```
<time datetime="2017-05-24">  
  24 May 2017</time>
```

```
<time datetime="2017-05-24T11:13:24">  
  24 May 2017</time>
```

```
<time datetime="2017-05-24T11:13:24-04:00">  
  24 May 2017</time>
```


This is “flow” content with line breaks


```
<article class="entry">
  <h1 class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</h1>
  <dl class="entry__meta">
    <dt>Published</dt> <dd><time ...>24 May 2017</time></dd>
    <dt>Reading Time</dt> <dd>25 minutes</dd>
  </dl>
  <div class="entry__content">
    I had the great pleasure of delivering a talk...
    <br><br>
    I do a lot of traveling and it's...
  </div>
</article>
```

This is “flow” content with generic divisions

```
<article class="entry">
  <h1 class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</h1>
  <dl class="entry__meta">
    <dt>Published</dt> <dd><time ...>24 May 2017</time></dd>
    <dt>Reading Time</dt> <dd>25 minutes</dd>
  </dl>
  <div class="entry__content">
    <div>I had the great pleasure of delivering a talk...</div>
    <div>I do a lot of traveling and it's...</div>
  </div>
</article>
```


That is meaningful content

```
<article class="entry">
  <h1 class="entry__title">Progressive Web Apps and
    the Windows Ecosystem</h1>
  <dl class="entry__meta">
    <dt>Published</dt> <dd><time ...>24 May 2017</time></dd>
    <dt>Reading Time</dt> <dd>25 minutes</dd>
  </dl>
  <div class="entry__content">
    <p>I had the great pleasure of delivering a talk...</p>
    <p>I do a lot of traveling and it's...</p>
  </div>
</article>
```


A photograph of a field of yellow flowers, possibly mustard, under a clear blue sky with some white clouds. The flowers are in the foreground and middle ground, with some in focus and others blurred. A dark blue rectangular box is overlaid on the left side of the image, containing white text.

With CSS it all looks the same anyway,
so why should I care?

Readability

Progressive Web Apps and the Windows Ecosystem

Published 24 May 2017

Reading Time 25 minutes

I had the great pleasure of delivering a talk...

I do a lot of traveling and it's...

Readability

Progressive Web Apps and the Windows Ecosystem

Published

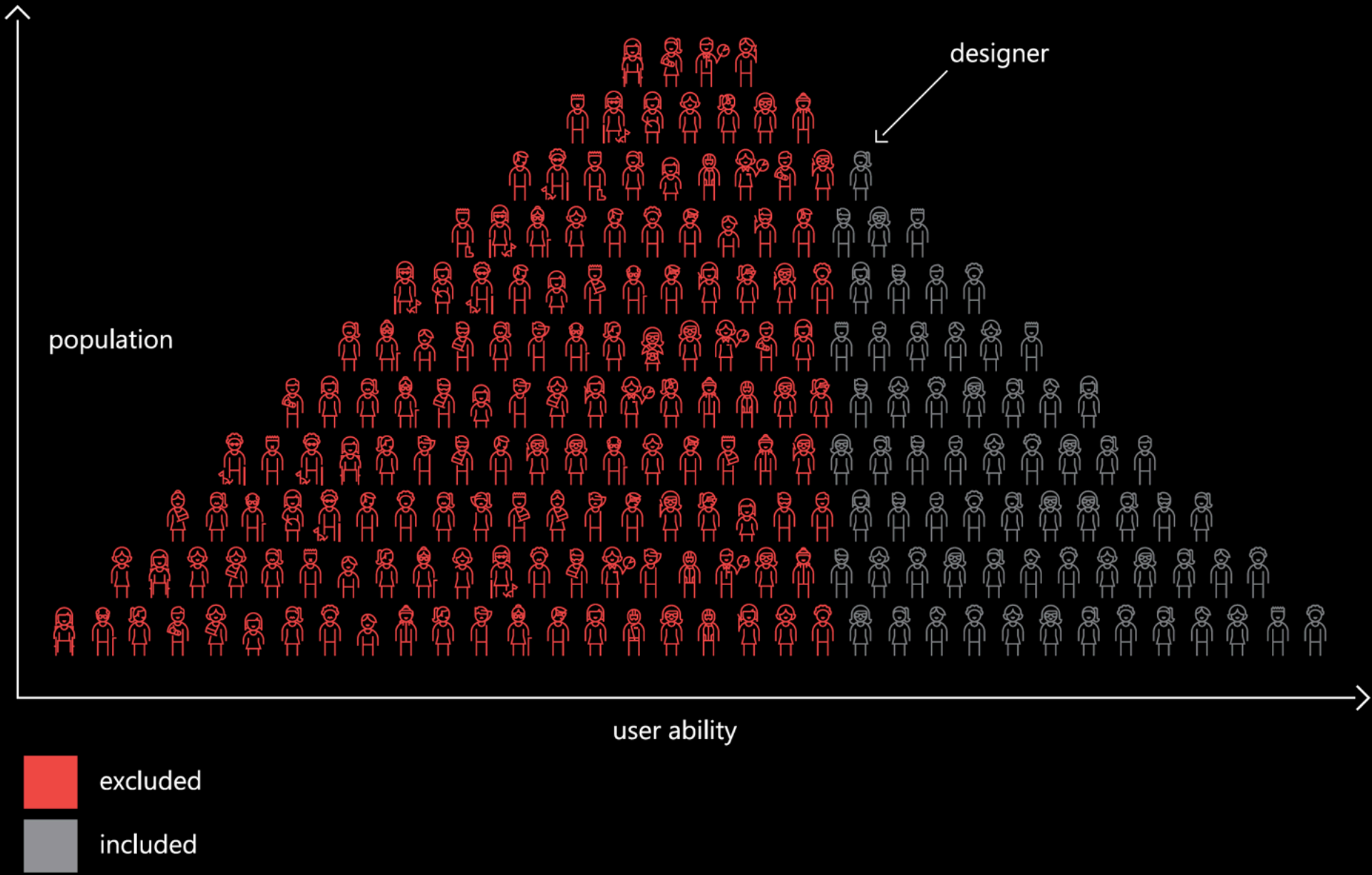
24 May 2017


Reading Time

25 minutes

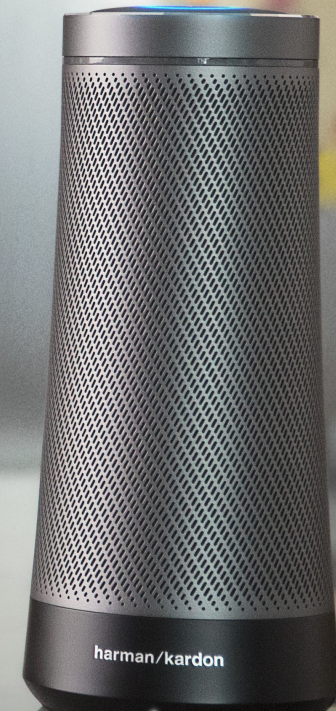
I had the great pleasure of delivering a talk...

I do a lot of traveling and it's...



A man with dark hair and a beard, wearing a blue button-down shirt over a white t-shirt, is looking towards a smart speaker on a table. The background is a kitchen with a brick wall, a window with blinds, and a refrigerator with colorful papers pinned to it. A semi-transparent dark blue banner is overlaid on the lower half of the image, containing white text.

Hey Cortana, read me the top three
headlines in today's New York Times



Accessing content via semantics:

```
function extractHeadlines( response ){
  var $html = document.createElement('div'),
      $headings, i=0, headlines=[];
  $html.innerHTML = response.contents;
  $headings = $html.querySelector('#top-news')
               .querySelectorAll('article h1, article h2, article h3');
  heading_count = $headings.length;
  while (headlines.length < 3) {
    let $link = $headings[i].querySelector('a');
    if ($link && $link.href) {
      headlines.push({
        title: $headings[i].innerText.trim(),
        link: $link.href
      });
    }
    i++;
  }
  console.log( headlines );
}
```

Accessing content via semantics:

```
function extractHeadlines( response ){
    var $html = document.createElement('div'),
        $headings, i=0, headlines=[];
    $html.innerHTML = response.contents;
    $headings = $html.querySelector('#top-news')
                .querySelectorAll('article h1, article h2, article h3');
    heading_count = $headings.length;
    while (headlines.length < 3) {
        let $link = $headings[i].querySelector('a');
        if ($link && $link.href) {
            headlines.push({
                title: $headings[i].innerText.trim(),
                link: $link.href
            });
        }
        i++;
    }
    console.log( headlines );
}
```




Articles



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 Topics

MAY 23, 2016 • [17 COMMENTS](#)

Developing Dependency Awareness

[Coding](#) ⁵⁸⁷ # [CSS](#) ²⁴³ # [JavaScript](#) ¹⁸⁶ # [jQuery](#) ⁴⁰

I'm sure you've heard the proverb, "A chain is only as strong as its weakest link," probably many times. Its written origin dates back to the 18th century, but I wouldn't be surprised if it was much, much older. And though the work we do has little to do with

Let's say you needed to code a button...



Sign Up

```
<input type="submit" value="Sign Up">
```

```
<button type="submit">Sign Up</button>
```

```
<a class="button" href="#">Sign Up</a>
```

```
<div class="button">Sign Up</div>
```


Let's compare

Pattern	Display	Semantics	Focusable?	Activate By	Submits Forms
<code>input[type=submit]</code>	button	button	Yes	Mouse, touch, ENTER, SPACE	Yes
<code>button[type=submit]</code>	button	button	Yes	Mouse, touch, ENTER, SPACE	Yes
<code>a</code>	link	Named generic	Yes	Mouse, touch, ENTER	No
<code>div</code>	block	Not exposed	No	N/A	No

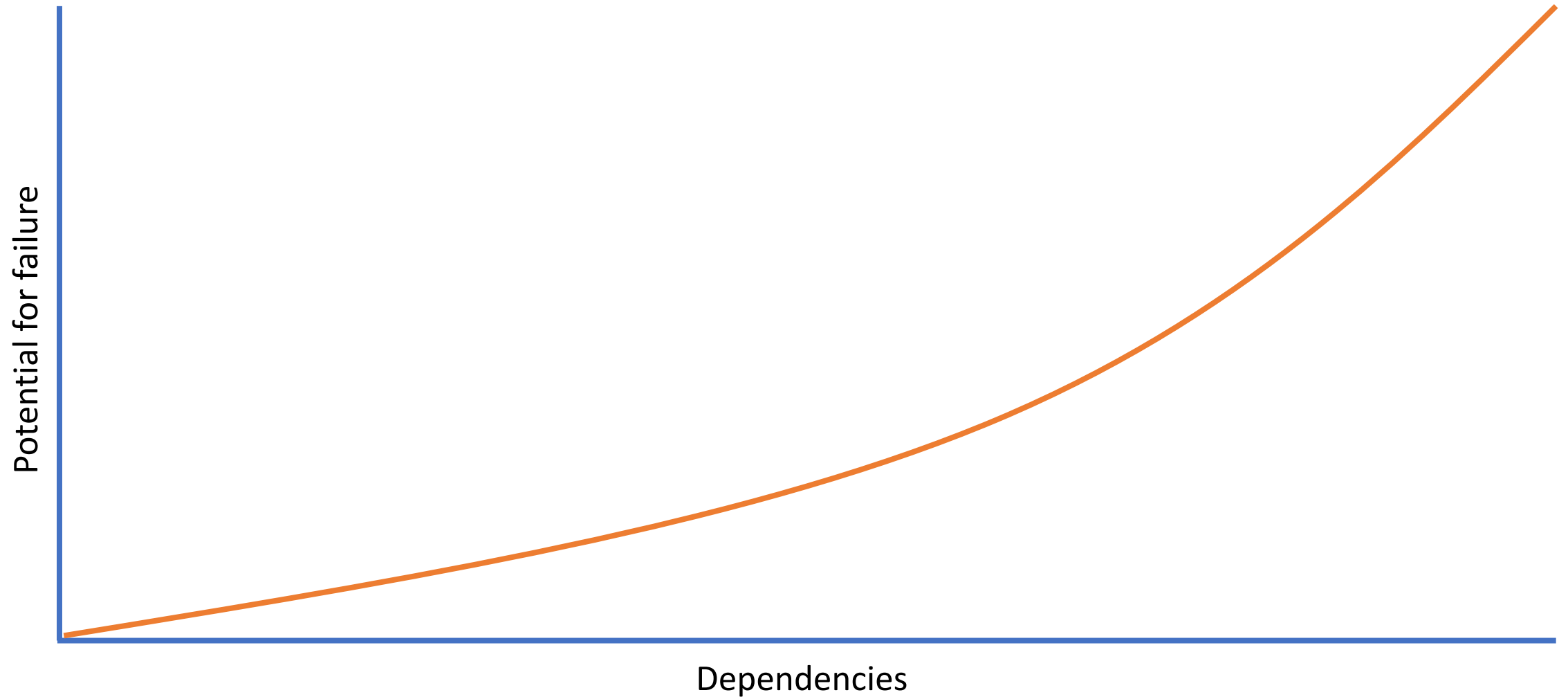
UX gaps that need to be filled

Pattern	Display	Semantics	Focusable?	Activate By	Submits Forms
<code>input[type=submit]</code>	button	button	Yes	Mouse, touch, ENTER, SPACE	Yes
<code>button[type=submit]</code>	button	button	Yes	Mouse, touch, ENTER, SPACE	Yes
<code>a</code>	link	Named generic	Yes	Mouse, touch, ENTER	No
<code>div</code>	block	Not exposed	No	N/A	No

Filling those gaps introduces dependencies

Pattern	Display	Semantics	Focusable?	Activate By	Submits Forms
<code>input[type=submit]</code>	None	None	None	None	None
<code>button[type=submit]</code>	None	None	None	None	None
<code>a</code>	CSS	ARIA	None	JavaScript	JavaScript
<code>div</code>	CSS	ARIA	HTML	JavaScript	JavaScript

More dependencies, more (potential) problems



Disaster averted



Michael Spellacy

@Spellacy

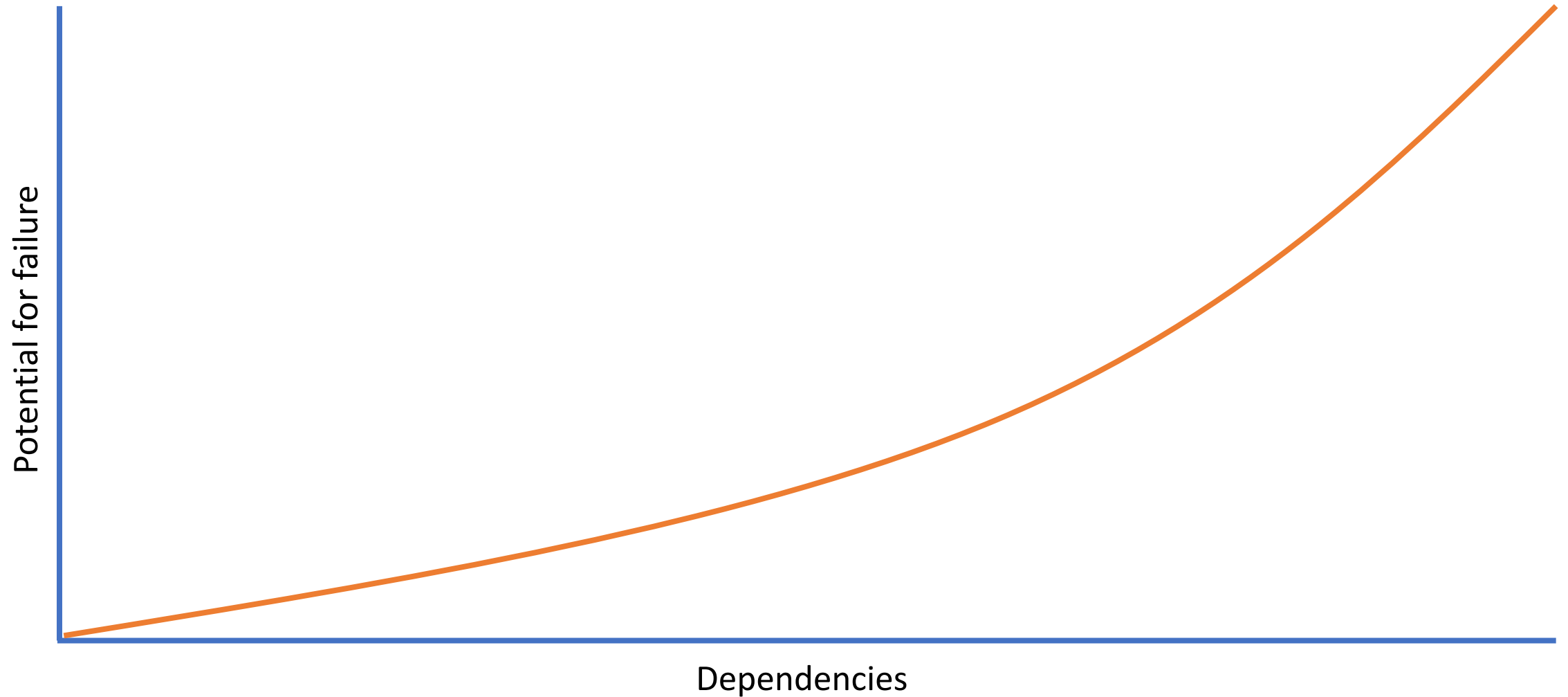
Follow



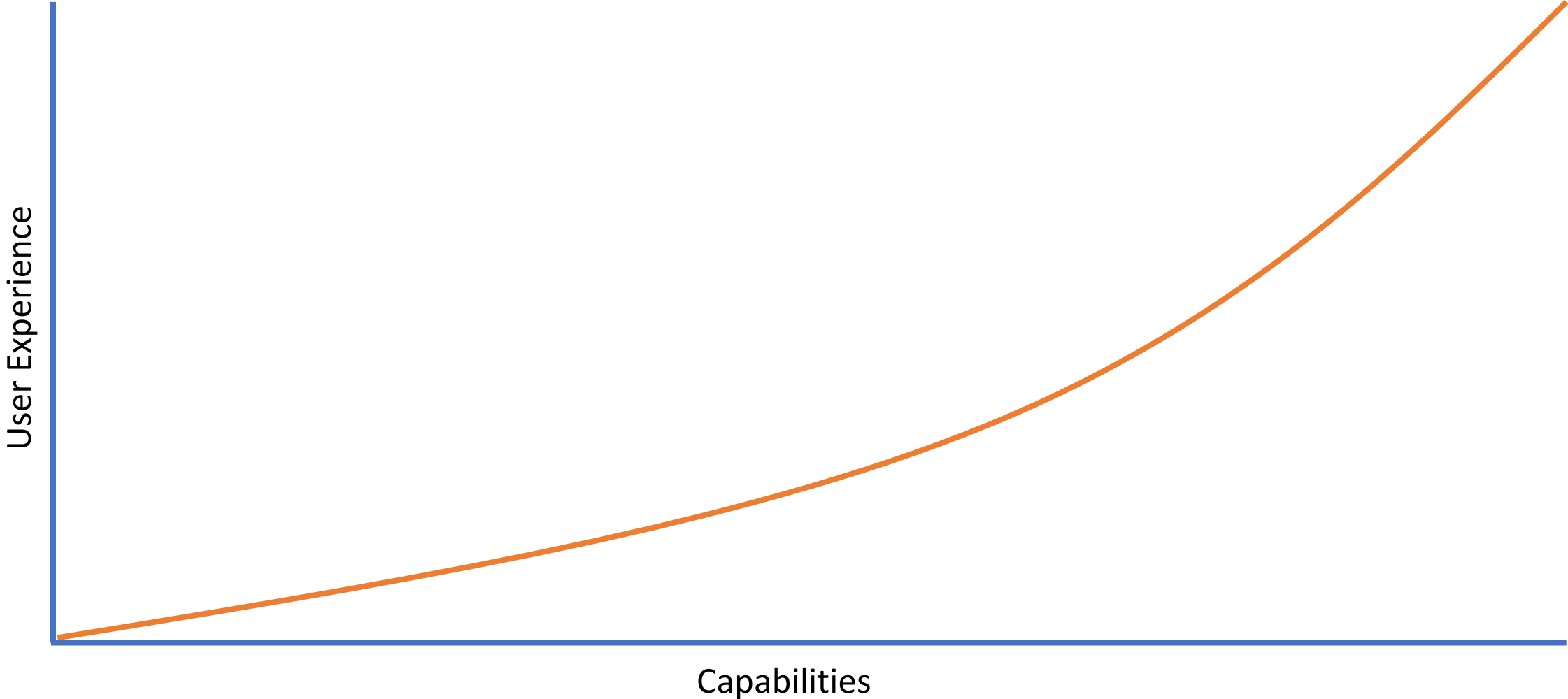
Do you think progressive enhancement is a waste of time? Think again! Chrome 66 just knocked out SSL on a CDN that hosted CSS and JS for 200 of my employer's sites and most of them still work with good ol' HTML! @AaronGustafson would be proud! :-)

10:15 PM - 18 Apr 2018

More dependencies, more (potential) problems

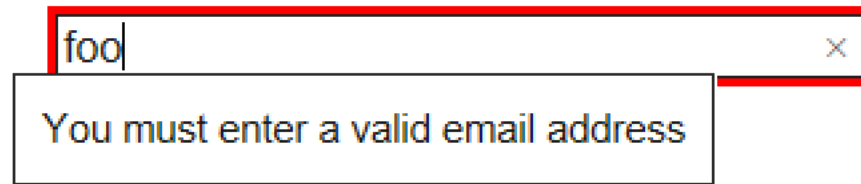


Enhance the experience



Enhancing UX with markup

```
<input type="email" name="email" id="email"  
      required aria-required="true">
```

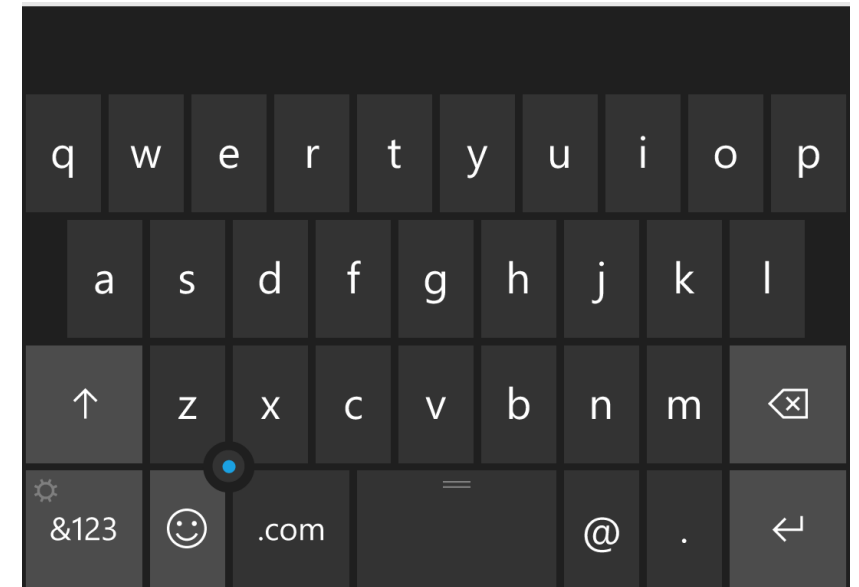


foo

You must enter a valid email address

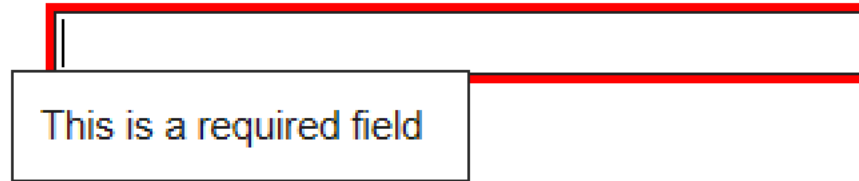
Experience deltas

1. Support for email input type?
2. Validation algorithm implemented?
3. Virtual keyboard?



Enhancing UX with markup

```
<input type="email" name="email" id="email"  
      required aria-required="true">
```



Experience deltas

1. Support for HTML validation?

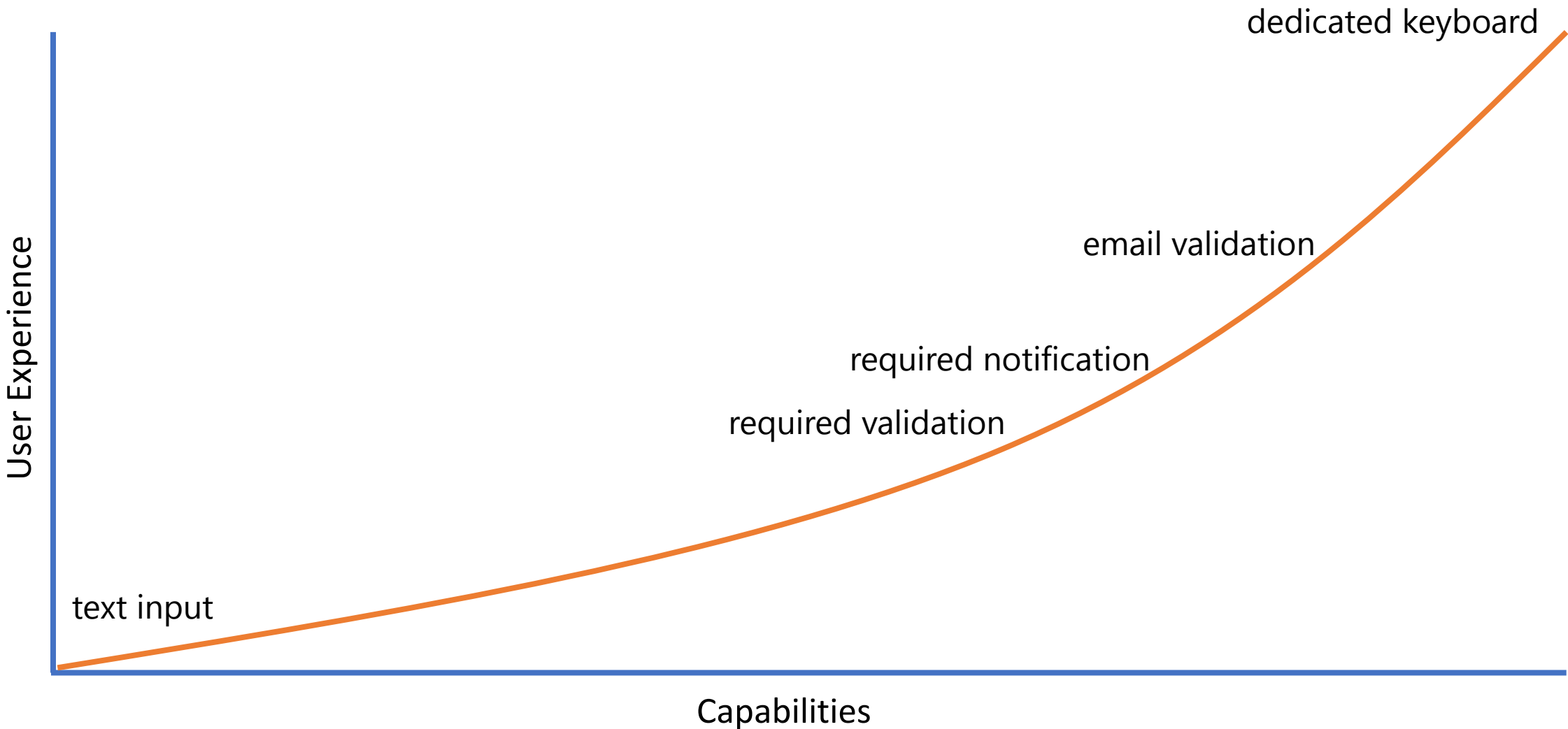
Enhancing UX with markup


```
<input type="email" name="email" id="email"  
      required aria-required="true">
```

Experience deltas

1. Browser exposure of aria-required property?
2. Assistive tech implementation of aria-required?

Enhance the experience



The background of the image is a photograph of a field of yellow flowers, possibly mustard, with thin black stems. The sky is a clear, bright blue with some light, wispy clouds visible on the right side. A dark blue rectangular box is positioned in the upper left to center of the image, containing white text.

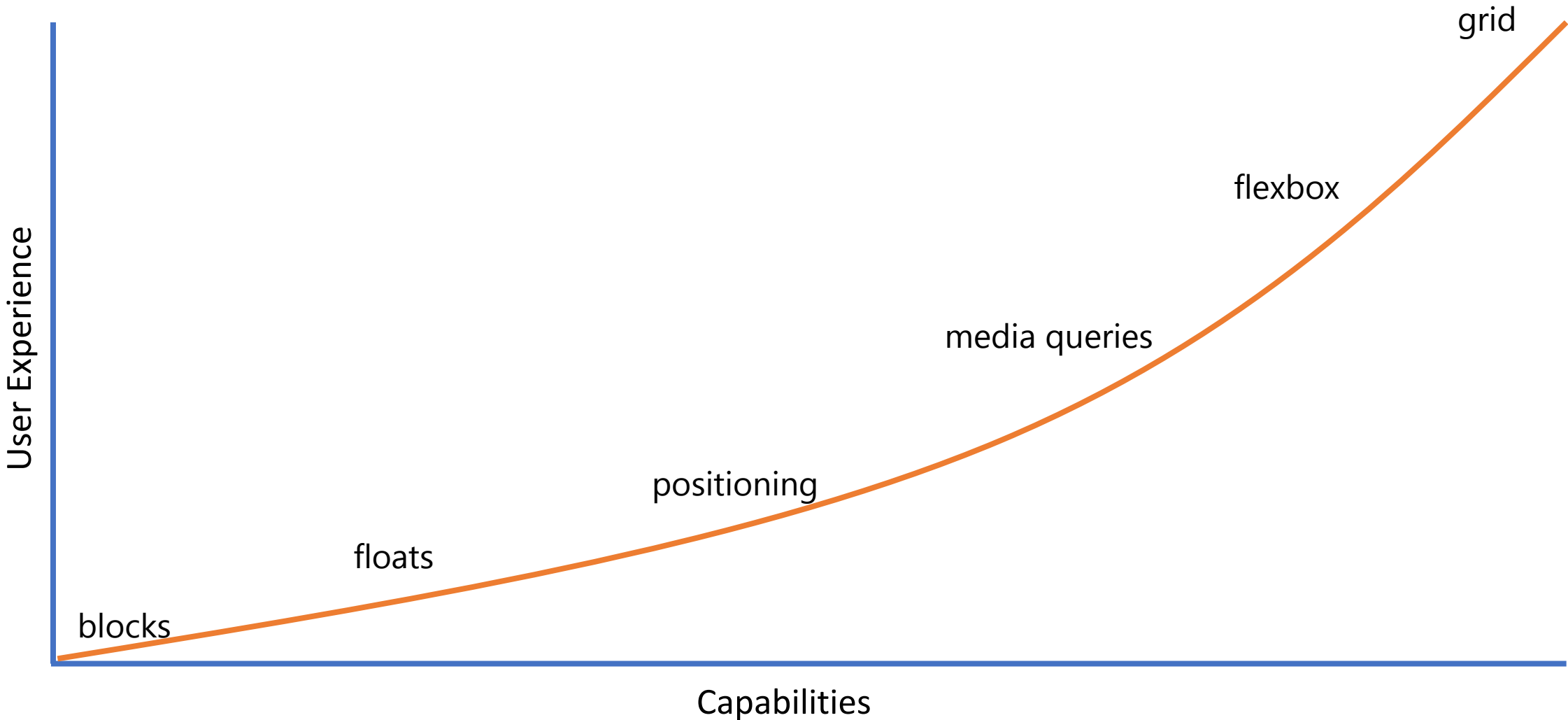
When you think of user experience as a continuum that scales with capabilities, a progressive approach to interfaces is both elegant and powerful.

A close-up photograph of a dark branch with several clusters of small, light pink cherry blossoms. The background is a soft, out-of-focus mix of light pink and pale blue, suggesting a sky or a distant landscape. The lighting is gentle, highlighting the delicate petals of the flowers.

Step 3

Design in support of the core experience

Enhance the experience



Enhance!

ay!



Basic, but ok!

Gridbyexample

Progressive Enhancement

Grid Garden

Progressive Enhancement Demo

Leverage the power of CSS Grid Layout!

Read [this article](#) for details on how to use CSS Grid Layout today.

I've been amazed at how often those outside the discipline of design assume that what designers do is decoration—likely because so much bad design simply is decoration. Good design isn't. **Good design is problem solving.**

— Jeff Veen



Tools for graphic design

🕒 Alignment

🕒 Balance

🕒 Contrast

🕒 Emphasis

🕒 Gestalt

🕒 Harmony

🕒 Movement

🕒 Proportion

🕒 Proximity

🕒 Repetition

🕒 Rhythm

🕒 Unity

🕒 White Space

Tools for graphic design

🕒 **Alignment**

🕒 Balance

🕒 **Contrast**

🕒 Emphasis

🕒 Gestalt

🕒 Harmony

🕒 Movement

🕒 **Proportion**

🕒 **Proximity**

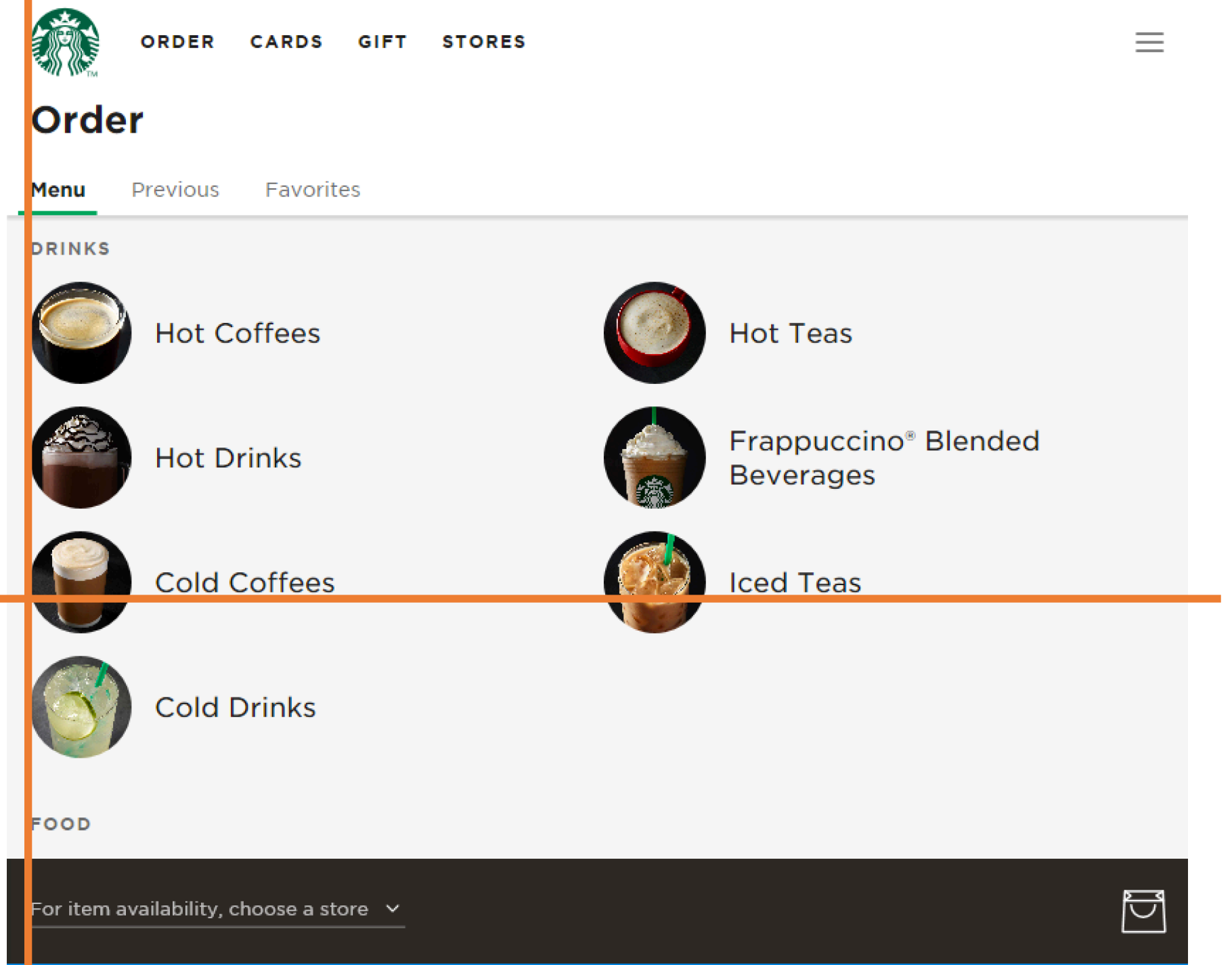
🕒 Repetition

🕒 **Rhythm**

🕒 **Unity**

🕒 White Space

Alignment



Contrast

Medium



MEMBER FEATURE STORY

Believing Women Means Believing Their Pain

A notoriously dangerous birth control device reveals the extent to which the medical establishment disbelieves women’s pain



Sady Doyle [Follow](#)
Apr 16 · ★ 5 min read



Melissa Davis Gilbert with her husband before her surgery in 2017. Gilbert has had the Essure device for about 10 years, and her symptoms — pelvic pain, fatigue, rashes, joint swelling — have gotten worse. In deciding to remove the device, it would mean she would have to get a hysterectomy. Photo by Katherine Frey/The Washington Post via Getty Images

Proportion

Menu



Proximity



Create FREE Account

EMAIL

PASSWORD

- Minimum 8 Characters
- 1 Capital Letter
- 1 Lowercase Letter
- 1 Number

Create FREE Account

By clicking Create FREE Account, I have read and agreed to the [terms and conditions](#)

Rhythm

This is a header

Lorem ipsum dolor sit amet, consectetur adipisicing elit. Quasi reprehenderit sint obcaecati reiciendis voluptas voluptate excepturi recusandae ab accusamus deleniti facilis, illo placeat harum, iusto ratione. Ullam laborum voluptas et!

Lorem ipsum dolor sit amet, consectetur adipisicing elit. Quasi reprehenderit sint obcaecati reiciendis voluptas voluptate excepturi recusandae ab accusamus deleniti facilis, illo placeat harum, iusto ratione. Ullam laborum voluptas et!

Lorem ipsum dolor sit amet, consectetur adipisicing elit. Quasi reprehenderit sint obcaecati reiciendis voluptas voluptate excepturi recusandae ab accusamus deleniti facilis, illo placeat harum, iusto ratione. Ullam laborum voluptas et!

24px

24px

72px

This is a header

24px

24px

Lorem ipsum dolor sit amet, consectetur adipisicing elit. Quasi reprehenderit sint obcaecati reiciendis voluptas voluptate excepturi recusandae ab accusamus

Unity



Join Twitter today.

Full name

Phone or Email

Password

☒ Personalize Twitter based on where you've seen Twitter content on the web. [Learn more.](#)

Sign up

By signing up, you agree to the [Terms of Service](#) and [Privacy Policy](#), including [Cookie Use](#). Others will be able to find you by email or phone number when provided.

[Advanced options](#)

Design considerations unique to the web

- 🕒 Screen size
- 🕒 Resolution
- 🕒 Brightness
- 🕒 Color density
- 🕒 User preference
- 🕒 Network speed & quality
- 🕒 Assistive technology

Design considerations unique to the web

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Design considerations unique to the web

🕒 Screen size

🕒 Resolution

🕒 Brightness

🕒 Color density

🕒 User preference

🕒 Network speed & quality

🕒 Assistive technology

👉 Responsive layouts

👉 SVG, responsive images

👉 Contrast

👉 Color choice, media queries

👉 Responsive images, system fonts

Design considerations unique to the web

🕒 Screen size

🕒 Resolution

🕒 Brightness

🕒 Color density

🕒 **User preference**

🕒 Network speed & quality

🕒 **Assistive technology**

Examples of user preference

⌚ Larger or smaller fonts

```
@media (min-width: 32em) { ... }
```

⌚ High contrast colors

```
@media (-ms-high-contrast: active) { ... }
```

```
@media (-ms-high-contrast: white-on-black) { ... }
```

```
@media (-ms-high-contrast: black-on-white) { ... }
```

⌚ Reduced motion

```
@media screen and (prefers-reduced-motion: reduce) { ... }
```


Assistive technologies

🕒 Vision

- 🕒 Screen magnifiers
- 🕒 Screen readers
- 🕒 Braille printers & refreshable braille displays
- 🕒 High contrast settings

🕒 Motor/mobility

- 🕒 Speech recognition
- 🕒 Mouse settings
- 🕒 Keyboards & keyboard overlays
- 🕒 Eye tracking

🕒 Hearing

- 🕒 Captions & subtitles

Don't rely on color
alone to convey
important information

Confirm

Cancel

Confirm

Cancel

Good contrast
ensures your
content is readable

contrast ratio

Background:

white

8.52

hsla(200,0%,0%,

How to use

↔ Swap colors

As you type, the contrast ratio indicated will update.
Hover over the circle to get more detailed information.

When semi-transparent colors are involved as
backgrounds, the contrast ratio will have an error margin,
to account for the different colors they may be over.

This sample text attempts to visually demonstrate how readable
this color combination is, for normal or **bold** text of various sizes
and font styles.

Hint: Press the up and down keyboard arrows while over a number inside
a functional color notation. Watch it increment/decrement. Try with the
Shift or Alt key too!

By Lea Verou • WCAG 2.0 on contrast ratio

Explicit connections
ensure everyone can
follow references

```
<a href="#figure-3-3">Figure  
3.3</a> shows the lodging article  
in Safari with only the default  
browser styles applied.
```

...

```
<figure id="figure-3-3">
```

...

```
</figure>
```

Explicit connections
ensure everyone can
follow references

```
<a href="#figure-3-3">Figure  
3.3</a> shows the lodging article  
in Safari with only the default  
browser styles applied.
```

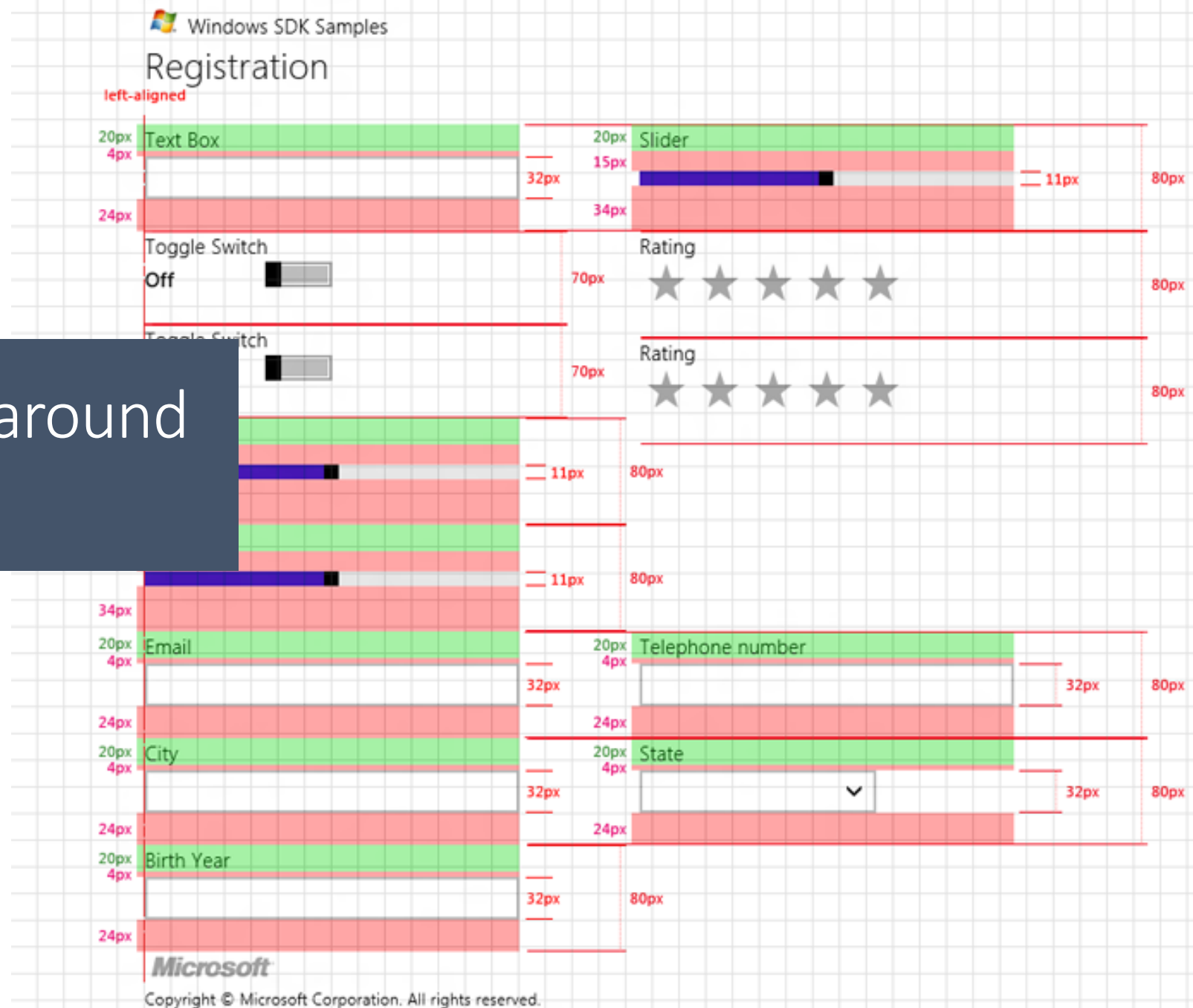
...

```
<figure id="figure-3-3">
```

...

```
</figure>
```

Provide ample space around interactive elements



Consider what
your design
leaves unsaid

```
<a href="#">Finish Reading</a>
```

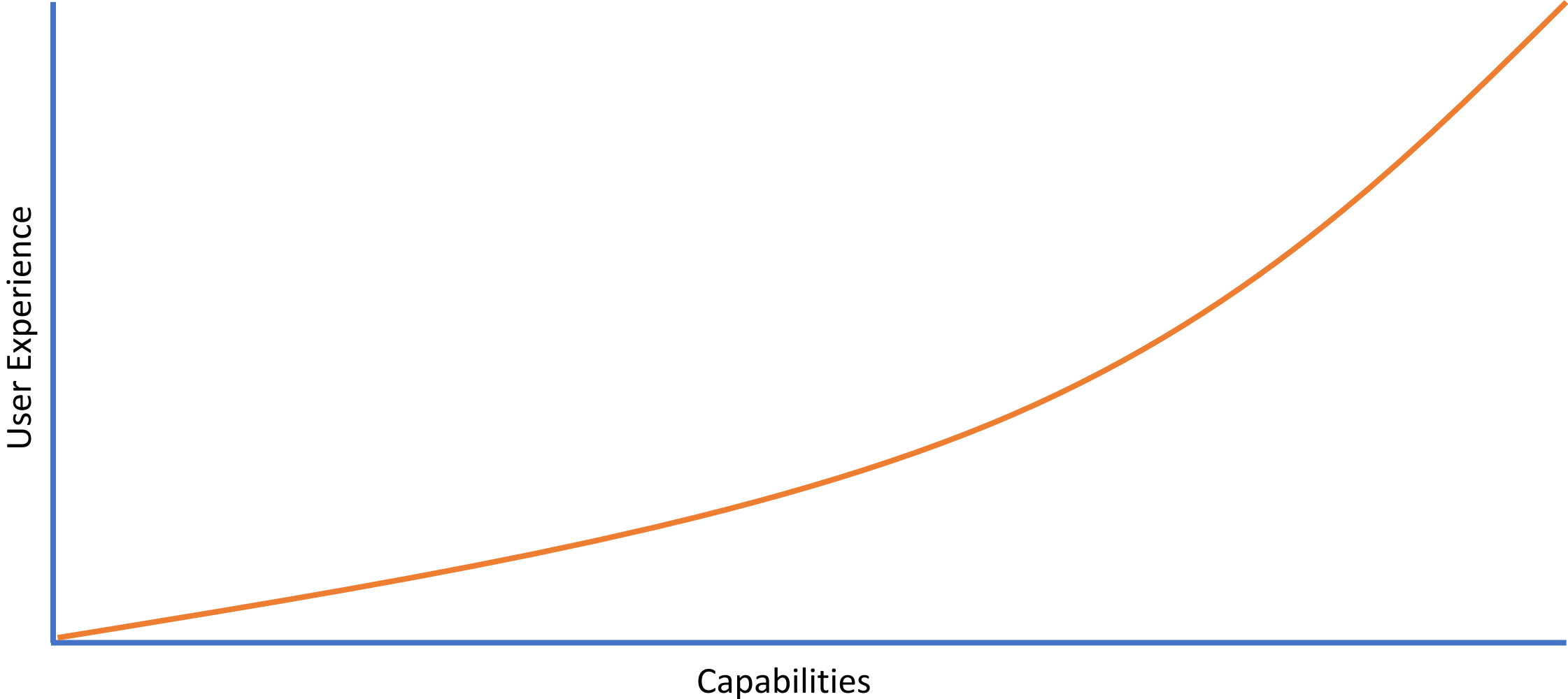
Consider what
your design
leaves unsaid

```
<a href="...">  
  <b class="hidden">You can</b>  
  finish reading  
  <b class="hidden">“The Web  
    Should Just Work for  
    Everyone” in less than  
    10 minutes</b>  
</a>
```

Consider what
your design
leaves unsaid

```
<a href="...">  
  <b class="hidden">You can</b>  
  finish reading  
  <b class="hidden">“The Web  
    Should Just Work for  
    Everyone” in less than  
    10 minutes</b>  
</a>
```

Enhance the experience



Enhancing design in CSS

```
p {  
  color: green;  
  color: rgba(0, 255, 0, .8);  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Enhancing design in CSS

```
p {  
  color: green;  
color: rgba(0, 255, 0, .8);  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Older browsers without RGBa support, ignore the second rule

Enhancing design in CSS

```
p {  
  color: green;  
  color: rgba(0, 255, 0, .8);  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Modern browsers with RGBa support, overwrite the first rule

Enhancing design in CSS

```
h1:has(+ p) {  
    color: green;  
}
```

**Passwords can be
a hassle**

(That selects h1s that have adjacent sibling paragraphs.)

Enhancing design in CSS

```
h1:has(+ p) {  
  color: green;  
}
```

**Passwords can be
a hassle**

Browsers that don't support :has() ignore the entire rule set

Enhancing design in CSS

```
h1:has(+ p) {  
  color: green;  
}
```

**Passwords can be
a hassle**

As browsers support :has(), matching h1s will turn green

Enhancing design in CSS

```
@media only screen {  
  p {  
    color: green;  
  }  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Enhancing design in CSS

```
@media only screen {  
  p {  
    color: green;  
  }  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Browsers without media query support ignore the block

Enhancing design in CSS

```
@media only screen {  
  p {  
    color: green;  
  }  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Browsers with media query support apply it

Enhancing design in CSS

```
@supports (display: grid) {  
  p {  
    color: green;  
  }  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Enhancing design in CSS

```
@supports (display: grid) {  
  p {  
    color: green;  
  }  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Browsers that don't grok @supports ignore the block

Enhancing design in CSS

```
@supports (display: grid) {  
  p {  
    color: green;  
  }  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Browsers that understand @supports, but don't display grid ignore it

Enhancing design in CSS

```
@supports (display: grid) {  
  p {  
    color: green;  
  }  
}
```

Passwords can be a hassle. Most people don't create strong passwords or make sure to maintain a different one for every site. People create easy-to-remember passwords and typically use the same passwords across all of their accounts.

Browsers that understand @supports and grid apply it

A background image featuring delicate pink cherry blossoms on dark, slender branches. The blossoms are in various stages of opening, with some showing five distinct petals. The background is a soft, out-of-focus mix of light pink and pale blue, suggesting a misty or overcast day. A semi-transparent dark blue rectangular box is positioned in the upper left quadrant, containing white text.

When it comes to HTML & CSS,
browsers ignore what they don't understand



When it comes to HTML & CSS,
browsers ignore what they don't understand

And new specs smartly override conflicting syntax

Enhance!

ay!



Basic, but ok!

Gridbyexample

Progressive Enhancement

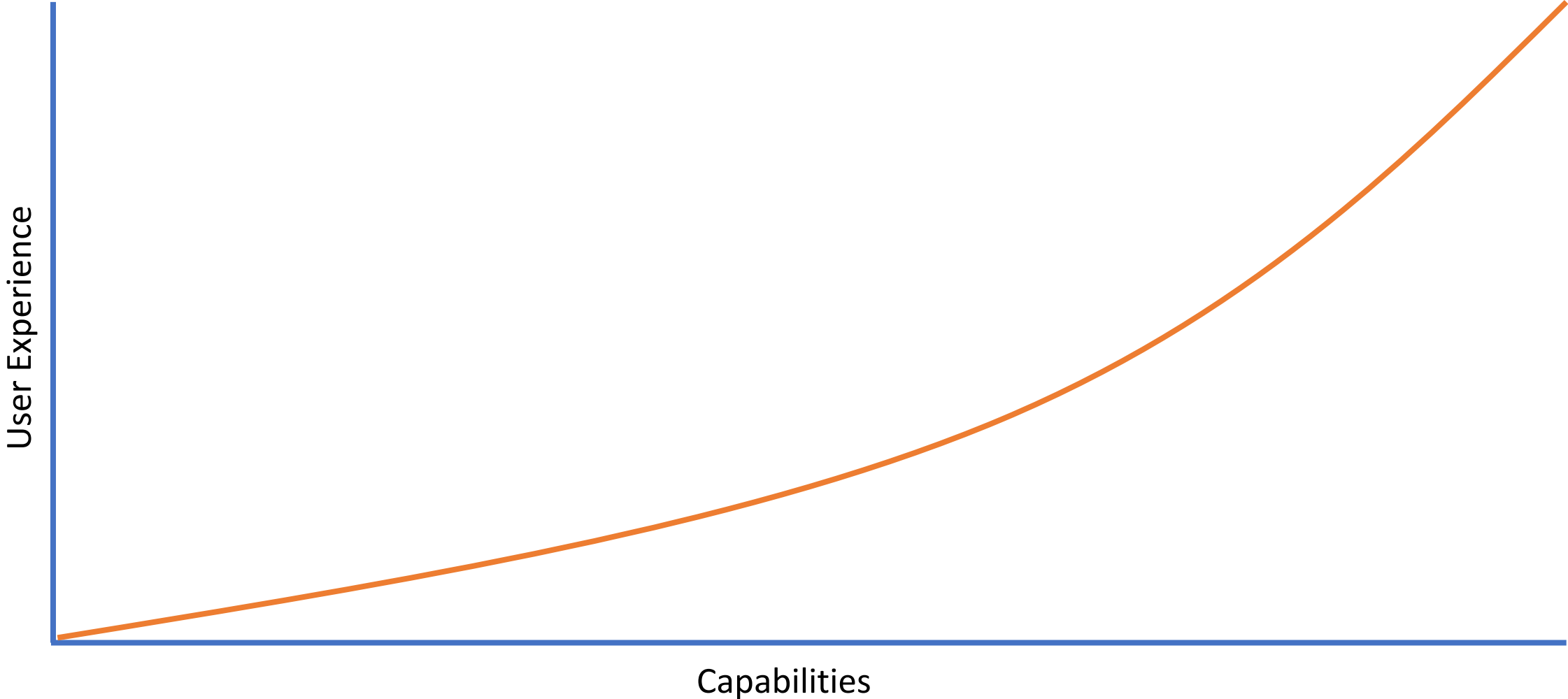
Grid Garden

Progressive Enhancement Demo

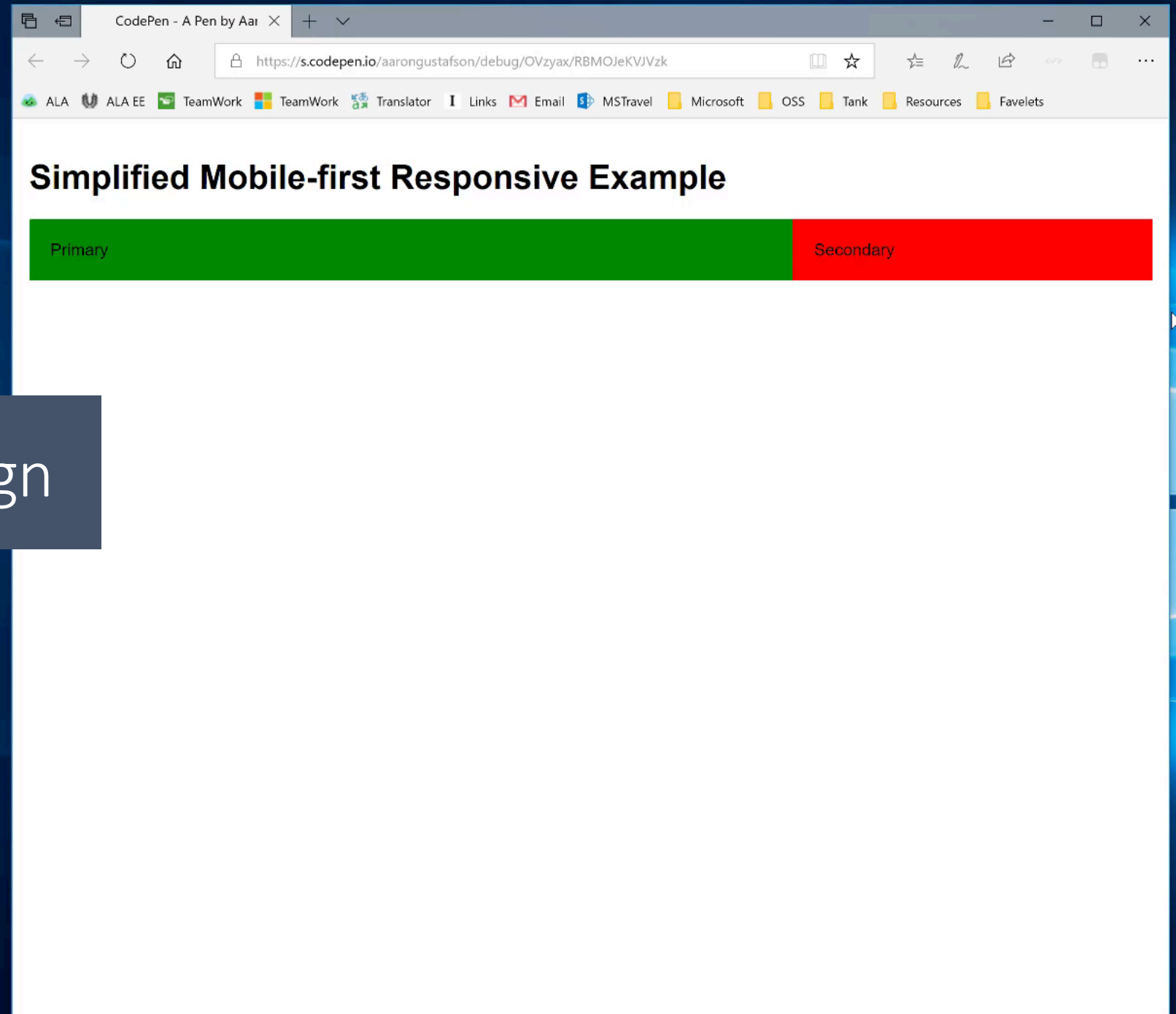
Leverage the power of CSS Grid Layout!

Read [this article](#) for details on how to use CSS Grid Layout today.

Enhance the experience



“Mobile first” design



“Desktop first”

```
.primary {  
  float: left;  
  width: 68%;  
}  
.secondary {  
  float: right;  
  width: 32%;  
}  
@media (max-width:599px) {  
  .primary, .secondary {  
    float: none;  
    width: auto;  
  }  
}
```

“Desktop first”

```
.primary {  
  float: left;  
  width: 68%;  
}  
.secondary {  
  float: right;  
  width: 32%;  
}  
  
@media (max-width:599px) {  
  .primary, .secondary {  
    float: none;  
    width: auto;  
  }  
}
```


“Desktop first”

```
.primary {  
  float: left;  
  width: 68%;  
}  
.secondary {  
  float: right;  
  width: 32%;  
}  
@media (max-width:599px) {  
  .primary, .secondary {  
    float: none;  
    width: auto;  
  }  
}
```

“Mobile first”

```
@media (min-width:600px) {  
  .primary {  
    float: left;  
    width: 68%;  
  }  
  .secondary {  
    float: right;  
    width: 32%;  
  }  
}
```

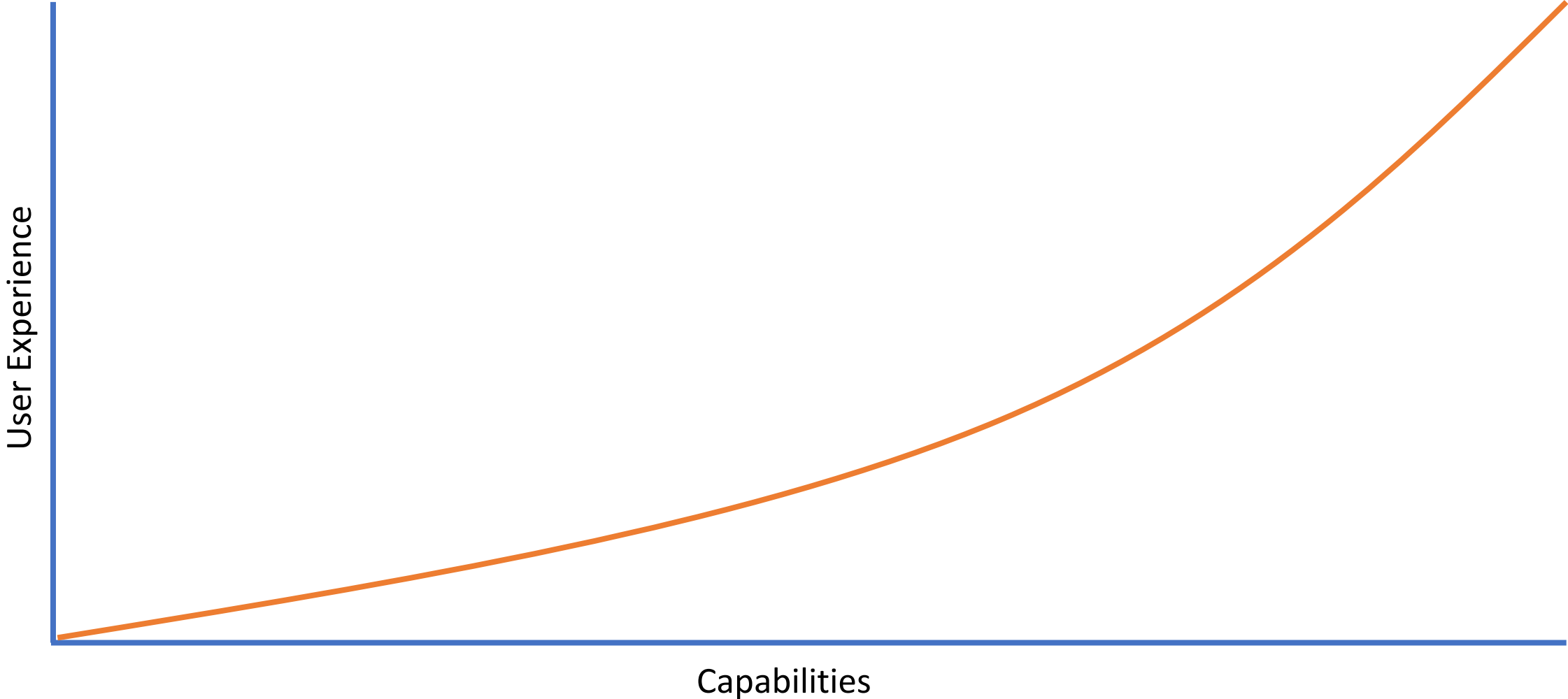
“Mobile first”

```
@media (min-width:600px) {  
  .primary {  
    float: left;  
    width: 68%;  
  }  
  .secondary {  
    float: right;  
    width: 32%;  
  }  
}
```

Other ways to design “mobile first”

- 🕒 Selectively deliver advanced styles
- 🕒 Isolate large CSS images in min-width media queries
- 🕒 Don't hide content images using CSS
- 🕒 Use responsive images
- 🕒 Prefer system fonts
- 🕒 `font-display: optional`

Enhance the experience

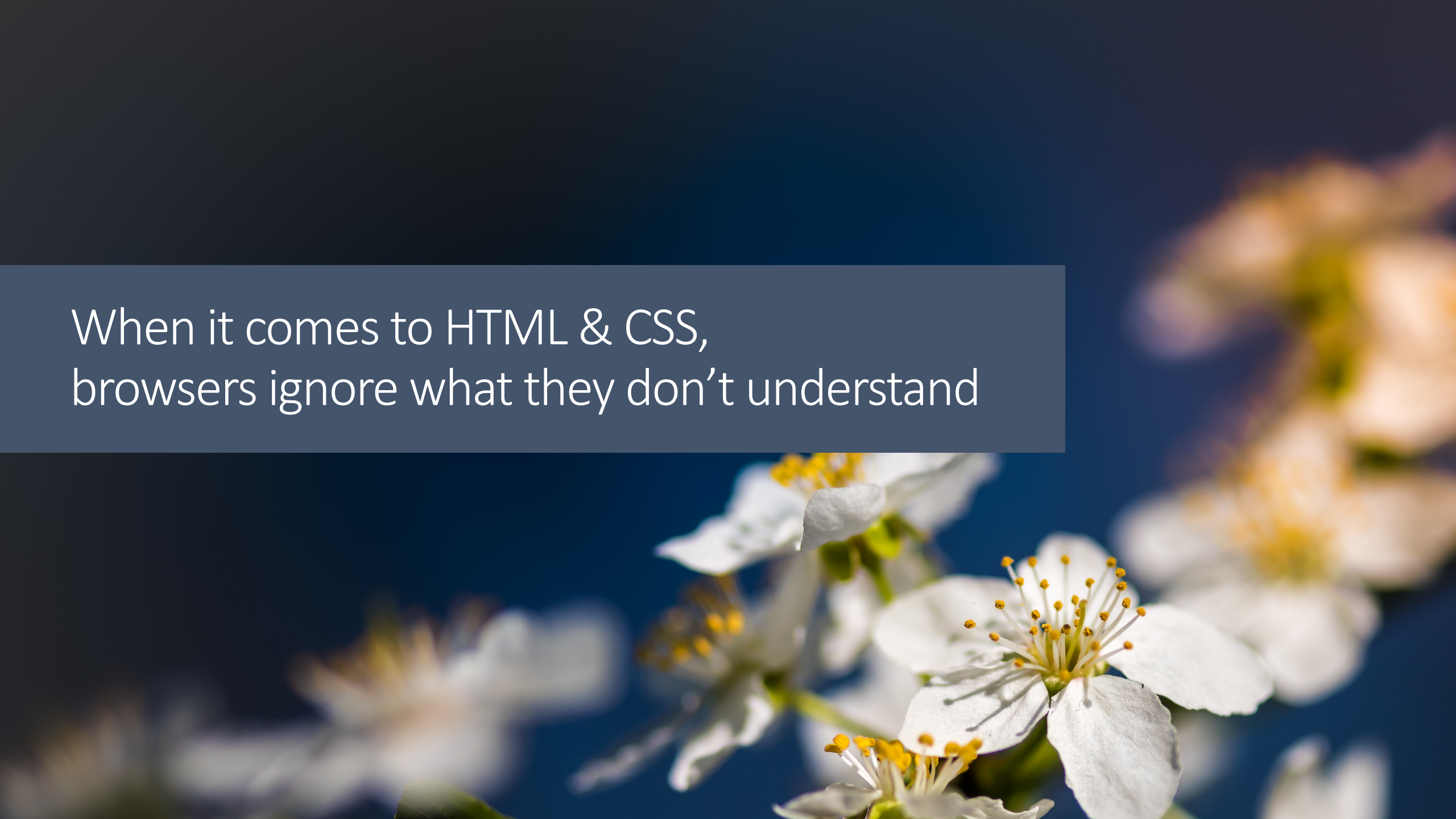


Step 4

Improve the core experience with JavaScript



When it comes to HTML & CSS,
browsers ignore what they don't understand





When it comes to HTML & CSS,
browsers ignore what they don't understand

Sadly, that's not the case with JavaScript

What happens when a browser doesn't understand **let**?

```
document.body.innerHTML += '<p>Can I count to four?</p>';
```

```
for ( let i=1; i<=4; i++ )  
{  
    document.body.innerHTML += '<p>' + i + '</p>';  
}
```

```
document.body.innerHTML += '<p>Success!</p>';
```

Does your browser support let?

If it does, you should see some numbers in paragraphs, followed by a success message.

Can I count to four?

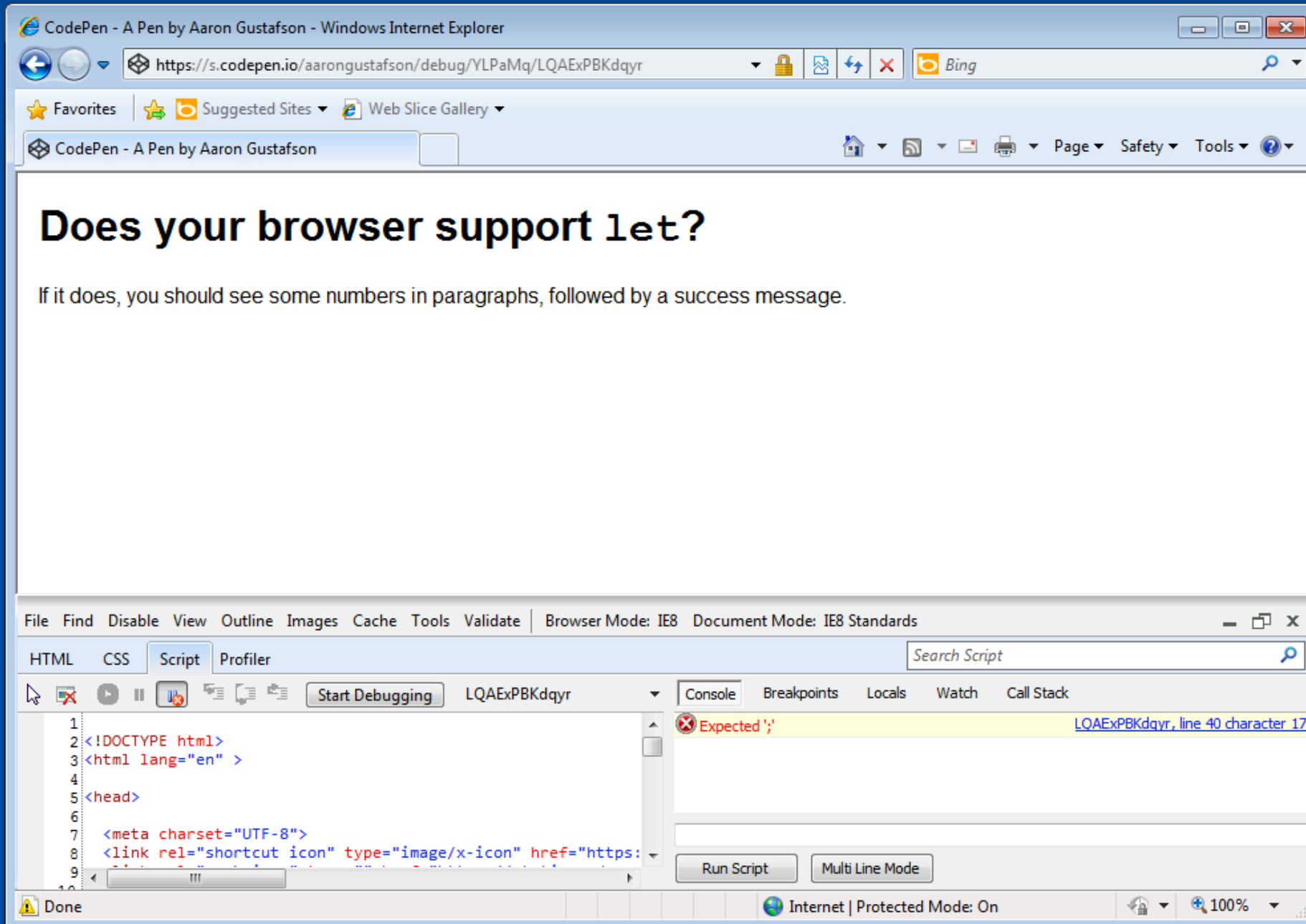
1

2

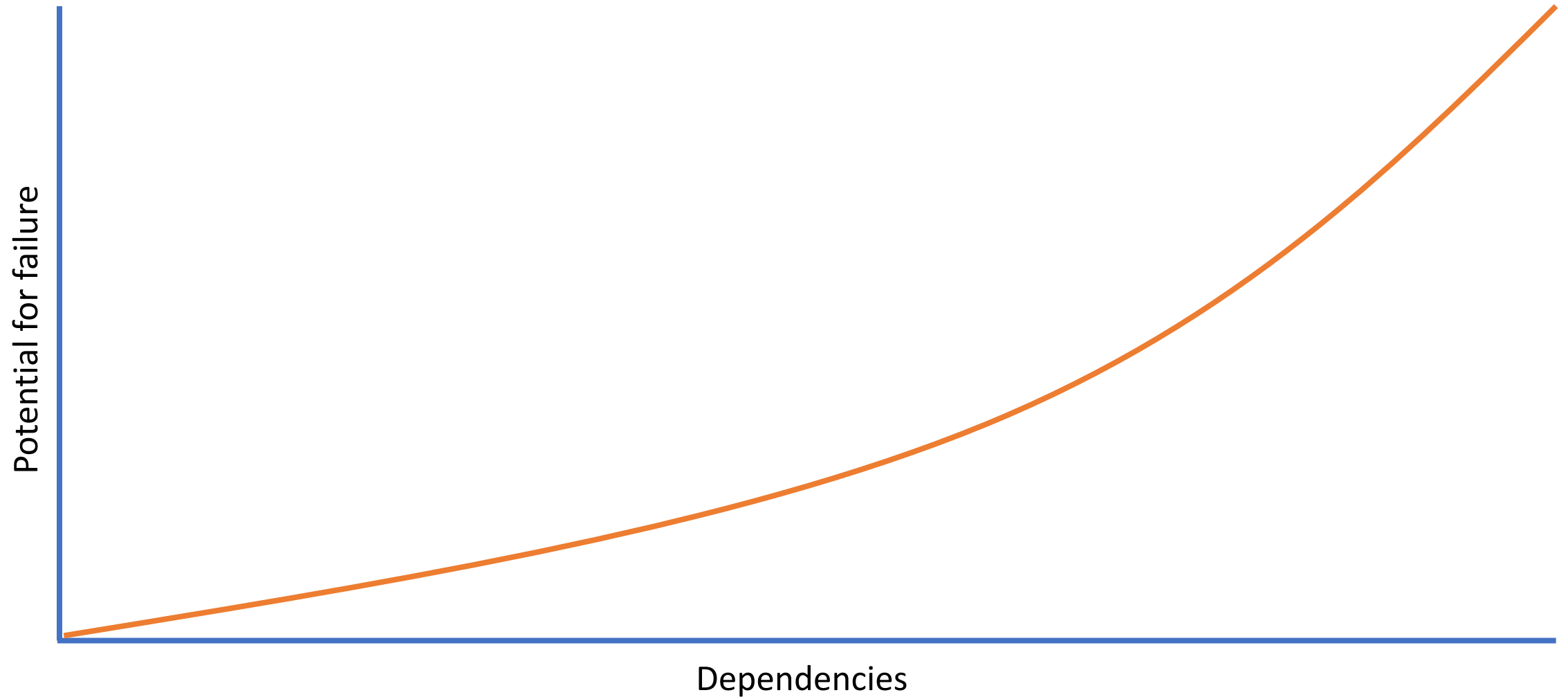
3

4

Success!



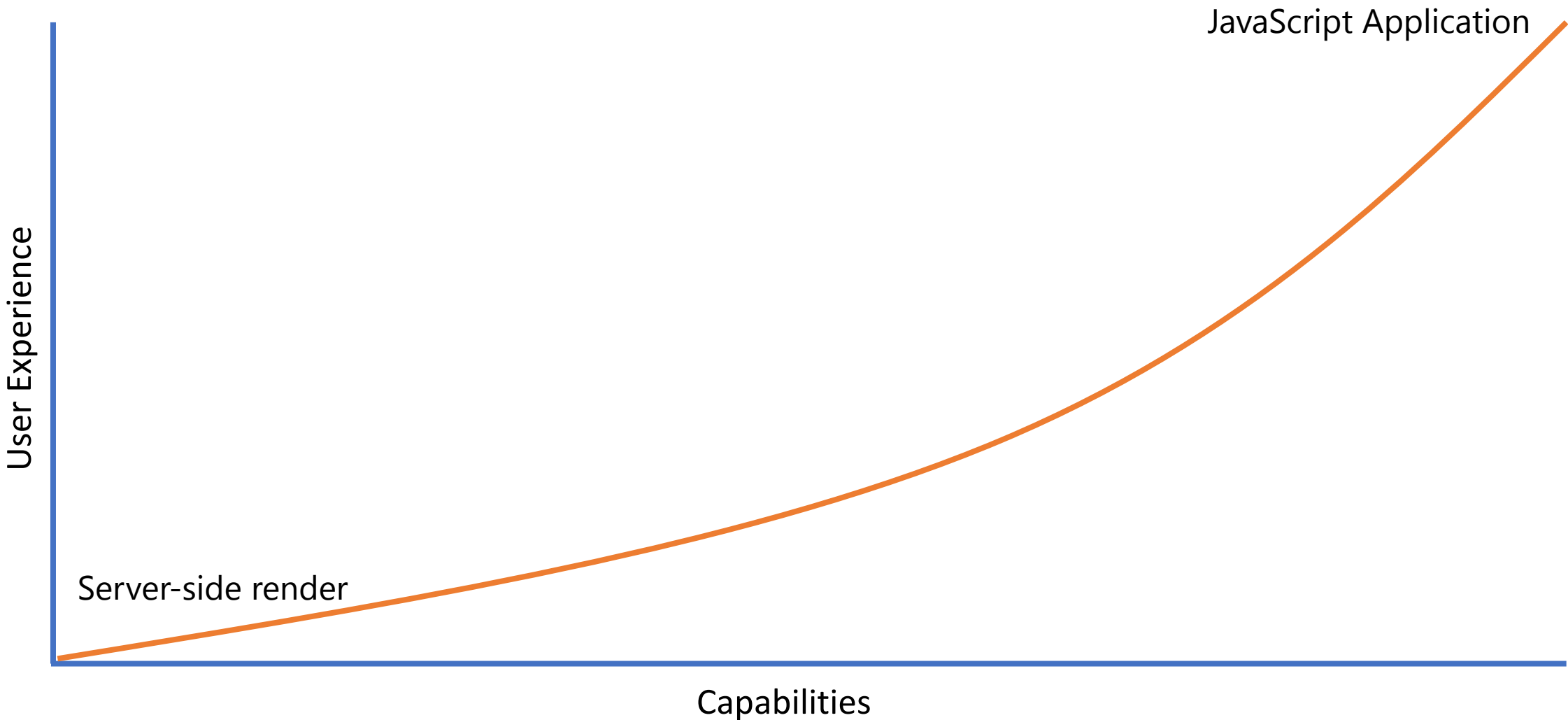
More dependencies, more (potential) problems



We can and should use JavaScript,
but thoughtfully & intentionally



Enhance the experience




My Feed Politics US World Technology Entertainment Sports Money Lifestyle Autos Video

powered by MSN ⚙️



Analysts: Giuliani's media blitz gave investigators new leads

The Washington Post





Weather

Hawaii volcano erupts; county issues evacuation orders


AP Associated Press

Seattle, Washington > ...

 53°F Partly Cloudy 50.0%

Fri	Sat	Sun	Mon	Tue
				
60° 52°	67° 57°	71° 55°	70° 55°	74° 57°


Data from Foreca | Updated 14 mins ago



Money

Why SF residents are freaking out after buying \$1M homes

BI Business Insider



US

Miami Cop Relieved Of Duty For Kicking Handcuffed Suspect...

CBS Miami - LocalNewsRSS









Politics

Ryan says chaplain will remain in his post

wp The Washington Post

NBA > ...

 PHI	May 3 103 - 108 FINAL BOS leads 2-0	 BOS
 CLE	May 3 128 - 110 FINAL CLE leads 2-0	 TOR
 GS	ESPN 8:00 PM ET May 4 GS leads 2-0	 NO

Data from Stats

Feedback

Detecting support

```
if ( navigator.credentials ) {  
    // Actual logic goes here  
}
```

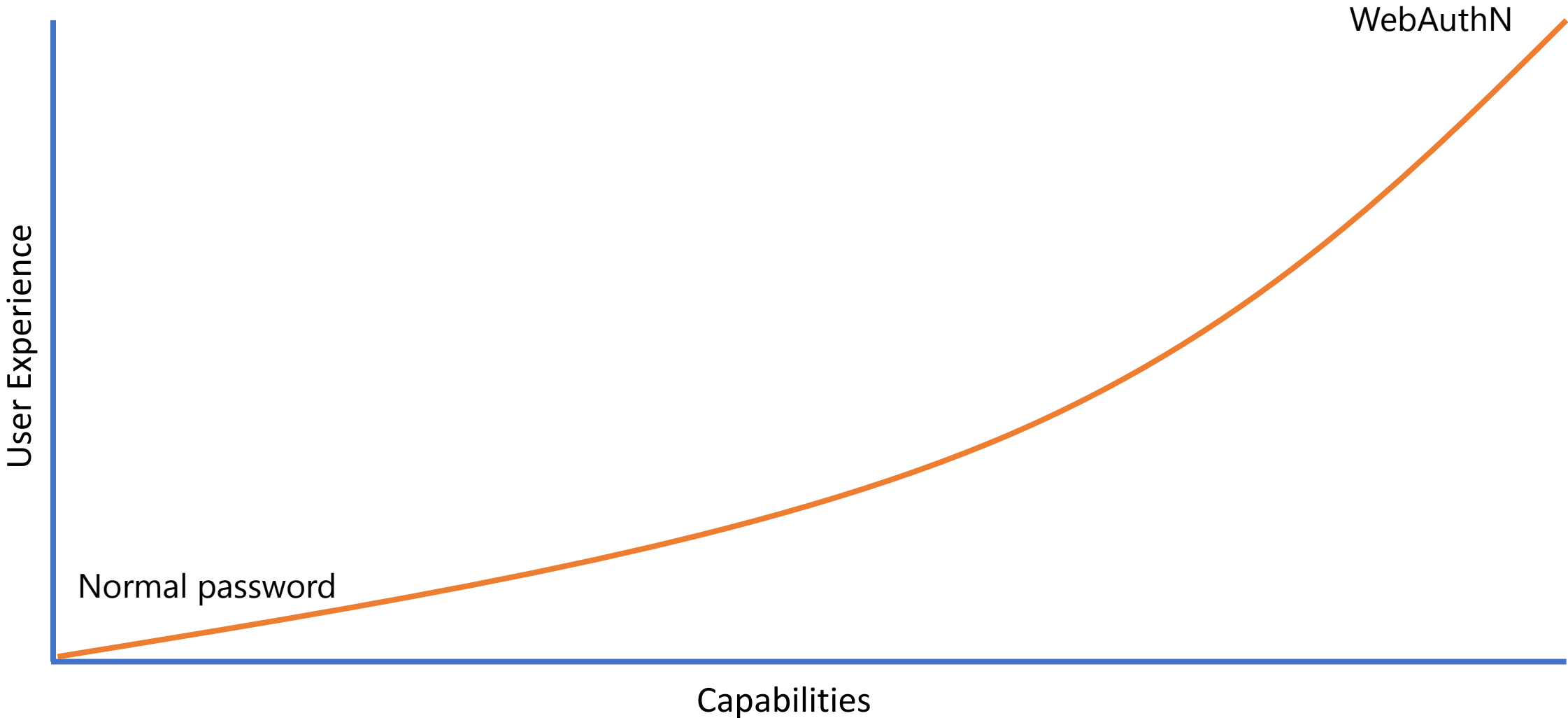

Creating the credential

```
// Create a credential with WebAuthn APIs
navigator.credentials.create({
  publicKey: {
    rp: { /* relying party info */ },
    user: { /* user info */ },
    authenticatorSelection: {
      authenticatorAttachment: "platform"
    },
    pubKeyCredParams: [{
      type: "public-key",
      alg: -257 /* Accept RS256 credentials */
    }],
    // and other required parameters such as challenge, timeout, ...
  }
}).then(attestation => {
  // Send the credential to your server, which decodes it and stores the public key
  sendToServer(attestation);
});
```

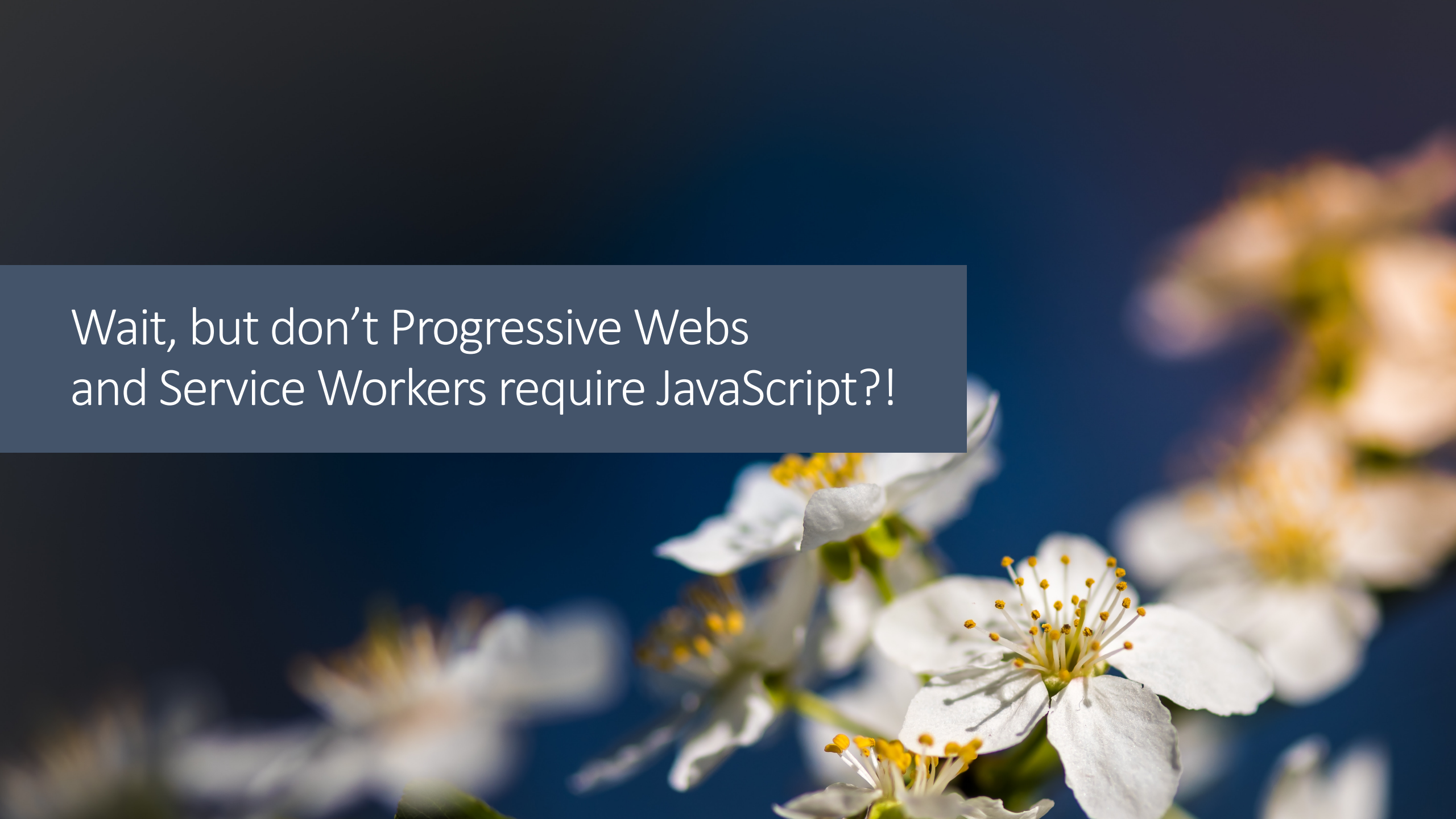
Verifying the credential later

```
// Next time the user visits the page, call the WebAuthn APIs
navigator.credentials.get({
  publicKey: {
    allowCredentials: [{
      type: "public-key",
      id: credentialId // ID of credential(s) previously created
    }]
    // and other required parameters such as challenge, timeout, ...
  }
}).then(assertion => {
  // Send the assertion to your server, which decodes it and ensures the
  // contained signature matches the public key received at credential creation
  sendToServer(assertion);
});
```

Enhance the experience



Wait, but don't Progressive Webs
and Service Workers require JavaScript?!



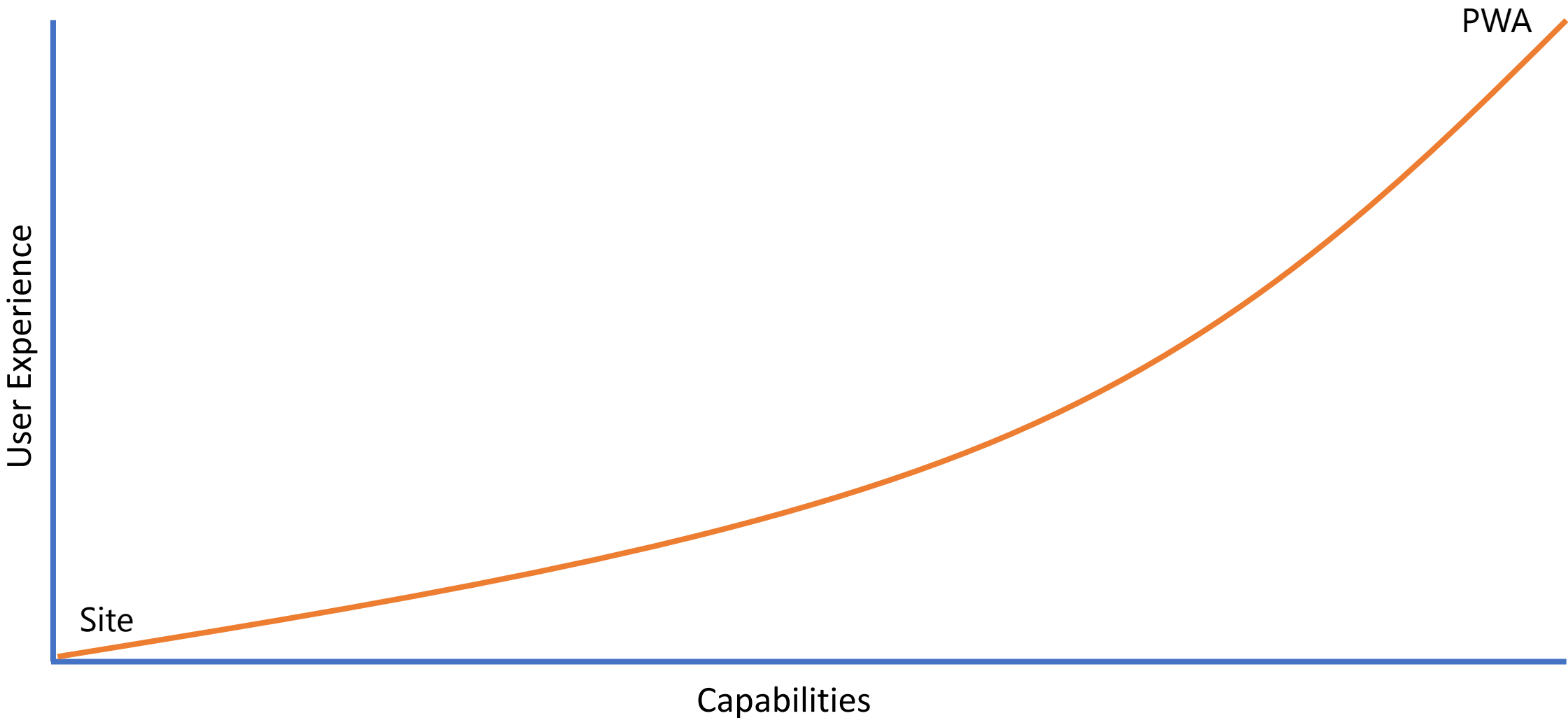
Registering a Service Worker

```
if ( navigator.serviceWorker ) {  
    navigator.serviceWorker.register('/serviceworker.js')  
        .then(function(registration) {  
            console.log('Success!', registration.scope);  
        })  
        .catch(function(error) {  
            console.error('Failure!', error);  
        });  
}
```

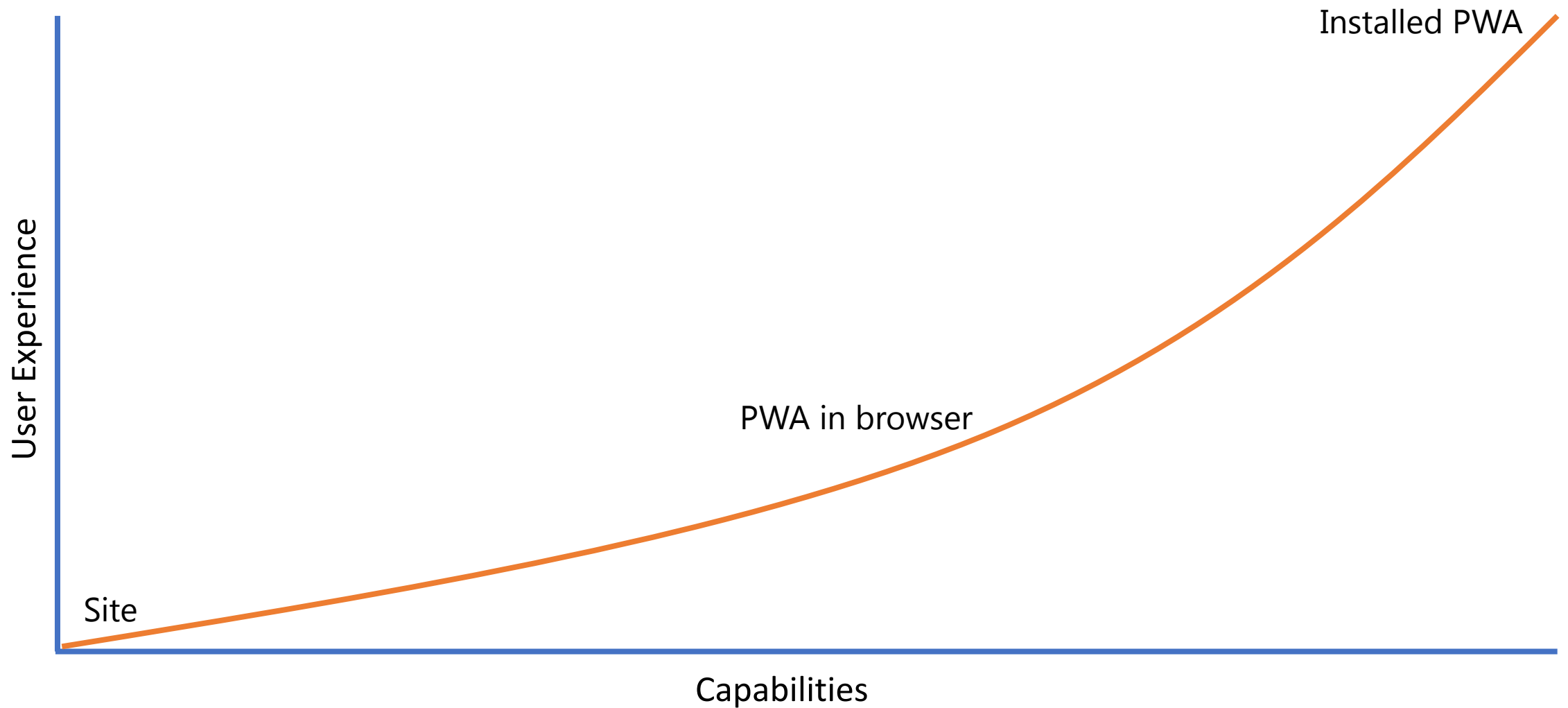
Object detection FTW!

```
if ( navigator.serviceWorker ) {  
    navigator.serviceWorker.register('/serviceworker.js')  
        .then(function(registration) {  
            console.log('Success!', registration.scope);  
        })  
        .catch(function(error) {  
            console.error('Failure!', error);  
        });  
}
```

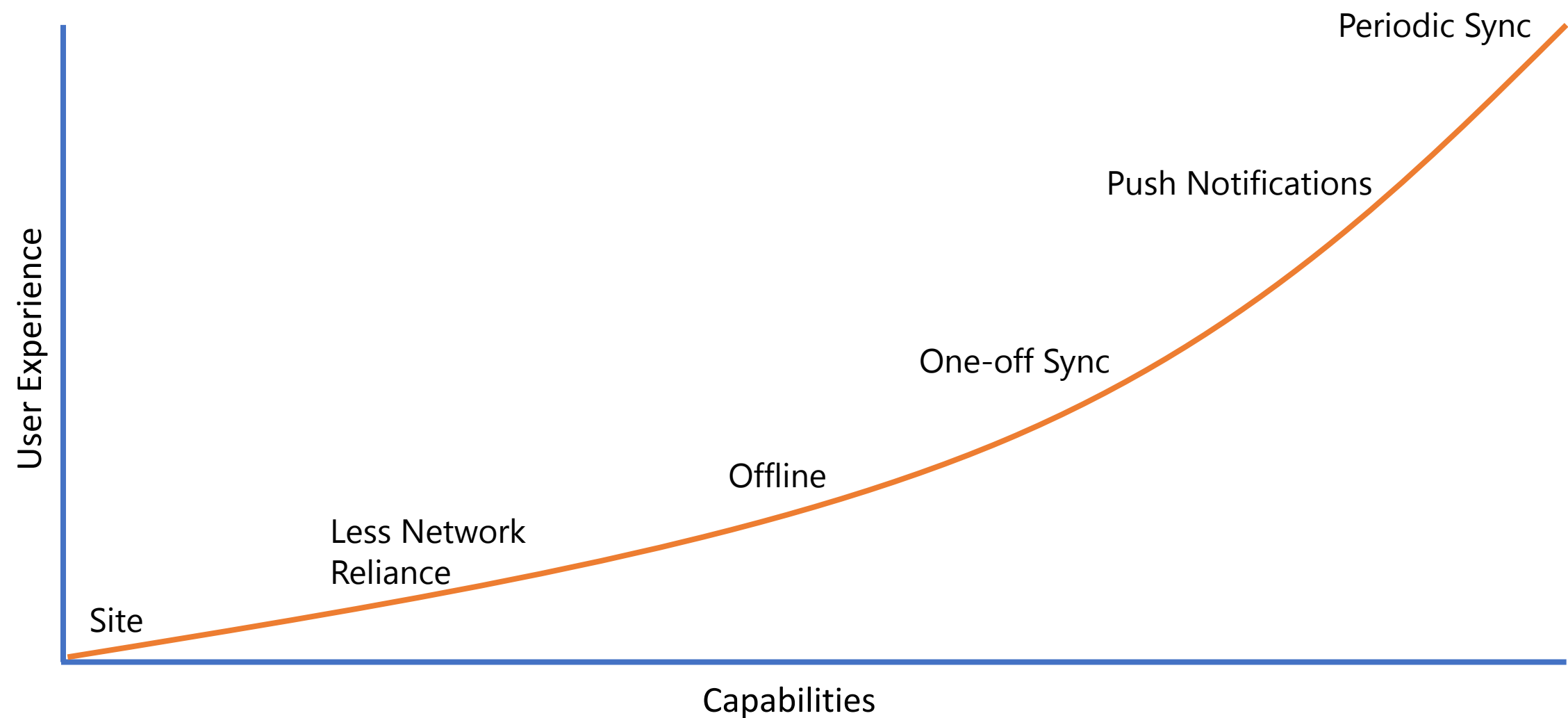
Enhance the experience



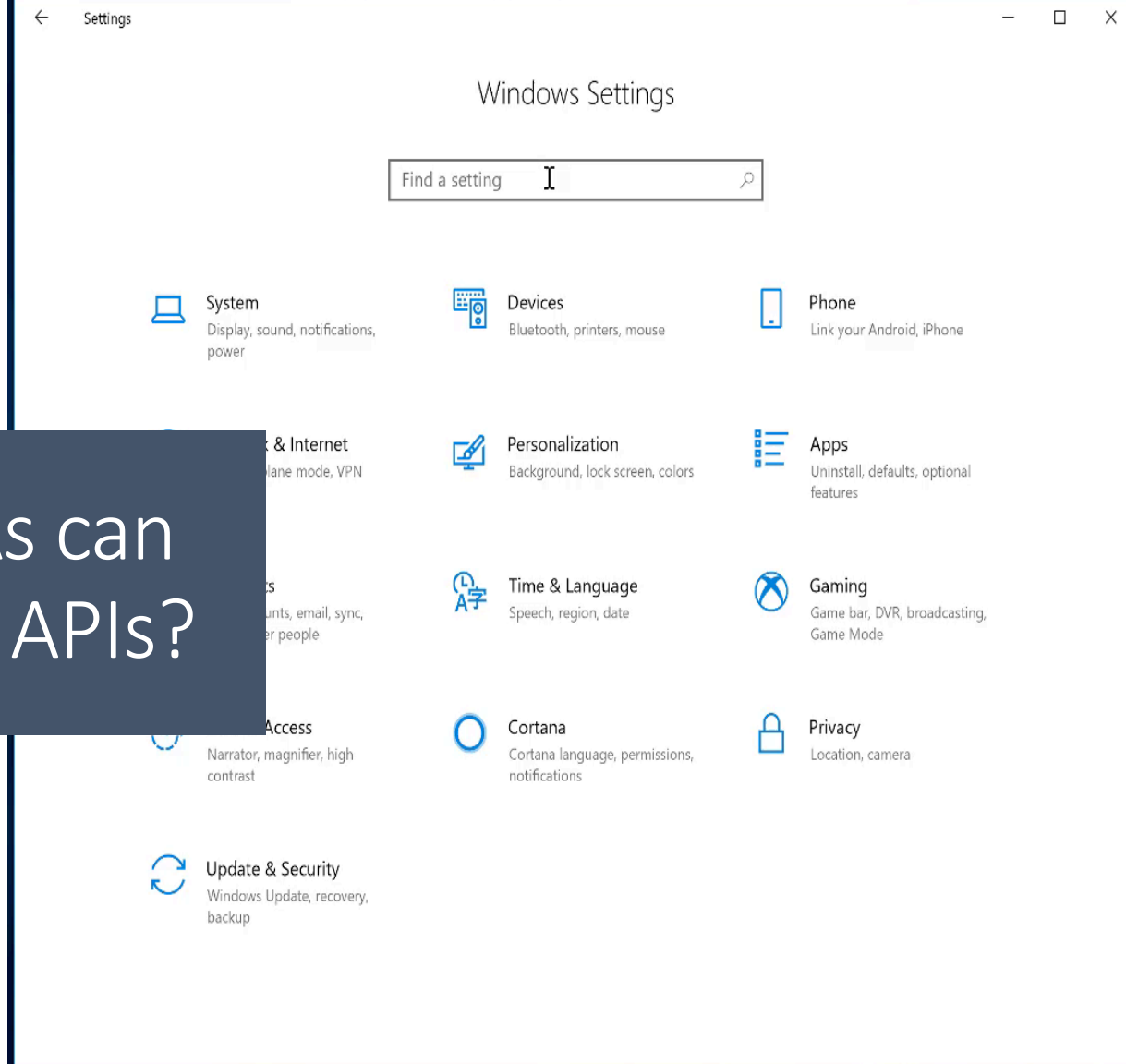
Enhance the experience



Enhance the Service Worker



Did you know PWAs can
enhance via native APIs?



Recycle Bin

Detecting “dark mode”

```
if (window.Windows) {  
    var uiSettings = new Windows.UI  
                        .ViewManagement  
                        .UISettings();  
  
    var color = uiSettings  
                .getColorValue(  
                    Windows.UI  
                    .ViewManagement  
                    .UIColorType  
                    .background  
                );  
    if (color.r == 0 && color.g == 0  
        && color.b == 0) {  
        // changes for Dark Mode  
    }  
}
```

Detecting “dark mode”

```
if (window.Windows) {  
    var uiSettings = new Windows.UI  
                        .ViewManagement  
                        .UISettings();  
  
    var color = uiSettings  
                .getColorValue(  
                    Windows.UI  
                    .ViewManagement  
                    .UIColorType  
                    .background  
                );  
    if (color.r == 0 && color.g == 0  
        && color.b == 0) {  
        // changes for Dark Mode  
    }  
}
```

Detecting “dark mode”

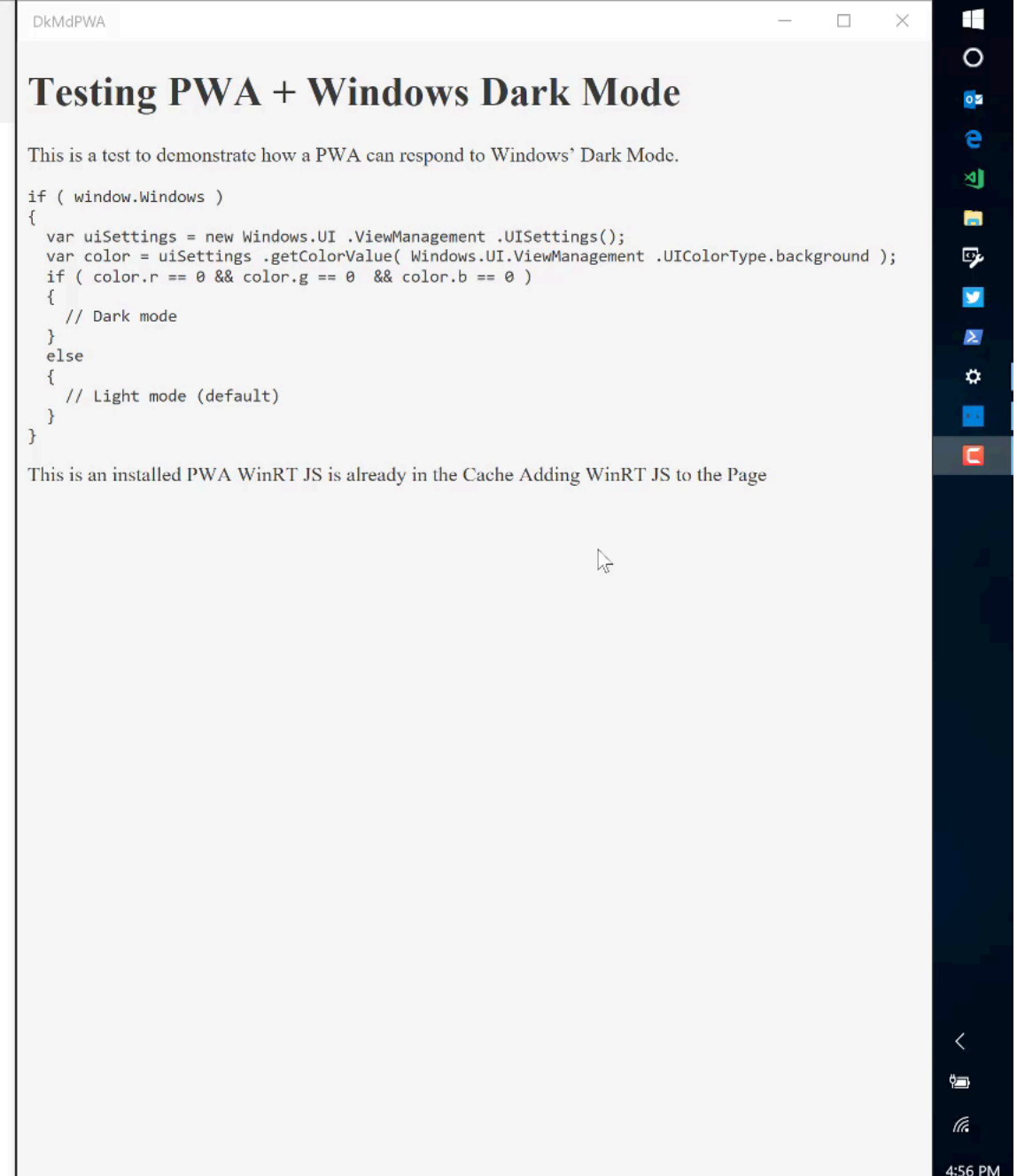
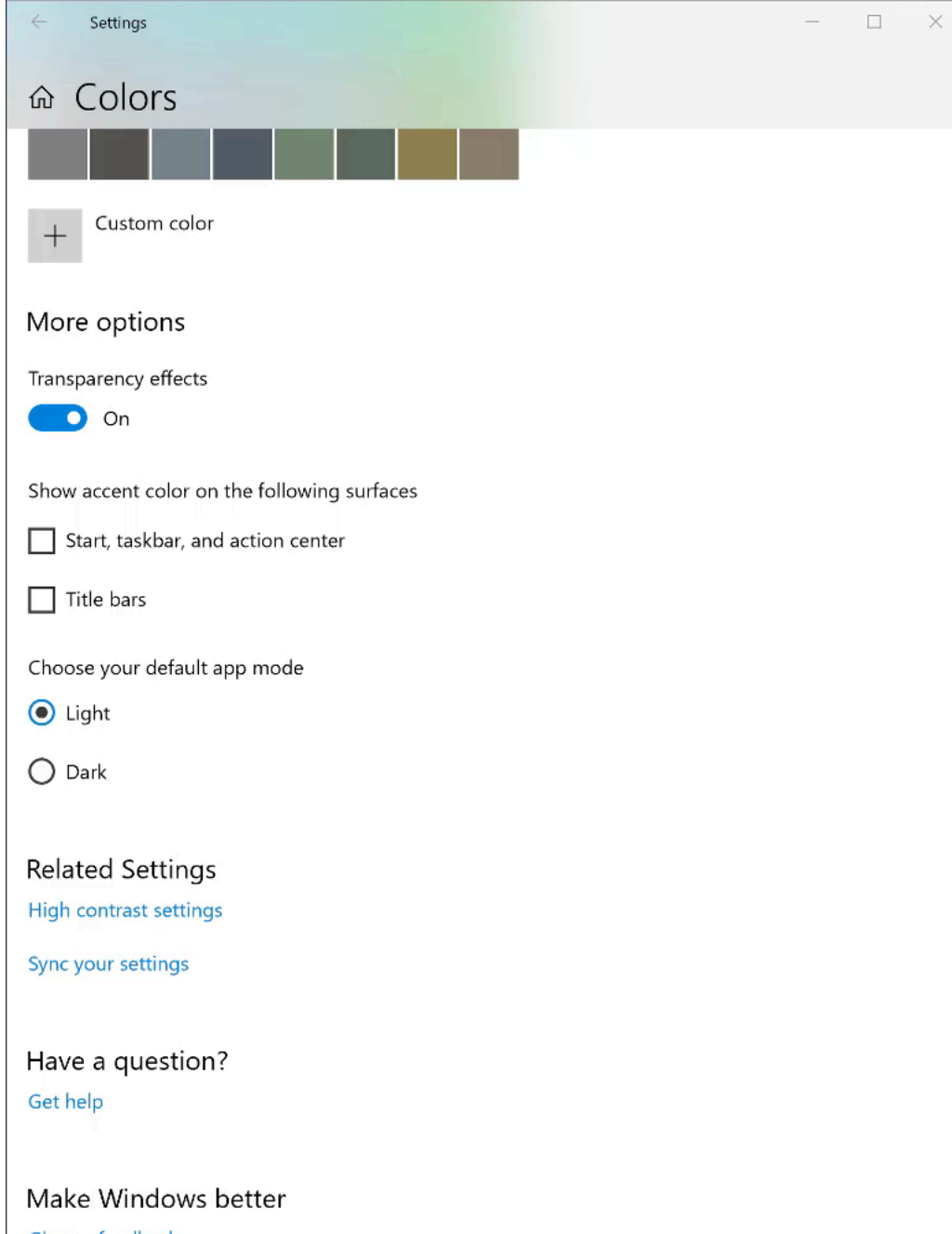
```
if (window.Windows) {  
    var uiSettings = new Windows.UI  
                        .ViewManagement  
                        .UISettings();  
  
    var color = uiSettings  
                .getColorValue(  
                    Windows.UI  
                    .ViewManagement  
                    .UIColorType  
                    .background  
                );  
  
    if (color.r == 0 && color.g == 0  
        && color.b == 0) {  
        // changes for Dark Mode  
    }  
}
```


Detecting “dark mode”

```
if (window.Windows) {  
    var uiSettings = new Windows.UI  
                        .ViewManagement  
                        .UISettings();  
  
    var color = uiSettings  
                .getColorValue(  
                    Windows.UI  
                    .ViewManagement  
                    .UIColorType  
                    .background  
                );  
  
    if (color.r == 0 && color.g == 0  
        && color.b == 0) {  
        // changes for Dark Mode  
    }  
}
```

Detecting “dark mode”

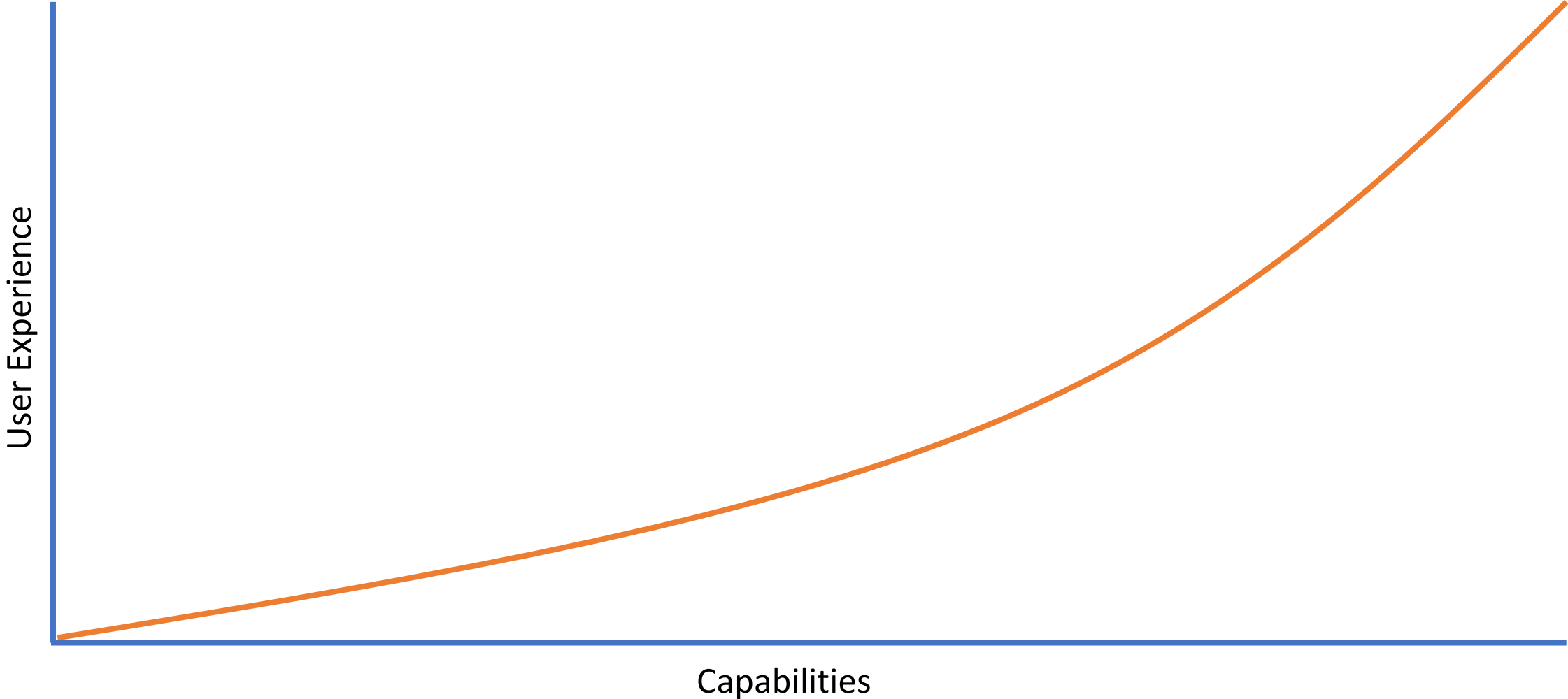
```
if (window.Windows) {  
    var uiSettings = new Windows.UI  
                        .ViewManagement  
                        .UISettings();  
  
    var color = uiSettings  
                .getColorValue(  
                    Windows.UI  
                    .ViewManagement  
                    .UIColorType  
                    .background  
                );  
  
    if (color.r == 0 && color.g == 0  
        && color.b == 0) {  
        // changes for Dark Mode  
    }  
}
```



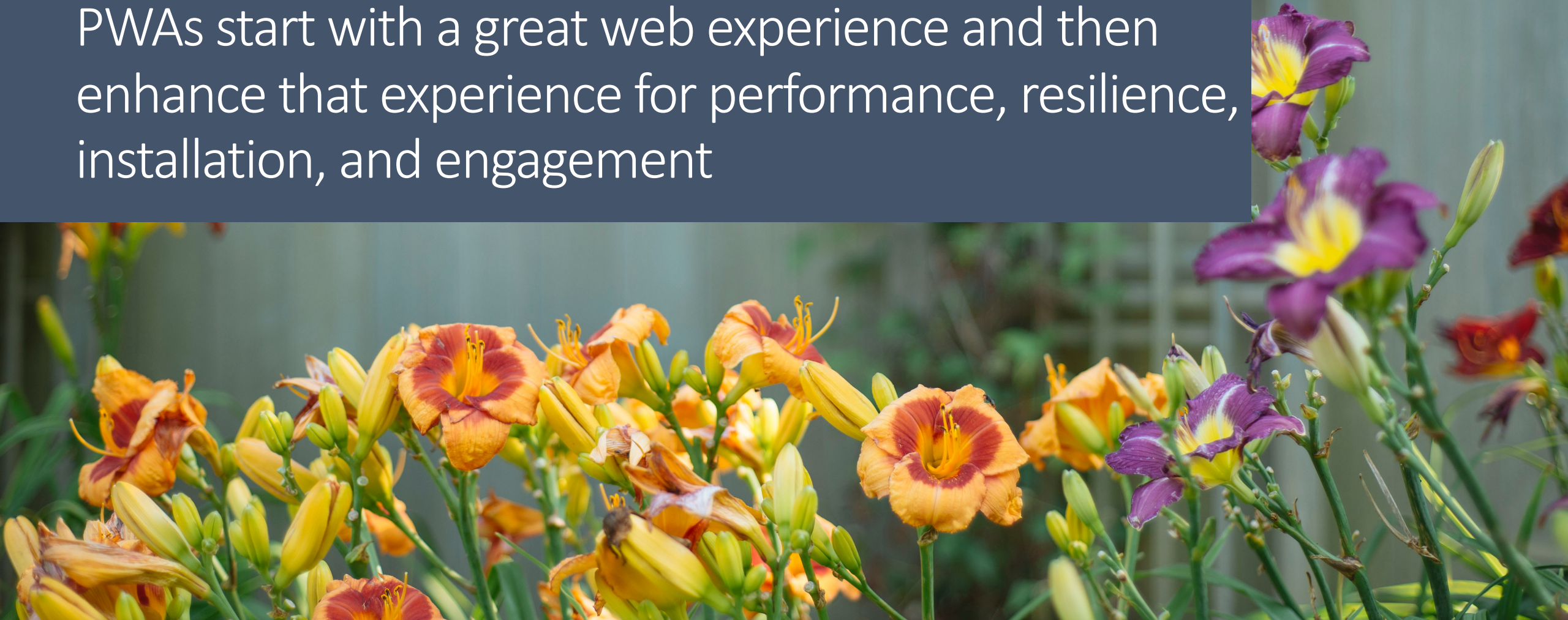
We can and should use JavaScript,
but thoughtfully & intentionally



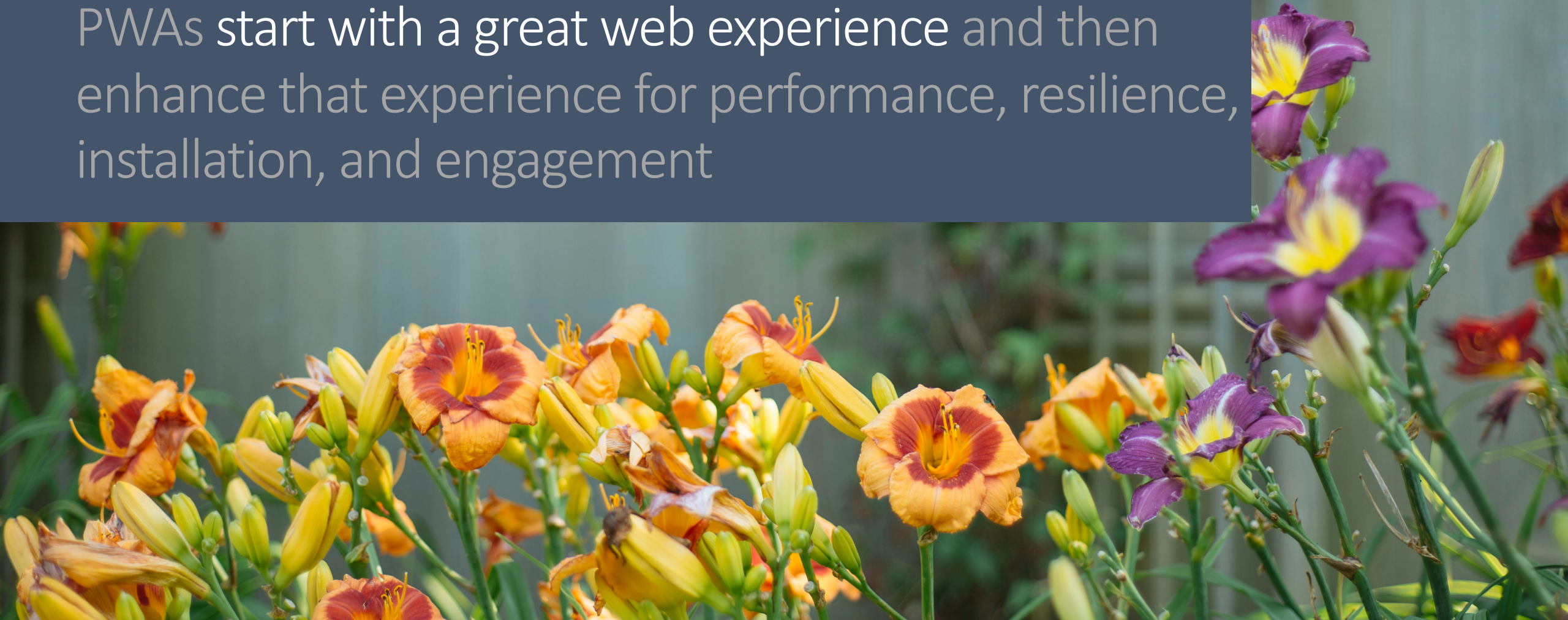
Enhance the experience



PWAs start with a great web experience and then enhance that experience for performance, resilience, installation, and engagement



PWAs start with a great web experience and then enhance that experience for performance, resilience, installation, and engagement





Focus
Design

Markup
JavaScript



Thank you.

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