

31
PAGES OF
EXPERT TUTORIALS

FREE 176 MINUTES
OF PWA VIDEOS

web designer

TM

HTML5

CSS3

jQuery

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8 WordPress SECURITY SECRETS

Essential tips to keep your install safe

WEB ACCESSIBILITY

How to create an all-inclusive online experience

BETTER
BUILDS WITH

WEB COMPONENTS

HOW TO GET READY FOR THE FUTURE OF HTML

PLUS
POLYMER 3.0
SNEAK PEEK

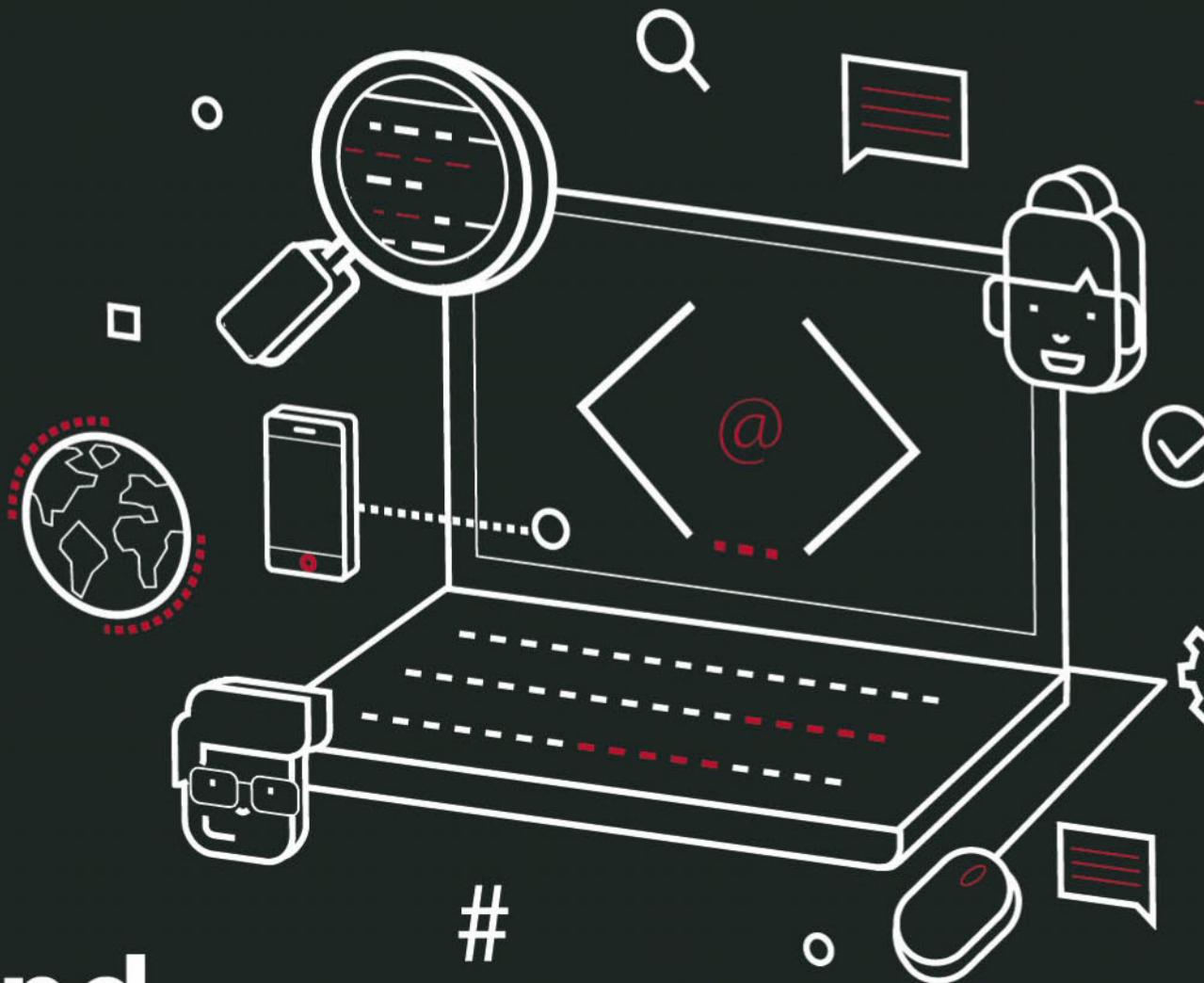
**CONVERT VISITORS
TO CUSTOMERS**
Introduce CRO techniques
for better returns

**CODE A WEBGL
RACER GAME**
Employ the power of
ThreeJS for 3D action

**CREATE DATA
VISUALISATIONS**
Bring together Twitter
and Flickr data



ISSUE 272



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Welcome to the issue

THE WEB DESIGNER MISSION

To be the most accessible and inspiring voice for the industry, offering cutting-edge features and techniques vital to building future-proof online content



Steven Jenkins
Editor

Web Components. Try now



Web components have been around since 2011, but browser vendors have been slow to follow, very slow. But Chrome now offers full support, Firefox can and Edge can't. But, with Google pushing it forward Web Components are happening. The option to create custom code, build reusable elements and get better builds is an opportunity not to miss.

In our lead feature (p44) you will find out what's happening in the world of Web Components, who's using them and how Google's Polymer library is a key driver in helping to start the build process using Web Components. A selection of short tutorials

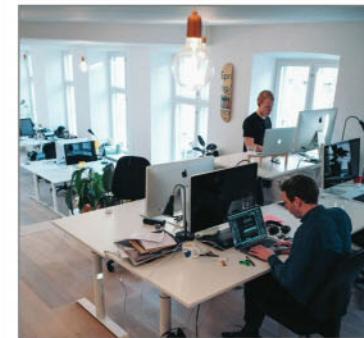
reveal how to get started with Polymer, build custom elements and extend existing elements to suit. Plus, discover third-party elements to try and what the next version of Polymer will bring.

Web accessibility is another part of the design and development process that has had a slow adoption. But still the web is awash with sites that simply don't give it a second thought. It's about time everyone did and our feature on page 66 tells you how to go all-inclusive.

WordPress is hardly a newcomer to web design, but keeping it safe and secure is still as important as it's always been. Discover a collection of must-know security secrets in our feature on page 74. Enjoy the issue.

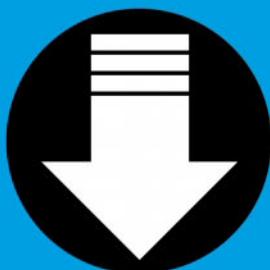
• The primary objective of web components is to allow you to break your code down into custom elements, or re-use those others have made •

Highlight



Being in a small country like Denmark, we sometimes get potential clients that think we can make things for no-money! Passion and technical prowess, has ensured that Spring/Summer is a sought-after agency. Web Designer finds out more. Page 36

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42 Designer resources

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Assets - 24 Urban desaturated effects and 7 Holographic Photoshop styles from Sparklestock (sparklestock.com)
- Tutorial files and assets



www.filesilo.co.uk/webdesigner

This issue's panel of experts

Welcome to that bit of the mag where we learn more about the featured writers and contributors...



Simon Jones

Simon works with a variety of front-end frameworks which each bring different approaches to development. This issue, he looks at how Polymer, a web component library from Google, can help you easily write highly modular code for the web.

Page 44

◆ A number of libraries seek to make web components more widely compatible and simpler to work with. The most prolific of these is Google's Polymer library ◆

Ashley Firth



Ashley is head of front-end development at start-up energy company Octopus Energy. In this issue he talks about designing and developing for general web accessibility, and how to help specific disabilities. **Page 66**

Mark Shufflebottom



Mark is a Professor of Interaction Design at Sheridan College and is also an Adobe Education Leader. In this issue, Mark is starting the first in a two-part tutorial, creating an endless flying game in WebGL with ThreeJS. **Page 54**

Sarah Maynard



Sarah is a freelance writer, WordPress developer and digital illustrator. In this issue she covers eight need-to-know secrets that will keep your WordPress install safe, secure and free from unwanted intrusions. **Page 74**

Paul Betteridge



Paul has 15 years' experience and has been cherry picked as a 'Google Leader'. In this issue he takes a closer look at how to convert visitors to customers using the best CRO techniques for better returns. **Page 58**

Steven Roberts



Steven is a multi-disciplined designer/developer from Teesside. Having recently changed jobs he's currently delving into the world of events with Asemblr.co. Check out his tutorial on improving the performance of web animation. **Page 86**

Luke Harrison



Luke is a web developer from Sheffield, UK who is all about scalable & efficient front-end architecture. In this issue, he explores how to create a simple web page design using the popular MacOS app Sketch. **Page 62**

Matt Crouch



Matt is a frontend developer based in London. In this issue, he will be going through how to create a dynamic and informative data mashup site based on the user's location using the Twitter, Flickr and Google Maps APIs. **Page 80**

Leon Brown



Leon is a freelance web developer and trainer who assists web developers in creating efficient code for projects. This issue he recreates a host of techniques as inspired by the top-class sites seen in Lightbox. **Page 16**

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Chat with the team and other readers and discuss the latest tech, trends and techniques. Here's how to stay in touch...

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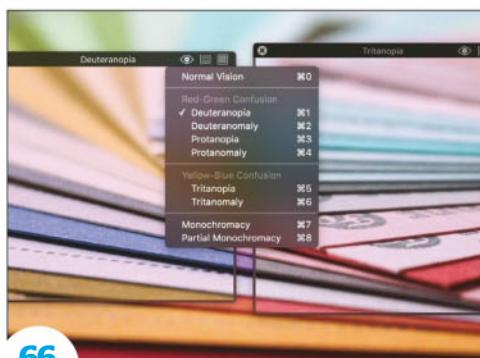
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Learn to design and develop a web for all



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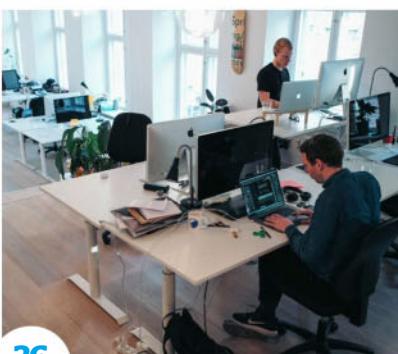
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ProFile: Spring/Summer
A much sought after Danish agency



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The tools, trends and news to inspire your web projects

Browser compatibility: Who does what?

Mozilla is bringing together its browser compatibility tables in one GitHub resource. Say hello to the Browser Compatibility Project

rowsers, everyone is using them. It doesn't matter if you use Chrome, Firefox, Safari, Opera, Edge or some lesser-known entity, you are still using them. What you use is simply a matter of personal preference. We all know that Chrome is the biggest player in the market. According to statcounter (gs.statcounter.com) Chrome currently engulfs the competition with over 56 per cent of the market share worldwide. Who's next in the line-up? Safari with 14 per cent. Then there's UC Browser with eight per cent, Firefox with five per cent and Opera with four per cent. Change from worldwide market share to specific continent market share and the stats change. In Europe, Chrome is way out in front with Safari closing the gap. Head to North America and the gap between the two comes down to around 25 per cent.

But the stats prove that Chrome is the undisputed number one browser across the globe. It hovers around the 50-60 per

cent mark for market share with none of the others getting close. While this means that it is the most popular browser in the world it is still only occupying 50-60 per cent of the market. Which means that 40-50 per cent of browser users are still using an alternative to Chrome. But none in the same sort of quantity, but still an

designers and developers need all the help they can get.

As we know different browser vendors have different priorities, resources (cash/people), features and obviously all are looking for a competitive edge so typically get released at different times. So what should designers and developers do? Any

“Any help is good and this is where Mozilla comes in”

alternative. However you look at it that's a lot of users not using Chrome.

As designers and developers it is always good to know which browsers are the preferred choice of your users. In an ideal world all would be equal but they are not, so it is important that designers and developers are aware of what is supported and what works in what browser. And lets not forget the ridiculous number of devices that the web can be viewed on. So,

help is good and this is where Mozilla's Browser Compatibility Project comes in. Mozilla already provides browser compatibility tables, but as it states: "Whilst unquestionably helpful, this resource alone doesn't eliminate all challenges". It's now working on migrating the compatibility information currently stored on thousands of wiki pages to a machine-readable JSON format on Github. Find out more at: github.com/mdn/browser-compat-data.

STAT ATTACK

DESKTOP v MOBILE*

Who's got the biggest market share?

Europe



North America



Africa



South America



Oceania

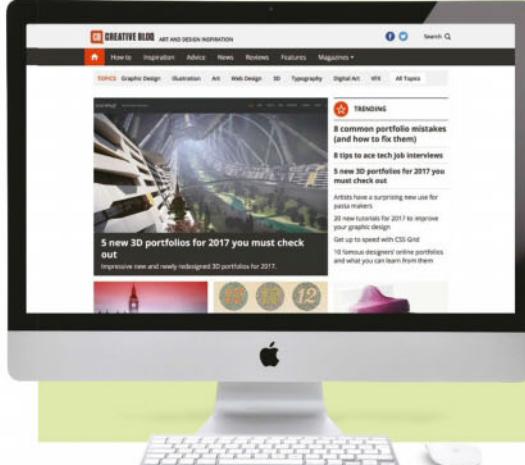


Source: gs.statcounter.com

*includes mobile and tablet

CREATIVE BLOQ

creativebloq.com



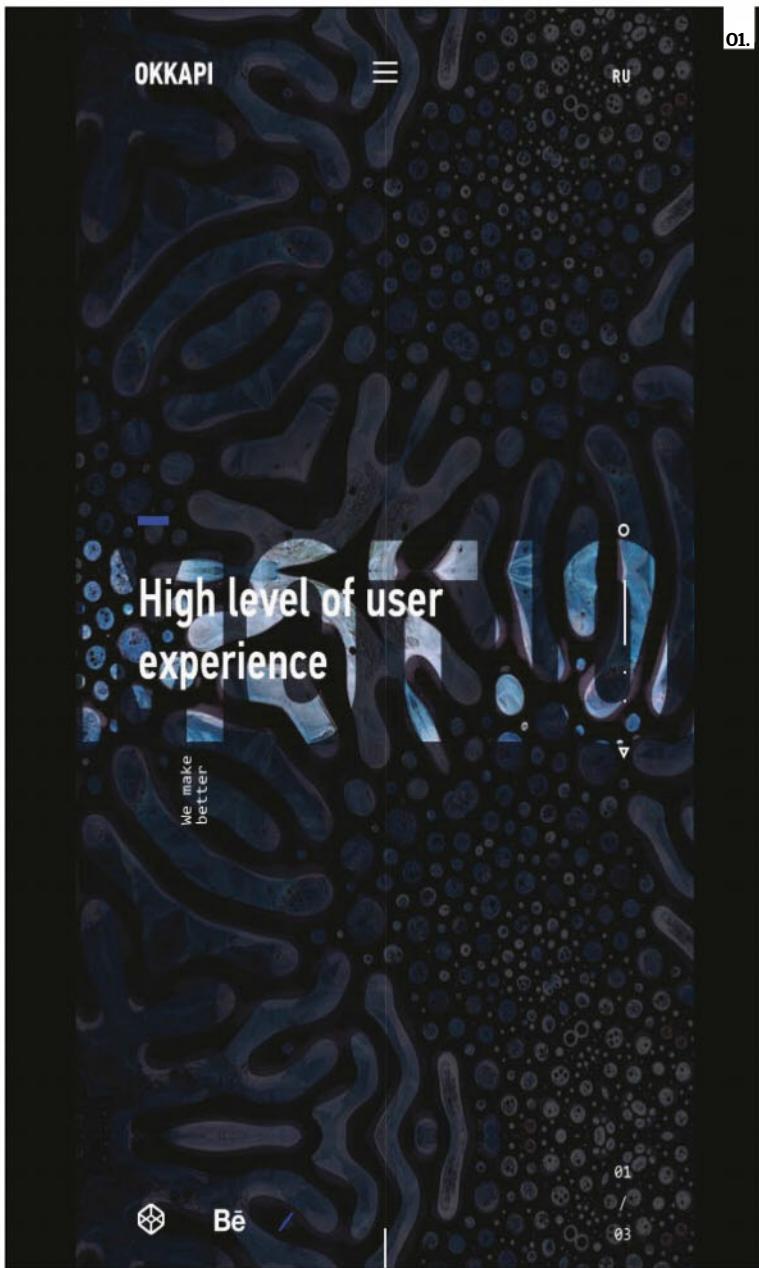
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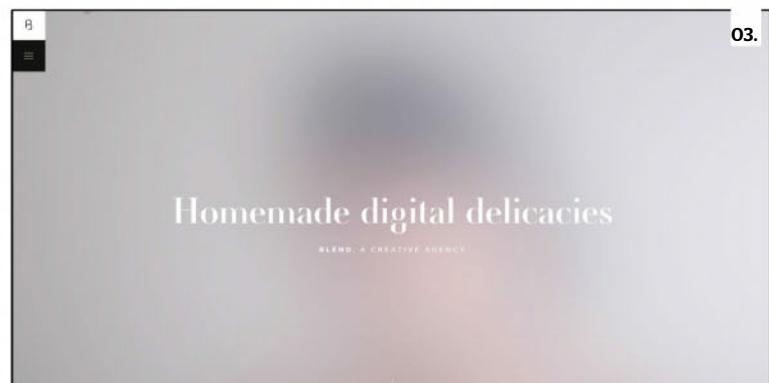
Sites of the month



01.



02.



03.



01. Okkapi

okkapi.agency/en

User interaction activates a background kaleidoscope effect.

02. Red Collar

2017.redcollar.digital

Follow the light to see amazing real light effects. Sit and admire.

03. Blend

blendingpoint.com

A heavily blurred image appears from the mist to reveal more.

04. The Global Goals

globalgoals.org

A grid-based design that perfectly slips into mobile mode.

Graphics

ITsumma

bit.ly/2EPKO5b

A gorgeous collection of illustrations for ITsumma by the talented Spoon Jar.



Colour picker Pink valentine

bit.ly/2oamvp2



Typesetter Muara

bit.ly/2oajogl

A retro-modern typeface with a classic look. Ideal for books, packaging and branding.

ABC
01234

WordPress Bole

bit.ly/2CyMAlI

If you like fullscreen and simple then this multi-talented theme is for you.



webkit

Discover the must-try resources that will make your site a better place



Phaser 3

github.com/photonstorm/phaser

In case you don't know Phaser is a free and fast 2D game framework for making HTML5 games for desktop and mobile web browsers. It supports Canvas and WebGL. The open source framework has now reached version 3. There is also a Phaser CE 'a community-lead continuation of the Phaser 2 codebase and is hosted on its own repo'.



Blotter.js

blotter.js.org

If you want to create unconventional, and impressive, text effects for the web then this JavaScript API is the ideal tool for your projects.



fullstory

fullstory.com/free

How are customers using your website? What experience are they getting? Fullstory will capture everything, ready for you to analyse.



Vecta

vecta.io

Vecta is a real-time, collaborative, advanced SVG editor. Create diagrams to visualise your backend architecture or agile processes.

TOP 5 Web conferences - April 2018

Get yourself a seat at the biggest and best conferences coming your way soon



An Event Apart

bit.ly/2oeUtlU

Set in Seattle this event offers three days of design, code and content with a swathe of great well-known speakers.



React Amsterdam

react.amsterdam

The biggest React conference in the world. Guess you better get your ticket now.



NG Conf

ng-conf.org

Workshops and speakers all with a love of code. If you want to learn about Angular then this conference is for you.



CodeStock 2018

codestock.org

A two-day event for technology and information exchange. Created by the community, for the community.



Generate NY

bit.ly/2ksb9YY

A three-day event consisting of a day of workshops followed by a two-day, single-track conference. Be there.

Developing developer skills for AI

Todd Anglin of Progress suggests devs should be building AI into everything



Todd Anglin
VP of Product at Progress
progress.com

“There is not a magic programming language or approach that will work for everyone”

It would not be a surprise to say that AI is everywhere these days. From the fantastic to the mundane, everything from manufacturing to healthcare is being earmarked for transformation with the technology. This potential for AI to not only transform businesses but replace simple tasks means that every developer should be looking at how to build the technology in to everything they code. If we are to build a cognitive-first future, then it will be essential to be at the forefront of this technology, constantly looking for ways to innovate.

But what does this mean for the everyday developer? The biggest myth of AI is that it will take over the world by itself. Through a combination of Hollywood assumptions and general ignorance, many people outside of software development have the notion that AI will write itself, teach itself and then eventually tell all of us what to do. Computers are amplifiers. They can amplify your intelligence. Or, they can amplify your lack of it! AI solutions are not programming themselves. They are being created in the programming languages that exist today – everything from JavaScript to Python to C++ – by the developers that exist today. We’re not at the point yet where we can rely on AI to author software, nor will we reach that point anytime soon. Whilst mundane coding tasks may increasingly become the domain of smarter tools and AI, development jobs and the presence of software engineers will still be essential to drive innovation.

However, that’s not to say that new skills are not needed. As with all development, a willingness to constantly learn and evolve is needed. In order for businesses and projects to avoid falling behind their competition, developers need to begin shifting mind-sets to understand how they can leverage increasingly capable machines to change the way they design software. AI and an increasingly wide array of off-the-shelf cognitive services demands that we challenge traditional patterns that have largely governed software development for at least the last 20 years. This is the biggest fundamental shift in software design since the Internet became a pervasive force in the ‘90s.

So what’s needed to stay ahead of the machines? Many of the skills needed to prepare for this future are the same required to remain competitive today. There is not a magic programming language or approach that will work for everyone. Perhaps the biggest change needed is that of the developer mind-set. Conventional thinking towards software development requires that all possible inputs and outputs be anticipated and designed. With AI, developers can create software that learns and is capable of handling unexpected inputs. It will take time for developers to fully realise the potential of this mind-set change.

Another key skill for developers to acquire is a deeper understanding of the different components that make up “AI”. Courses are available to help with this, introducing concepts such as computer vision, natural language processing, conversational bots, robotics and machine learning. Interestingly, delving into philosophy and psychology may also be essential for developers in the future. The importance of building a moral code in to the software itself is rapidly becoming more than a Hollywood cliché.

Additionally, for those looking to move into AI, or specifically machine learning, spending extra time learning the leading frameworks that are serving as the building blocks of AI would be a great idea. TensorFlow and Spark are two good examples of the frameworks underpinning many of today’s AI solutions and APIs.

As has always been the case, existing educational establishments are always evolving to keep up with the latest trends in developing. We are going to see more and more introductory courses to AI being launched that will help teach the basics to everyone. For those wanting to specialise, there exists a number of resources online that will help delve further into the specific components.

We are just scratching the surface with what can be achieved through the introduction of AI. It’s hard to fathom what will be possible in the next three to five years. From the ability to discover new life-saving drugs in healthcare to simply predicting a breakdown on a production line, the limits will be bound only by imagination and our ability as developers to find new ways to leverage these.

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 stencil

Docs Demos PWAs Resources GitHub



The magical, reusable web component compiler

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▶ Watch launch video

Stencil

stenciljs.com

Stencil, built by the Ionic framework team, describes itself as 'The magical, reusable web component compiler'. So what does it do? It is a compiler that generates Web Components, more specifically, Custom Elements. This means that Stencil-generated components can be used with a framework of choice, or by itself.



Vuetify

vuetifyjs.com/en/

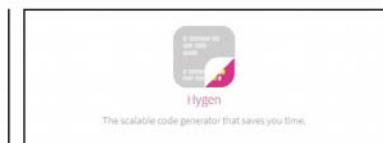
There is a clue in the name. Vuetify brings together the power of Vue.js and Material Design. Includes eight pre-made vue-cli templates.



Placeholder image generator

bendera.github.io/placeholder/

Need placeholder images, but don't have an image editor to hand? Get online, choose size, colour and format, then download. Simple.



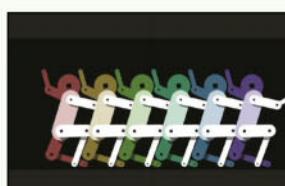
Hygen

hygen.io

Describes itself as the 'The scalable code generator that saves you time'. Want to know more? Then head over to the website.

TOP 5 Codepens

Get your hands on an impressive collection of code examples



The Last Experience

bit.ly/2weqZAH

A collection of in-sync dancing robots. Spoil the equilibrium by interacting with your mouse.



I could not stop

bit.ly/2ov4OX

You won't be able to stop clicking - once you start and the shapes start multiplying, time will fly by.



WebGL Particles

bit.ly/2E18BAN

Colourful particles join together and pull apart before moving across the screen. Much like a virtual lava lamp.



Winds

bit.ly/2CAF35Y

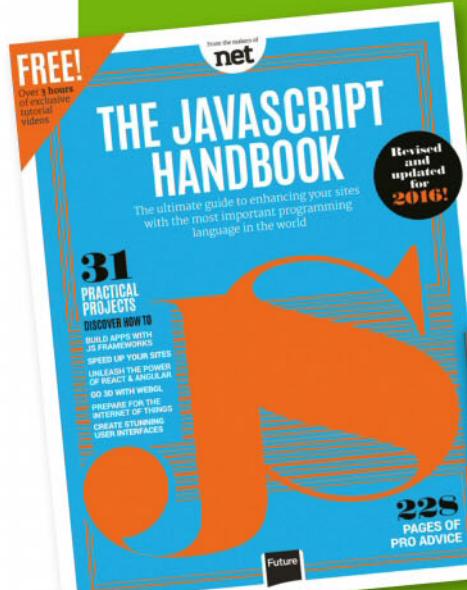
A hypnotic swaying collection of lines, coupled with subtle shadows, bring a wave of calm over the viewer.



GLSL

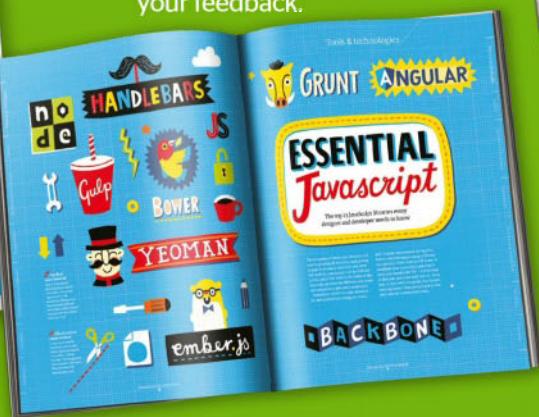
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Liam Egan's 'First Attempt at Raymarching a Tunnel' is simply mesmerising. Interact to see more of the tunnel.



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Steven Jenkins
Editor





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TODAY,
ENJOY THE
TASTE OF YOUR
FREE TIME



WHAT YOU
gonna do

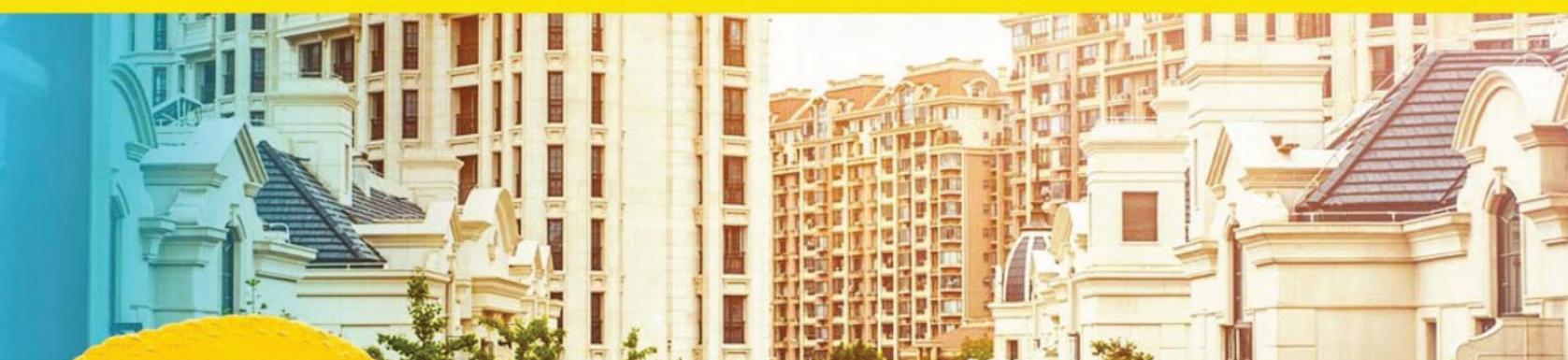
Mr. Fisk

www.queharashoy.es

Designer: BMO – <http://bmo.agency>

Development technologies jQuery, jQuery UI, Ajax API, Cloudinary

“Promoting fish food products, this bright, bold and colourful site asks to cook or not cook in order to navigate a rollover catalogue”



#54BCE1



#C3DE21



#FFE72C



#DB1119

**ABCABC
1234567890**

Above

Sequel Pro Regular by Philip Trautmann is a Sans Serif font designed for use on headlines as employed here.

**abcABC
1234567890**

Above

The Helvetica Neue font by Edouard Hoffman and Max Miedinger for Linotype appears in Condensed Bold.



WHAT YOU gonna do TODAY?

Individual portions of fish seasoned and accompanied by the healthiest and tastiest sides and garnishes. Three minutes in the microwave, one minute to rest and that's it! Or, if you prefer, you can quickly prepare the meals using a pan or grill.

Choose your favorite recipe, make your plans and enjoy them while eating healthy on a daily basis: the taste of free time is in your hands.

**Above**

Split into two core sections for raw and ready-made cooking options, the Mr Fisk product range is navigated via rollover images

SHANGHAI COD

It was spectacular! All the details of this trip will remain engraved in your memory for a long time. It was exactly what you needed. The whole trip was like a spell, like drinking from the legendary fountain of youth. You returned so full of energy! The first thing you want to do is organize all the photos you took and pick the best ones for printing.

You want to surround yourself with these experiences and memories to help you keep the energy and excitement alive for as long as possible. This trip was special and doesn't deserve to be forgotten somewhere in the Cloud. There are so many photos to go through. But today you have more time. You don't have to hurry. In just 3 minutes you will be able to enjoy great food as you work through the images.

What a coincidence! Mr. Fisk's dish for today is the Shanghai Cod. Its flavors will make you feel like you're still traveling around distant Orient, even though you're already home.

Above

Blending bold corporate colours with bold fonts, the site employs simple layouts to present punchy imagery on all devices

**Above**

Equally responsive with mobile browsers, the site reformats to slim down and deliver the same eye-catching experience

Create an interactive mouse-controlled parallax image

Give the impression of depth by using a parallax effect controlled by the user's mouse movements

1. Initiate HTML

The first step is to define the HTML document, which consists of the HTML container for storing the head and body sections. While the head section is primarily responsible for loading the external CSS and JavaScript resources, the body section will store the content elements to be created in step 2.

```
<!DOCTYPE html>
<html>
<head>
<title>Mouse Scroll</title>
<link rel="stylesheet" type="text/css"
      href="styles.css" />
<script src="code.js"></script>
</head>
<body>
*** STEP 2 HERE
</body>
</html>
```

2. Content elements

The technique will allow any content container using the 'data-parallax' attribute to display the effect. Each first level child element will display with the parallax presentation. This example sets three child layers for the parallax, but you can add more if you want to. You can also add content to these layers such as text or images; PNG or SVG with transparency will work best.

```
<article data-parallax>
  <div></div>
  <div></div>
  <div></div>
</article>
```

3. Parallax container style

Create a new file called 'styles.css'. The first set of rules in this file sets the default size of the parallax container and its position mode. It's important to use relative positioning so that the child elements can be placed in relation to wherever the container is located. The width and height are set to cover the full screen to allow for maximum interactivity.

```
[data-parallax]{
  position: relative;
  width: 100vw;
  height: 100vh;
}
```

4. Parallax children

Each of the first level elements inside the 'data-parallax' container are sized and positioned to appear centrally.

Along with parents relative positioning, percentage is used as the measurement unit, allowing the sizing and positioning to be placed in relation to the parallax container. For this example, a transparent red background is used to demonstrate the effect - you can replace this with PNG or SVG image of your choice using @background: url(your image here);

```
[data-parallax] > *{
  position: absolute;
  width: 50%;
  height: 50%;
  left: 25%;
  top: 25%;
  border: 1px solid #000;
  background: rgba(255,0,0,.25)
}
```

5. Initiate the JavaScript

Create a new file called 'code.js'. JavaScript will be used to control responses to the user's mouse interactions. We don't want the JavaScript to run any of the JavaScript code until the page has fully loaded, hence the code for steps 6 and 7 placing a function triggered by the 'load' event, which activates when the window has completed loading.

```
window.addEventListener("load", function()
{
  *** STEP 6 HERE
});
```

6. Node search

The first activity of JavaScript to execute immediately after the page is ready is to find all of the parallax layers. Firstly, the parallax containers are found, followed by their children. Each child has an index number applied to

them under the 'data-index' attribute.

```
var nodes = document.querySelectorAll("[data-parallax]");
for(var i=0; i<nodes.length; i++){
  var children = nodes[i].children;
  for(var n=0; n<children.length; n++){
    children[n].setAttribute("data-index",
    n+2);
  }
  *** STEP 7 HERE
}
```

7. Parallax listeners

The final step is to apply an event listener for any mouse movement occurring over the parallax container. Any such actions trigger a feature to calculate the new positions of the parallax layers based on the mouse position and the 'data-index' attribute defined in step 6 - resulting in each layer updating at different paces. The result of each calculation is applied to the layers via the 'style' attribute.

```
nodes[i].addEventListener("mousemove",
function(e){
  var elms = this.children;
  for(var c=0; c<elms.length; c++){
    var divisor = parseInt(elms[c].getAttribute("data-index"));
    var startX = this.offsetWidth/4;
    var startY = this.offsetHeight/8;
    elms[c].style.left = startX-((e.screenX/divisor)-e.clientX)/3)+"px";
    elms[c].style.top = startY-((e.screenY/divisor)-e.clientY)/3)+"px";
  }
});
```





CONTENT

A social media network that rewards con-

who positively influence

85% of all revenue is



GET NARRATIVE UPDATES

Enter E

Narrative

narrative.network

Designer: Griflan Design Inc - griflan.com

Development technologies: HTML5, jQuery, TweenMax (GSAP), Typekit

“Narrative is a social network emphasising subject matter, with this cascading site telling its story across chapters of charming animations”

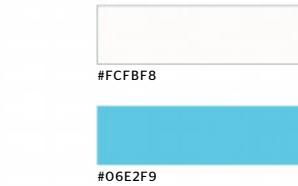
C TO THE

ECONOMY

content creators, moderators, and everyone

values the quality of content.

is distributed to users.



SUBMIT

**ABCABC
1234567890**

Above
Rift Soft font designed by Mattox Shuler for Fort Foundry and available on Typekit is used across all `<h2>` headings.

**abcABC
1234567890**

Above
Abril Text by José Scaglione and Veronika Buria for TypeTogether is used in `SemiBold` on `<h3>` text.

CHANGE IS COMING

READY TO DISRUPT

Narrative is changing the game with a powerful economic model that rewards the people creating and facilitating great content, with substantial revenue sources to build and sustain the network.

**Above**

The site applies subtle motion animations to stylish illustrative work, using a small palette of flat colour so effectively.

J O I N

THE COMMUNITY

Interested in Narrative? Join the conversation and sign up for our Narrative updates or check out one of our community channels.

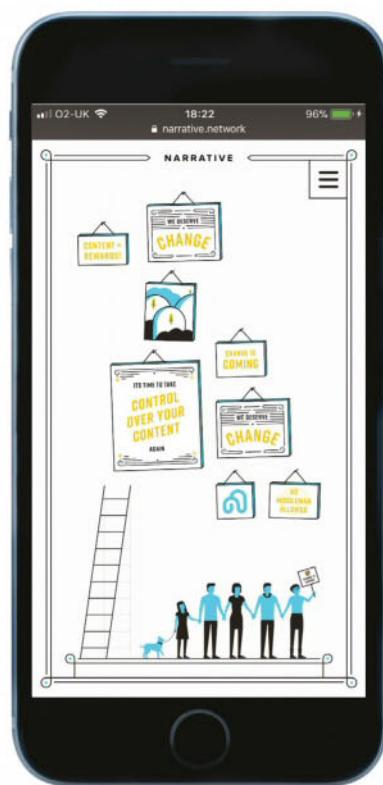
GET NARRATIVE UPDATES

 SUBMIT

TOKEN SALE


Above

At the end of the Narrative journey, visitors are encouraged to join a community conversation by signing up a valid email.

**Above**

Without disrupting the flow so necessary to the experience, the site reforms to look equally effective on smaller screens.

Create a visual full screen border overlay

Create a visual overlay for your website that doesn't prevent interaction with the underlying content

1. Initiate the HTML Document

The first step is to define the basic structure of the web page. This consists of a HTML document container that stores a head and body section. While the head section is used to load the external CSS file, the body section is used to store the page content created in step 2.

```
<!DOCTYPE html>
<html>
<head>
<title>Border Body</title>
<link href="styles.css" rel="stylesheet"
type="text/css" />
</head>
<body>
*** STEP 2 HERE
</body>
</html>
```

2. Create the page content

With the basic web page structure now in place, the next step of the exercise is to define the content to display. To allow a full preview of the border effect, we are using a series of paragraphs to make sure that the page is able to scroll up and down.

```
<h2>Title</h2>
<p>Content...</p> <p>Content...</p>
```

3. Border element properties

Create a new file called "styles.css". The border is to be made using "before" and "after" virtual elements of the document's HTML and body containers; providing advantages for keeping the HTML clean from unnecessary markup. Avoiding repetition, this step defines properties shared by the top, bottom, left and right border elements. Fixed positioning makes sure that the border remains in the same position as the page scrolls, while "content" ensures visibility of the virtual elements.

```
html::after, html::before,
body::after, body::before
{
  content: "";
  position: fixed;
  background-color: red;
}
```

4. Right border element

The right part of the border is made from the "after" virtual element of the HTML document container. Extending from the fixed positioning set in step 3, this element is placed in the top right corner. Its size is set to one character width and height extending to the full height of the screen.

```
html::after{
  top: 0;
  right: 0;
  width: 1em;
  height: 100%;
```

5. Left border

The opposite border element to previous step, the right part of the border is made from the HTML container's "before" virtual element. This time, the "left" attribute is used to position the element relative to the left side of the screen. The same width, height and vertical positioning are applied.

```
html::before{
  top: 0;
  left: 0;
  width: 1em;
  height: 100%;
```

6. Bottom border element

With the vertical side elements of the border in place, the next step is to initiate the horizontal borders. Using the same type of technique, the body container's "after" virtual element is used to create a block that is positioned in relation to the bottom left corner of the screen. This element is set to be the same height as the width of the

vertical borders, along with a width stretching across the full screen.

```
body::after{
  bottom: 0;
  left: 0;
  width: 100%;
  height: 1em;
}
```

7. Top border element

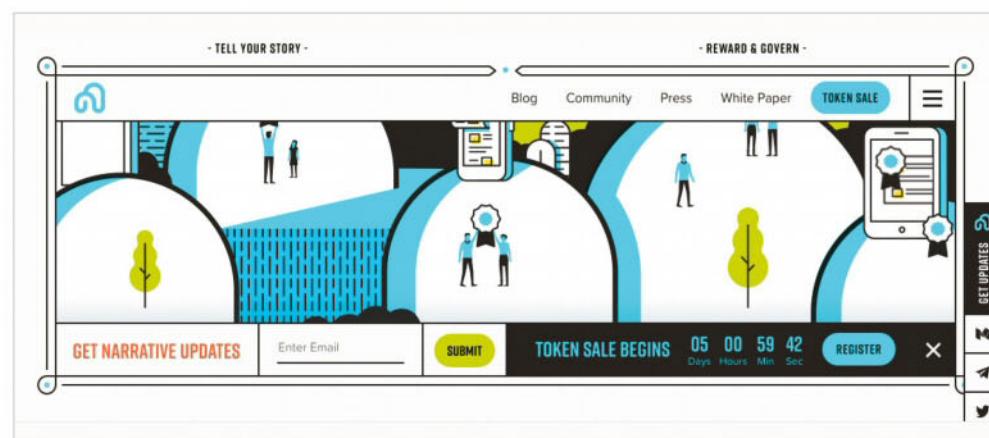
Like with the vertical borders, the top border almost identical to the definition of the bottom border. The significant difference is its position being set relative to the top of the page. This element will display at the same size and height to stretch across the screen from the top left corner.

```
body::before{
  top: 0;
  left: 0;
  width: 100%;
  height: 1em;
}
```

8. Content formatting

To make sure that the border overlay doesn't interfere with the main content, a padding of size two characters is set to the body. This is more than enough to cover the 1 character width/height of the border elements. Additionally, paragraphs are set with a horizontal margin space to allow for the scrolling to become visible – you can leave this out in your real project.

```
body{
  padding: 2em; }
p{
  margin: 5em 0; }
```





About me.



HALLOWEEN PARTY

Enable

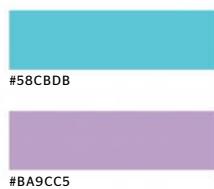
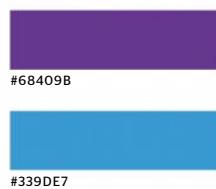
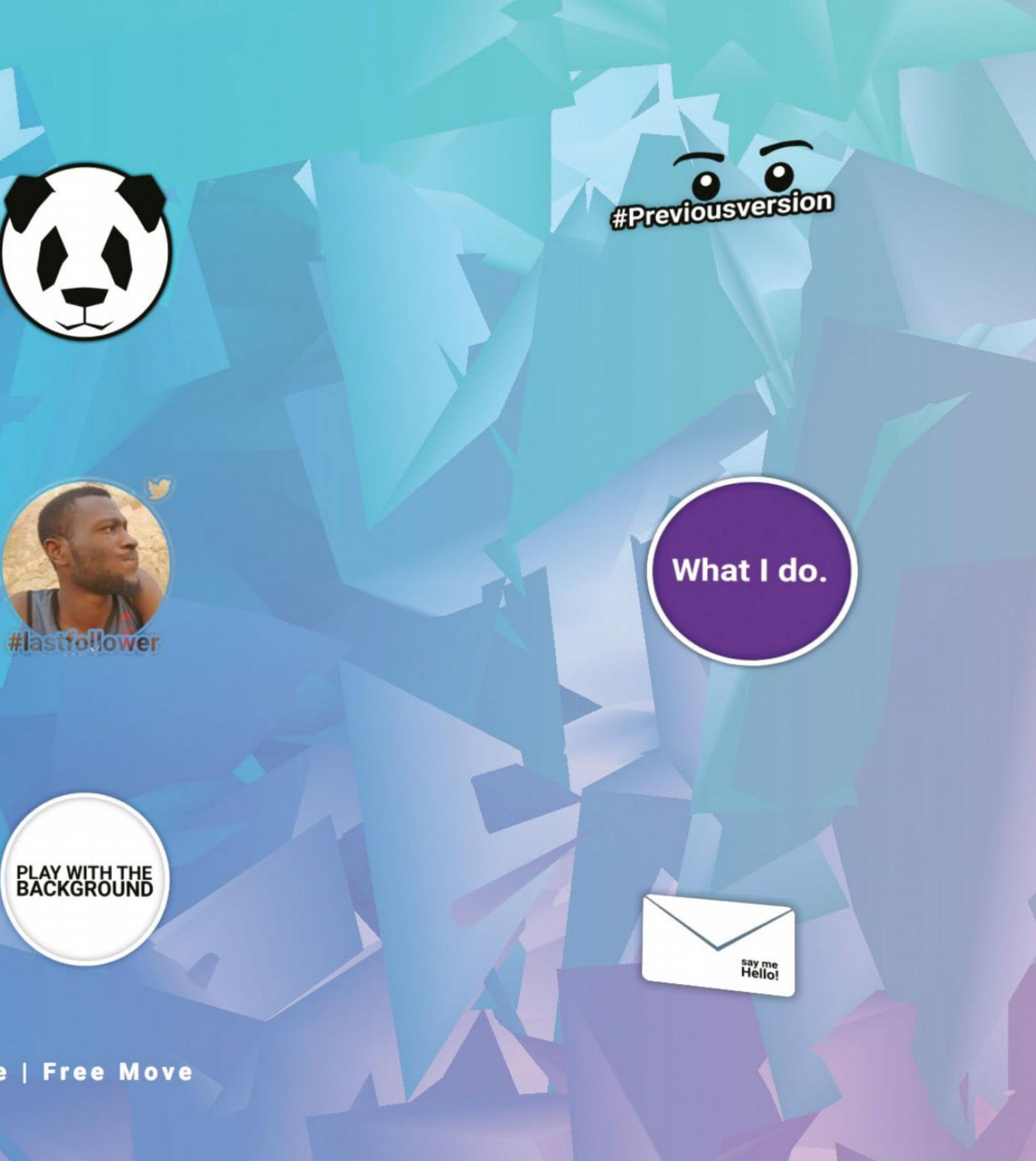
Gilles Riviere

gillesriviere.com

Designer: Gilles Riviere – gillesriviere.com/

Development technologies HTML5, jQuery, TweenMax (GSAP), WebGL

“Do what I want, without ever being content with doing what I can,” sums up WebGL maestro Gilles Riviere’s approach to this dynamic portfolio ,



abcABC 123456789

Above
Roboto by Christian Robertson and available via Google Fonts is used exclusively on the small amount of site text.

Create an interactive pop effect for mouse hovering

Allow icons to indicate ability to respond to mouse clicks using this animated pop effect

1. Page structure initiation

The first step is to initiate the HTML web page. This consists of the HTML document container that is responsible for storing the head and body sections. The head section stores non-visible information – in this case the document title and a link to load the external CSS document. The body section is used to store the visible page content created in Step 2.

```
<!DOCTYPE html>
<html>
<head>
<title>Hover Pop</title>
<link rel="stylesheet" type="text/css"
 href="styles.css" />
<body>
*** STEP 2 HERE
</head>
</body>
```

2. Body content

The document body content consists of a `` list with three list items. The important part is the application of the 'pop' class, which will be used by CSS to find this element to apply visual styling. The list items inside this list will be the elements that appear with the 'pop' effect.

```
<ul class="pop">
<li></li>
<li></li>
<li></li>
</ul>
```

3. Presentation rules

With the HTML now complete, create a new file called 'styles.css' to store your visual presentation rules. The first rule sets elements using the 'pop' class to have a margin of ten characters on all sides. This will position all of its child items with a visible space away from any other page content.

```
.pop{
 margin: 10em;
}
```

4. Pop children

All first-level children inside the 'pop' class container will display as an inline block – giving the advantage of text flow positioning combined with the ability to set size and padding. This example uses a blue background colour, but you could also apply an image to display using `'background: url(image filename)'`.

```
.pop > *{
 display: inline-block;
```

```
width: 5em;
height: 5em;
background: blue;
```

5. Pop animation application

With the visual presentation of the items now defined, the next step is to apply an animation when their state changes to 'hover'. Two pieces of information are used for this – the animation name and the duration that the animation will last. The name of the animation matches the animation name defined in the next step.

```
.pop > *:hover{
 animation-name: popAnim;
 animation-duration: 1s;
}
```

6. Animation definition

The 'pop' animation referenced in the previous step needs to be defined using the `@keyframes` animation feature. This step sets the presentation adjustments at specific parts of the animation – indicated by the percentage. A scale transform is used to animate

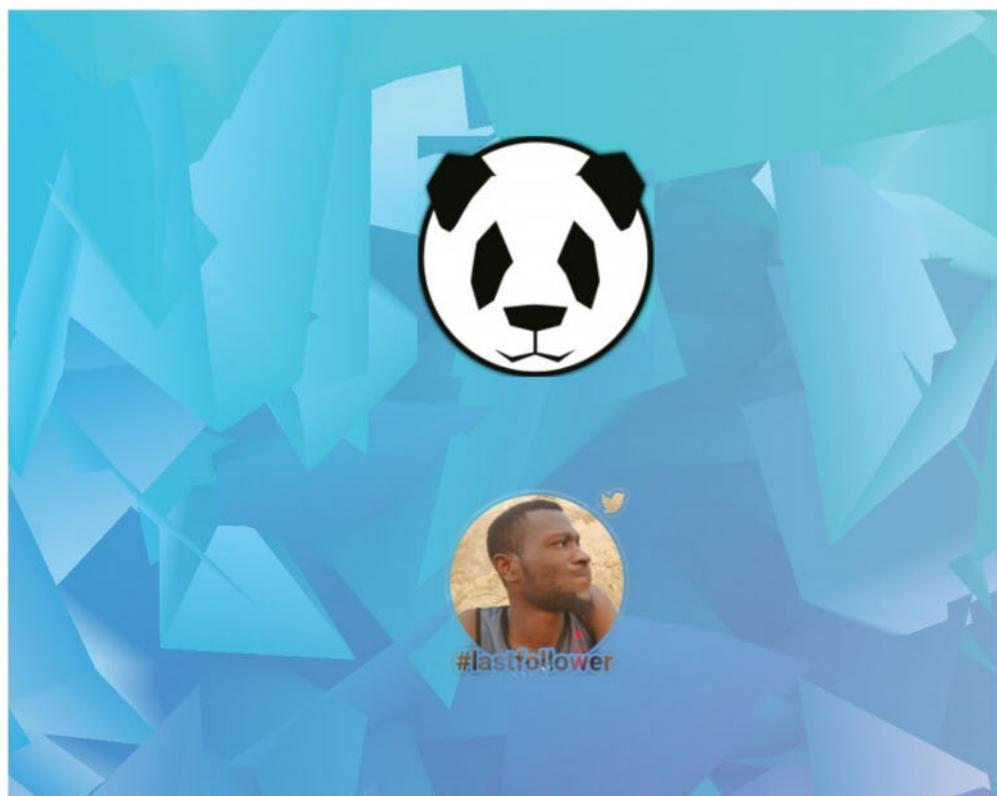
elements from their original size at zero per cent, to a half size bigger at 50 per cent of the animation. The animation concludes by returning the element to its original size.

```
@keyframes popAnim {
 0% {transform: scale(1);}
 50% {transform: scale(1.5)}
 100% {transform: scale(1);}
}
```

7. Other stuff

You can apply styling for other elements on the page that affect the presentation of 'pop' elements. Where you are aiming to make maximum use of the screen, you may want to eliminate any page border spacing. This is achieved by taking out the default padding and margin applied to the page document and border.

```
body, html{
 display: block;
 padding: 0;
 margin: 0;
 min-height: 100vh;
}
```



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A DIFFERENT

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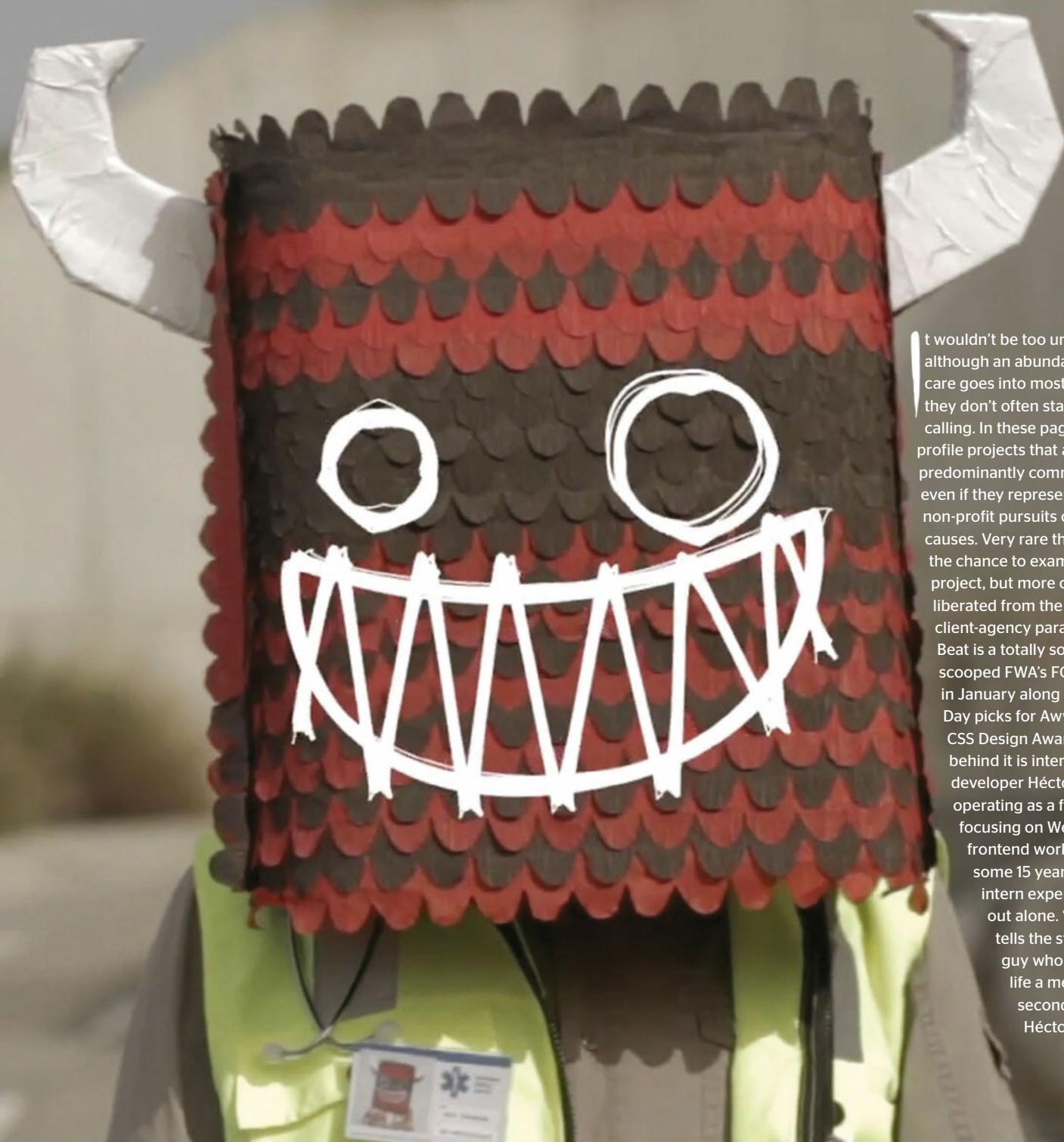
nerris.com

@mcnerris



DRUM

NOT ALL DIGITAL PROJECTS ARE CREATED EQUAL. WE LEARN HOW A LONE FREELANCE DESIGNER DANCED TO HIS OWN BEAT TO LAST THE COURSE AND BUILD A WEBSITE SUCCESS STORY



t wouldn't be too unfair to say that although an abundance of creative care goes into most web projects, they don't often start solely as a calling. In these pages we typically profile projects that are predominantly commercially driven, even if they represent admirable non-profit pursuits or charitable causes. Very rare then that we have the chance to examine not a vanity project, but more of a mission liberated from the typical client-agency paradigm. One Last Beat is a totally solo effort that scooped FWA's FOTD and FOTM in January along with Site Of The Day picks for Awwwards and the CSS Design Awards. The man behind it is interactive developer Héctor Monerris, now operating as a freelancer focusing on WebGL-powered frontend work, who drew on some 15 years of agency intern experience to strike out alone. "One Last Beat tells the story of a regular guy who tries to give his life a meaning just a few seconds before dying," Héctor begins. "Your

A DIFFERENT DRUM



INSPIRING AN IDEA

Even before One Last Beat's creator Héctor Monerris dreamed up the germ of its idea during his train commutes, he felt a creative calling. In seeing what others were doing with web-based storytelling, the inspiration was already in place even if the theme needed work. "It had been a very long time since I did a less technical and more creative project, so I needed to do something. Then I watched an amazing work by AATOAA, called Way to Go (<http://a-way-to-go.com>), which was an online immersive experience far beyond anything else I had seen. Plus its not a commercial project and does not require anything from the user - it just exists. I definitely wanted to create something like that, but with my resources and my modest style. The only problem being that initially I did not have a story to tell." To find that impetus, Monerris did what most writers in any medium espouse - the notion of looking within one's self for inspiration. If he could happen upon a narrative thread that moved him enough, then it could surely be enough to power the project and resonate with others. "Some time ago, I was at a time of my life where I needed a radical change, but I was not ready to face it," says Monerris. "And I found myself repeating this thought over and over again, the thought that a second before dying there will be regrets for not having been brave enough to do things. That is how the One Last Beat idea popped up into my mind and I loved it instantly, because I never had the chance to do a project exploring a feeling. A feeling of mine, something personal."



mission is to make his heart beat to give him power to accomplish all his expectations." It's an idea that seems biographical, albeit it allegorically, to his own ambitions for the One Last Beat concept, while ironically hinting at the multiple powers Héctor himself has drawn on. Professional skills in 2D animation and web design are joined by hobbies spanning music, sound, movies and photography. As an interactive story, One Last Beat harnesses all that creative enthusiasm to deliver everything you watch or hear. He wrote the script, shot his own acting performances, composed the soundtrack, edited the movie and then coded the site itself. The only bit he delegated was the driving and moral support duties - gratefully received from mum and dad. "It is not a project for everyone," Monerris concedes. "It has an amateurish aesthetic style and the storyline deals with a character who has to face death and failure, in complete loneliness. But everything is told in a wild, funny and optimistic way." Doing our best to follow suit, we gleefully accepted the invitation to chronicle what made the talented maverick tick during One Last Beat's rollout.

ON YOUR TONE

The genesis of the project dates back to August 2016 when, as a confessed train lover, Héctor would dream up ideas during trips to Valencia. It was then that this fiercely personal story idea took early form, quickly becoming a narrative our hero needed to tell. "Immediately, I started to work on the project during my free time," Hector tells us. "Soon I realised that working on it some weekends and a couple of hours a day would make the production of the project endless." As a studio employee at that time, it was a hugely bold move to quit and go out on a limb for a dream, supplemented by the odd small commercial commission here and there. "I had worked on Godzilla-sized projects for big brands before," he says. "And since school, I have been frequently producing small personal projects on my own, but the production of One Last Beat took me by surprise. Putting it all together was stupidly complex maybe due to my lack of experience in the 'producer' role. Initially I thought I could use a linear approach of script, production, video, sound, music, to coding and then end. But early on I discovered that this was not



Creator HÉCTOR MONERRIS sums up the key reason why the One Last Beat project occupies a special place in his heart.

"I made the project because I wanted to do it, for fun and regardless of external opinions. When I finished it, I thought that nobody would care about it, but it has gone in the opposite direction. This has made it my most successful project by far and so my highlight is knowing people over the world, some who barely understand English are enjoying it. Wow!"

"IT WAS A PAINFUL PART OF THE PROCESS TO REMOVE SOME OF MY FAVOURITE IDEAS, ESPECIALLY THOSE IN WHICH I HAD SPENT TIME PROTOTYPING THEM, OR THE ONES ALREADY DEVELOPED AND COMPLETELY FINISHED"

possible." So much of the work would prove to overlap, and in the early stages Monerris would need to do time-consuming testing and proof of concept work just to get going. Pre-production hours were consumed by honing storyline, not to craft a masterpiece he says, but just reach a consistent tone. "I started modelling the whole thing from diverse angles," Monerris says. "After the first rough draft of the script was finished, I made some software prototypes, also some tests on the props and a first approach to the music score. When all those tests were completed, I got back to the script and make adjustments and changes using the conclusions."

TECH CHECKING

Very much an organic and iterative process, Monerris recalls filling a notebook with ideas as everything began to take shape. He would also make numerous

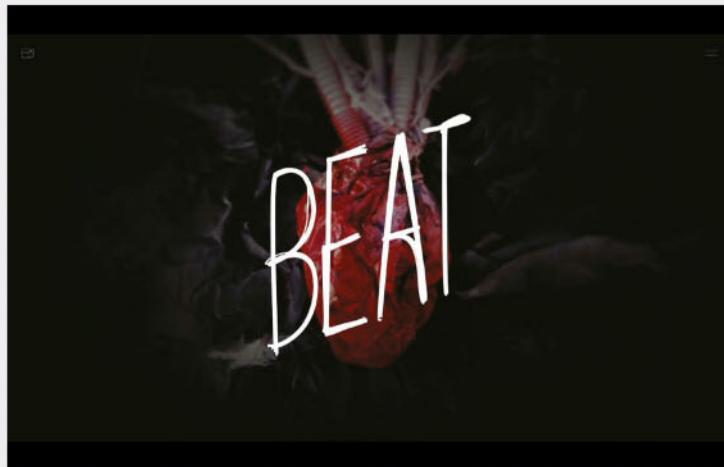
script rewrites and tweaks during the realisation that a story around loneliness would benefit by him doing everything on his own. It was important to acknowledge his skill limitations and engineer around them while leaning on his core background. "Being mainly a developer influenced my workflow," he says. "I created some helpful tools and scripts to assist myself. In that way, I could spend more time developing rather than, for example, animating. Also that preference towards developing initially made it seem attractive to face the project in a more technical way. I was going to use VR 360° video and a sort of web sockets plus second screen combination as controller for the interactions." Although this appealed to his technical ambitions, Héctor worried it would detract from the story and decided to give that the emphasis, sacrificing some impressive work in the process. "It was a painful part

of the process to remove some of my favourite ideas. Especially those in which I had spent time prototyping them, or the ones already developed and completely finished. Surprisingly, some aspects almost started to look too good and I had to make them look worse to maintain the average aesthetics of the project." Taking inspiration from movie director Darren Aronofsky's philosophy about a film not being done until a favourite shot is cut, he knew to simplify the vision and chase the essential. So difficult first moments in storyboard and practically achieving the shoot would not get him down, whether figuring out how to film himself wearing a cardboard piñata head on little more than a mobile phone. "I neglected the white balance for several shots and the colour was severely different from one take to another," he explained. "Not a big deal for a regular user, but I am colour blind. Luckily, I found some tutorials about

Above
Who lies behind the mask and shades?

MONSTER APPETITE

"I would love to see the faces of people who watch the story for the first time," muses Héctor when questioned about gauging the audience response and where that might lead. "Just to know if they are laughing with the things that I find funny. It would be nice to know if they are touched by something, or if they close the browser during the first minute instead. But this is not possible of course and I just have opinions from people who kindly shared it with me." So has that kind of encouragement given Monerris a hunger for more? Certainly it's clear that the warm reception and his own personal pride continues to yield palpable creative satisfaction when he speaks about it. Might we see a sequel to the project one day or is it time to move on to pastures new? "I'm not planning to release another episode of One Last Beat as it is a complete story by itself, but for sure I will try to do more personal projects in the future," he said. "Plus maybe with this one in my portfolio, studios or companies can call me to do collaborations in projects more focused on storytelling, being the ones that interest me the most... or projects with monsters! Yes, if somebody has a project with monsters, call me please, I am on it. I can perform the monster role and write some code."



"I NEEDED TO BE SURE THAT A MID-END SMARTPHONE OR TABLET WITH A NICE WI-FI CONNECTION COULD HANDLE EVERYTHING IN A DECENT WAY, ALSO REMEMBERING THAT THERE ARE SOME DESKTOPS THAT SUPPORT TOUCH EVENTS"

a technique that allowed me to do the colour matching using grey scale and numeric values. The result was far from perfect but it did the trick."

DOODLE BUGS

Monerris always preferred the visual frontend design to almost be invisible to support and not distract from the story. Having attempted more "polished" options without satisfaction, it was clear the GUI would require the same organic, improvised and handmade feeling of the film. "I didn't want to doodle faces for 12,000 frames and then realise that I didn't like the width or the colour of the stroke and have to redo them," he says. "The solution seemed to be to create a doodle animation tool and after building that in Node, HTML5 and JavaScript, I animated and rendered to PNG sequences all the characters faces in less than three days. Liking how the doodles looked, I

decided to do the main titles for the site with the same technique. But instead of generating heavy weighted PNG sequences, I isolated the renderer from the animation tool and adapted it to render the titles in real time." Limiting the frame rate to 30 over 60fps due to the titles appearing "too wiggly" for Héctor's taste, the parameters could at least be animated using GSAP to achieve the unique transitions and effects. The main worry was ensuring it would all work on mobile without going too crazy to cover older devices or try too hard to replicate an undoubtedly better experience on desktop. "I needed to be sure that a mid-end smartphone or tablet with a nice Wi-Fi connection could handle everything in a decent way," Monerris says. "Also remembering that there are some desktops that support touch events, and some mobile devices with physical keyboards - so everything is supported at

the same time." With the Flash era an increasingly distant memory, Monerris knew that platforms and browsers would deal with the site's video in different ways: "Touch devices have weird behaviours because of data usage policies and standardisation just isn't there. You can use blobs and other techniques to control the loading, but I decided to let it go and let every device or browser to handle the video its own way."

VIDEO NICETY

Héctor's practical approach to serving the site was therefore very bandwidth conscious, opening with a preload of the GUI and all the JavaScript. Everything is optimised, minified and gzipped, with the first preload disguised by the headphone recommendation message before all the bigger assets are initialised only when the user presses the Start button. "All interaction assets are loaded during this



second preload," he explains. "I did it that way because I did not want the video having to compete with other assets for bandwidth. During the interactions the video stops loading itself, depending on the browser, but it has some seconds buffered so it can start right after the interaction end and starts preloading again." Hosting the assets on the Google Cloud Platform, Monerris explains the choice as a "bandwidth beast" offering great service that boasts an easy learning curve. He continues: "Plus I'm able to choose the right compression and quality for the video, something not achievable by using Vimeo or YouTube players." Speaking there of money, Héctor can only shrug at any notions of marketing budgets or campaigns for publicising One Last Beat. Always a non-profit endeavour from day zero, the project remains a very personal journey and story he needed to tell without investing funds into promotion.

"If One Last Beat was a regular short film instead of an interactive story wrapped into a website, the way to go would have been through movie festivals," he told us. "So I tried with the online equivalent by submitting the project to the most important online award sites for consideration and that was really effective. Winning the awards it has, made the site visible for a wide and specialised audience. Luckily, that was the audience that could and remains best to appreciate it."

TOUCHING PERFORMANCE

Thanks to those awards and recommendations from an impressed audience, the site has enjoyed more than 30,000 views and counting. Sure, in an age of multi-million grossing viral vids of people falling down holes, such numbers are smaller fry, but it's enough for the creator to feel heartened. His own acknowledgement of One Last Beat's

leftfield "weirdness" and treatment of uncomfortable issues always meant it wouldn't resonate with everyone. Monerris concludes: "I guess that there is a massive audience who is not attracted to the story because of various factors, which is totally understandable. But then, there is another group who is connecting in a very personal way, and they are really enthusiastic about it. What I am enjoying the most is getting feedback from people who find the project interesting, touching or inspiring. That encourages me to do more. I am also proud that almost everyone is enjoying both the interactive part and the movie as a unique piece. They talk about the story and I would have been very disappointed if the reviews had purely focused on the tech part. But for me, the big success of One Last Beat is just its existence. Having been able to finish it, while staying true to the idea, is the best reward."

Above
A regular guy trying to give his life a meaning

HOW TO MAKE THE SWITCH TO AFFINITY APPS

Why one web design agency decided to move over to Affinity

We Create Digital is made up of highly experienced web developers and graphic designers fuelled by a genuine passion for technology. Until recently, Adobe Illustrator was our go-to application for graphic design – indeed, it has been a mainstay for many designers since its introduction in 1987. While a plethora of competing products have been introduced since, most have fallen by the wayside and allowed Adobe to maintain its domination of the market.

Affinity has risen as Adobe's newest – and possibly fiercest – challenger yet, drawing parallels to two of Adobe's flagship applications: Illustrator and Photoshop. Affinity Designer is a professional vector graphics app with power to spare. Affinity Photo is a

dedicated image editing application boasting a wealth of highly refined tools for image readjustment and enhancement.

Affinity Designer and Affinity Photo are available for a one-off fee of £48.99 each, for Mac and Windows, which represents a more cost-effective solution than subscription-based plans. However, that's not to say you'll be getting a sub-standard product.

Affinity's improbable success hasn't gone unnoticed, with Apple awarding Affinity with its highly coveted Design Award in June 2015, unveiling Affinity Photo for iPad onstage at WWDC last year, and then naming it App of the Year.

We Create Digital first started considering moving away from Adobe as their team began to expand. Ultimately,

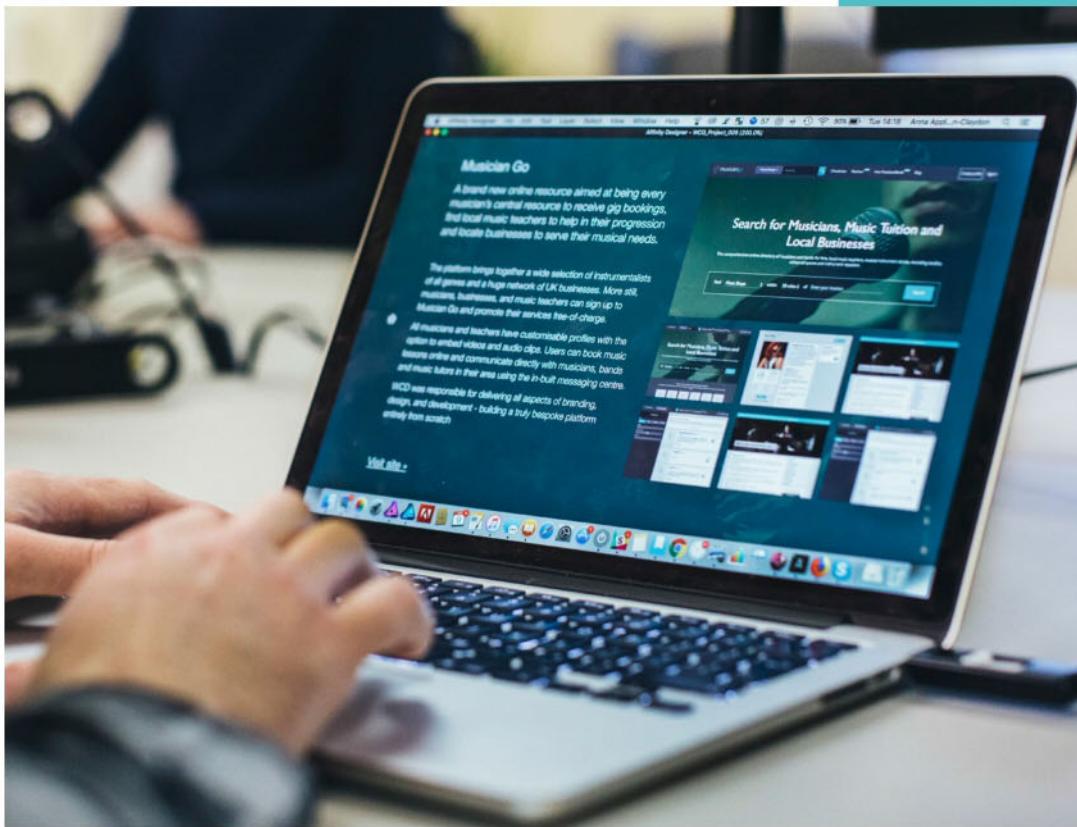
**Affinity Designer is a professional vector graphics app with power to spare.
Affinity Photo is a dedicated image editing application boasting a wealth of highly refined tools**

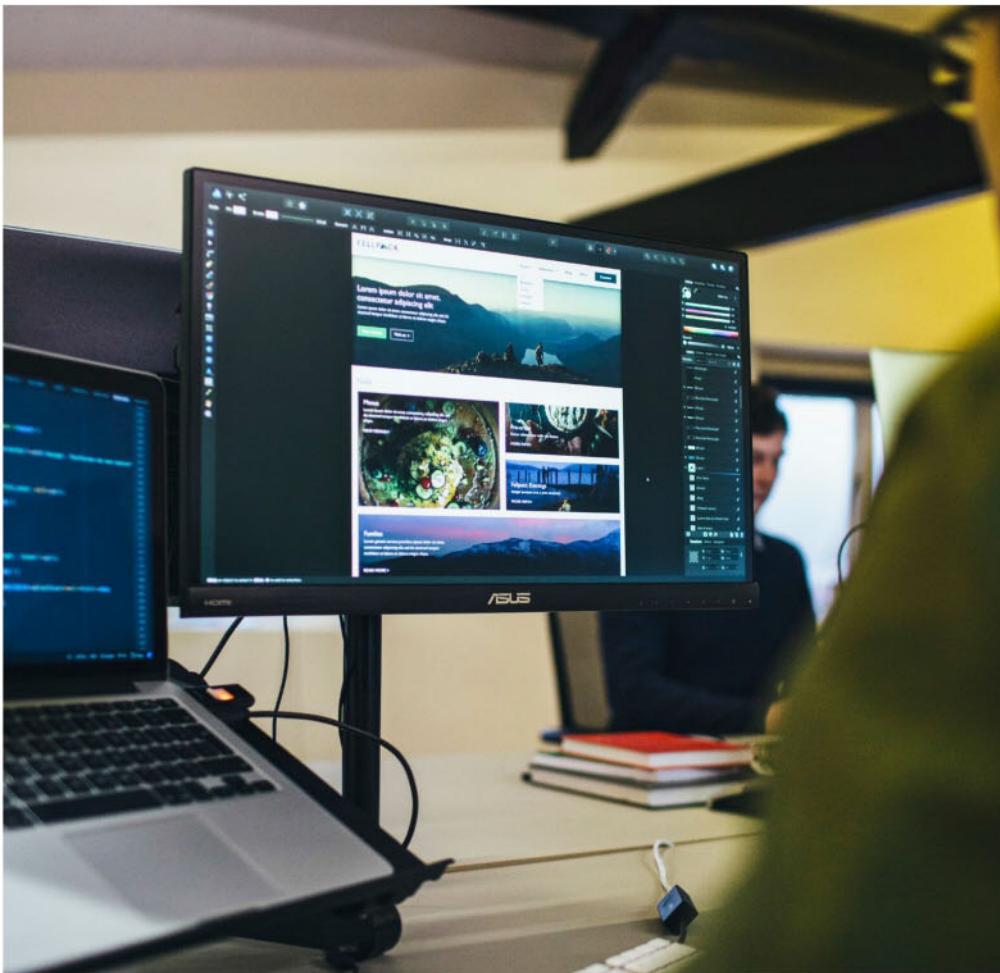
what was instrumental in their decision was a belief that Affinity Designer is better geared towards the needs of the modern web designer. In this article we'll explore why they made the switch, and how.

Feature focus

Affinity Designer is a high-end graphics software application that has been created for use by professional designers. It is equipped with most of the functionality seen in its big-name rivals, plus a whole host of new features and capabilities. Moreover, it is fast expanding its range of tools and feature set with regular updates – inviting users to submit new feature requests openly on its forum.

Affinity has shown an astute awareness of its audience. A basic example of this would be how users can choose from a





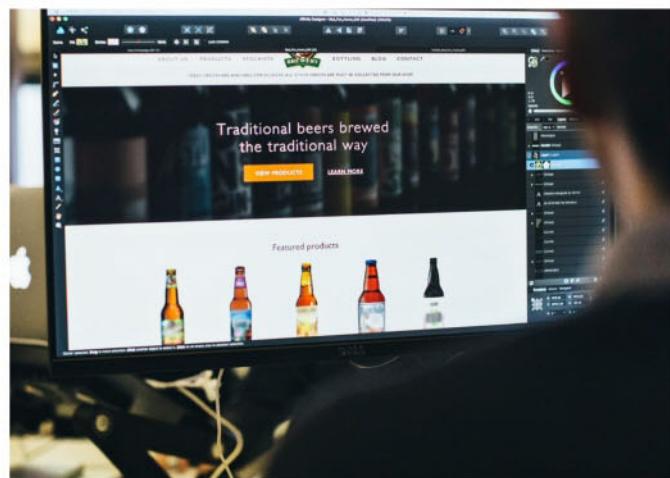
range of screen resolution presets based on the dimensions of popular devices. Furthermore, Affinity has clearly been developed with the aim of supporting a streamlined workflow. Customisable layer effects enable designers to effortlessly refine elements of their design, and these adjustment layers can be saved as templates for future use.

These features really shone in a recent project for Musician Go, a central resource for musicians. WCD was responsible for delivering all aspects of branding, design, and development - building a truly bespoke platform entirely from scratch. The asset management panel provides easy access to design elements that crop up repeatedly in projects, a feature we made frequent use of when designing Musician Go.

At WCD we are sticklers for detail and accuracy, which is why we love Affinity's advanced snapping and grid options. Affinity features zooming capabilities of more than 1,000,000% (that's right, one million percent!), meaning we can be as precise as we want. It's also geared up specifically for working with both vectors

and bitmap images within the same document, without having to switch between programmes.

Affinity offers advanced image adjustment options, which came in handy when we were asked to design a website for a new restaurant called Fellpack. The aim was to showcase the incredible landscape surrounding the restaurant, and to capture the brand's passion for food with vibrant photography.



Above
Both Affinity Photo and Designer are ideal for the modern web designer

Below
The software has replaced Photoshop and Illustrator for the agency

In Affinity Designer we were able to overlay text without impairing readability and with only minimal desaturation to photos. The result is a website that creates an instant impression on its visitors and captures the vision of Fellpack.

Making the switch

Our transition was aided by Affinity's support for PSD and AI files - meaning that we were able to work using our existing source files with ease. Similarly, its wide range of file support facilitates our collaborations with external designers and agencies.

Affinity's slick, accessible and highly intuitive interface mean users need little time to bring themselves up to speed with the nuanced differences between Affinity and Adobe. This also makes Affinity an attractive option for beginners as well as seasoned professionals.

With a free trial available, we'd strongly advise you to consider giving Affinity a chance. It's been two years since we switched to using Affinity, and we haven't looked back.

● affinity.serif.com



Seasonal Design

Passion coupled with technical prowess and a deep understanding of communications, has ensured that Spring/Summer has become a sought-after agency for some of the world's top brands

Like many designers, Pelle Martin had a varied career before starting Spring/Summer. Working at a Danish agency for a decade as executive creative director, Pelle also worked in New York, which coincided with freelance work where he worked as I AM PELLE. Working with international clients designing websites for Adidas by Stella McCartney, Victoria's Secret, HTC and other great companies.

At the end of 2012 Pelle and Jeppe Kruse - who would later become a partner in Spring/Summer - had landed a few larger clients, including F.C. Copenhagen, legendary jeweller Georg Jensen and cable network YouSee. These led Pelle to start Spring/Summer as he could see that his business needed a firm footing in order to grow and connect with new business partners.

Pelle had always thought that his freelancing would eventually become an agency. His ambition was always that his agency would have an international focus. Pelle initially hired Frederik Dufva (Account Director) to support the client accounts that the business had already secured. Also, Pelle hired Sander Kuypers (Art Director) from the

Netherlands and Henrik Dahlqvist (Art Director) from Sweden to give him a solid foundation onto which he could build Spring/Summer, which has just celebrated its fifth birthday.

And having different nationalities is definitely an asset. "At Spring/Summer we are a mix of nationalities, but fundamentally, we create our designs using the same set of rules that the great Danish furniture designers used: Function over form, which again gives the most beautiful form in return," says Pelle. "We are not slaves to the past, which means we create bespoke solutions for our clients. We take pride in trying to create trends rather than following them, although that does happen also."

Having developed his freelance business to the point where it needed to grow, Pelle started to think about what he would call his new business. "Spring/Summer is a term for a particular season in the world of fashion and the name of the agency dates back a little further than the company," Pelle explains.

"We were four freelancers who landed a client back in 2011 and we actually formed a company back then under ▶

Studio info

who Spring/Summer

what Digital creative design, digital concepts, production management, user experience, E-commerce, and web design

where Spring/Summer P/S, CVR: 36415754, Kompagnistræde 21, 1. tv. 1208 Copenhagen, Denmark

web springsummer.dk

Key Clients

Carl Hansen & Søn

Implement Consulting Group

Cofoco

B&O Play

Carlsberg & Tuborg





Seasonal Design

the same name. That company closed down, but I asked if I could use the name for my new agency. The initial thought was to change the name every six months, so we would change to Fall/Winter during the colder months – of course that was a terrible idea, but we still use that URL for all testing purposes. Both URLs were available, but we have always been too cheap to buy the .com, and the price of that keeps going up. Our favourite time of year is the spring and the summer, and we try to live that feeling all year around."

With a background in website design, it's no surprise that Spring/Summer's website has been a focus from day one. Pelle continues: "Having a great agency site is super important for us. For many of our clients it's an early stepping stone on the way to getting to know us, and seeing our work, plus the general level of effort we have put into our site usually creates trust and a desire to know more from the client's side.

"We have built a very solid platform for ourselves where we can design new sections by simply configuring modules in the CMS. We can get extremely creative with the pages that we build, and this makes the site a bit more future-proof and very fast to update. We put quite a lot of effort into making the cases for the site, so it becomes more of a content task."

Gaining the right kind of clients is vital for all agencies. Spring/Summer already had a great pedigree, as Pelle had been working with high-profile international clients for some years. This gave his agency a foundation of clients to build onto and expand. Ultimately though, Pelle feels it's their standing in the marketplace that makes their agency a magnet for brands.

"We live by our reputation and word of mouth, as we don't do any direct sales activities. We do try to get good PR when possible and we have succeeded in winning a good quantity of awards,

Agency Breakdown

- 1 Creative director
- 1 Account director
- 1 UX & UI development director
- 1 UX designer
- 1 Project manager
- 2 Art directors
- 2 Design interns
- 3 Developers

which helps as well. We do get invited to pitches, and last year we won most of the pitches we took part in, but we generally think that the work we have done for other clients should be enough to convince the potential client of our worth. If the potential in the project is not big enough, we cannot make a visual pitch. This year going forward we will focus more on both expanding our relationships with existing clients and expanding our overall client base to hopefully grow our turnover."

With such a diverse range of clients, Pelle explains his approach when deciding on which clients to work with: "Luckily most jobs that land on our table are, in some way, a good fit for us. Clients do their research and they choose us on a basis of our portfolio – most of the time. Or you can swap it around and say that if a potential client has found us through typing 'digital agency' into Google, then we know that the process will be much harder, and we



"We are at a time where we, like in the Adobe Flash days, see a lot of animation which we use a lot as well. It is however, an area where this can easily become overused – you have to strike a balance. Ideally you use animations to aid the user – not waste their time"

PELLE MARTIN
Founding Partner and Creative Director

“Being in a small country like Denmark, we sometimes get potential clients that think we can make things for no money”

will need to do a lot more work in convincing the client of what makes us special. Being in a small country like Denmark, we sometimes get potential clients that think we can make things for no money when, in fact, Denmark is one of the more expensive countries in the world. Luckily this is not the norm and at the moment we have dream clients knocking at our doors.”

How an agency defines its design sense and how this is expressed through the work it completes, can often speak volumes about the agency itself, and its founders. “We have a few ethos or trademarks, and they do not necessarily support each other,” explains Pelle. “We like to do the very focussed communication pieces, but also the more complex digital products. One thing that covers them all is that we focus on giving a good and tailored user experience each time we embark on a project.

“However, a few projects that define Spring/Summer include Beagle for Podio where we made a combination of good storytelling, a very coherent visual language, beautiful animations, no-compromise responsiveness and a very fluid feeling for them. And the design and UX we made for the Uniqlo Recipe app, which has proven very timeless. We thought through how the circles of the plates, forming loaders, cooking timer and image crops, and the colours of the app adapt to the clothing of the chefs, which again matches the courses that they cook. Scandinavian and Japanese minimalism and functionalism fusion.”

The workflow that a design agency adopts can often be defined by its founders. Pelle explains his approach: “We have invented our own process model that we apply to all our work. It’s a sprint-based physical card exercise that helps us scope and estimate and



Above Jenny working late and deep in concentration. We don't know what she's listening to, but it seems to be helping

make everybody involved in the project very early on and throughout the process.

“This is an evolution of ways of working that we have tried applying over the years, which has now taken form as ‘The Involver.’ Pelle believes he and his team spent too much time looking at screens and not physically collaborating with each other. The Involver, as its name suggests, enables everyone to come together to communicate their ideas. Using physical coloured cards, a project’s workflow can be mapped out, as it evolves in the minds of everyone working towards a common goal.

“Working digitally, we are aware of how a lot of good ideas today come through technology,” says Pelle. “For us, it was necessary to figure out a way to integrate our technological competencies much earlier in our project development – for instance, by interacting with



Stine Goya
stinegoya.com

We were asked by fashion brand Stine Goya to break the rules for what you can do with Shopify. They were already on the platform and very happy with the commerce part, but felt their digital look and feel was holding them back.

To begin their new design, we created various layout experiments in code and After Effects to begin our focus onto their brand DNA. Parts of the Shopify developer experience feel quite locked down (Shopify, hope you’re reading this!), especially when it comes to creating more dynamic pages where creative brand content gets mixed with products. This is where we had to come up with some alternative strategies, but we managed to find a way.

Typically for us, a lot of people contributed their specialist skills to this project. Two designers, a motion designer and a UX specialist initially worked on different aspects of the user experience, and the development task was split into two, with one dev handling mark-up, layout and Shopify backend setup while the other focused on effects and animation. Last, but certainly not least, a project manager made sure everything came together at the right time.

The end result launched just before Christmas. It’s a fullscreen feeling with a vibe of playfulness and a lot of colours that get applied in different ways, layered throughout the experience. We’re very happy with it and hope we’ll get more chances to wrestle with Shopify in 2018.

Uniqlo Recipe app

One of the biggest global clothing brands, Uniqlo has always opted for new ways of approaching its marketing. Continuing its tradition of releasing quirky 'life tools' apps as part its marketing activity, the Japanese brand set out to create a recipe app for Android and iOS. It would be an app that fused food and style by highlighting the wonderful colours and textures that tie them together with Uniqlo's LifeWear philosophy.

We created a part-Scandinavian, part-Japanese inspired user experience, focused on 24 dishes made by six chefs, with each chef dressed and photographed in

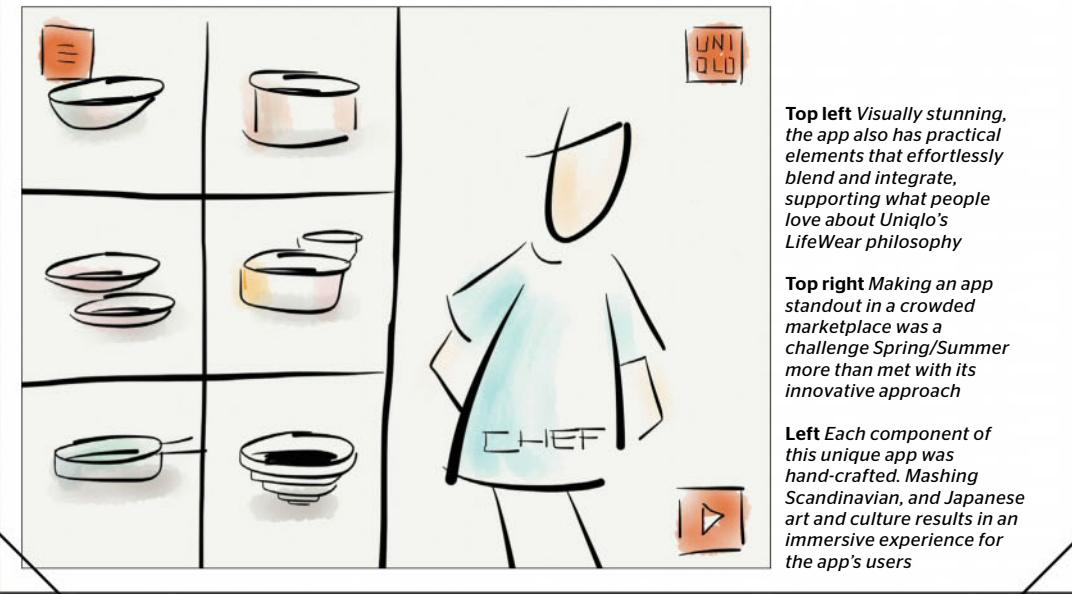
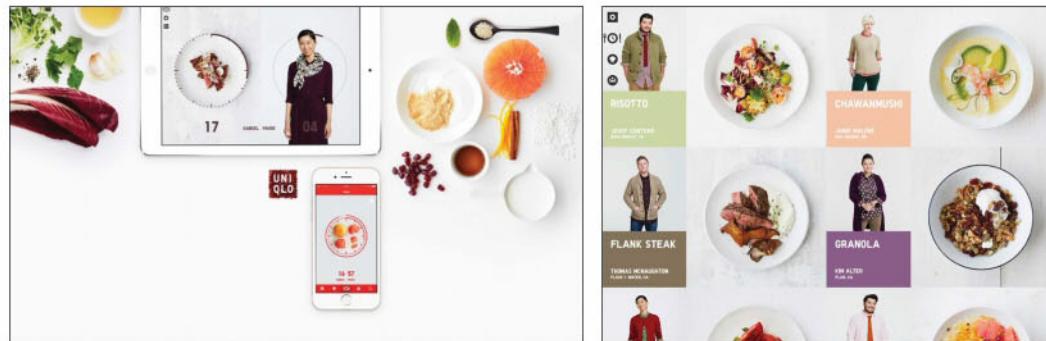
Uniqlo LifeWear which complemented the colours of the dishes. Each chef's look can be purchased easily through the app. Original music, food and style combine perfectly in a timer featuring cooking sounds, and the timer can be used on its own or as part of every recipe.

We defined the user experience in stages. First, at the concept level, all screens were sketched out on an iPad using Fiftythree's Paper app. This became the foundation for the app. We then defined look and layout for the entire app. The designs and navigation principles were embodied in many prototypes and underwent many changes

before we settled on the direction you see.

Later we also directed photography and produced all the image assets for the app, before handing everything over to a team of remote developers. In total, three designers and a UX specialist contributed from the Spring/Summer side.

The Uniqlo Recipe app came out for mobile and tablet and was named Apple's 'Best of 2013' in nine countries, including the US. It ranked number one in the App Store in 29 countries including the US and, until recently, was featured by Apple as a highlighted iOS app on apple.com.



the developers even more at the beginning of a project.

"Our larger projects span from about five months to maybe ten and sometimes include the full production, and other times, we work with a subcontractor for speciality development requirements. A typical team could look like this: One Designer (UI Design), one Art Director (UI Design lead), one Creative Director (Creative and Strategic oversight), one Project Manager (managing team and client), one UX designer (designing interactions and full oversight of the sitemap and details), one or two Developers (Advanced frontend and lightweight backend coding)."

Jeppe also comments: "We used to be firmly in the Adobe camp but during the last few years we've opened up more to using the likes of Sketch, Principle, Invision and other newer design tools. We try to let our designers have a say in how they work and what tools they use. When it comes to UI animation we are also big fans of Keynote."

"On our radar right now are CSS Grid and Element Queries, which will be really interesting to work with. Dynamic Typography is also interesting to play with, but mostly for fun so far.

"A lot of the things we continue to be hyped about, such as Canvas, are actually not that new. On a general level, device screens and capabilities are much the same as they have been for some years, and the interaction possibilities and performance of those devices haven't changed a lot. We care a great deal about little improvements that will let us push boundaries and achieve better performance in terms of loading times, framerates and perceived UI feedback."

Jeppe also offers his view on the current state of design tools: "We don't think HTML, CSS and JavaScript will go away anytime soon. The myriad number of frameworks and build tools continues to increase, and some tools will go out of fashion as others become popular. As an underlying trend, we believe that thinking about frontend code in an object-oriented way will become more popular, or at least deserves to. As an example, we often think about animation principles and content scaling rules in an object-oriented way, which makes it all the easier to handle the complexity that a really elegant solution is always going to have under the hood."



"As an underlying trend, we believe that thinking about frontend code in an object-oriented way will become more popular, or at least deserves to. As an example, we often think about animation principles and content scaling rules in an object-oriented way, which makes it all the easier to handle the complexity that a really elegant solution is always going to have under the hood"

JEPPE KRUSE
Director of User Experience

Below Henrik isn't normally the shy one. The camera seems to have made him want to hide



TIMELINE

2013

Spring/Summer is formed. We move into our first office in an old dancing school in Nørrebro, Copenhagen.

Employees: 2

2013

Our client, F.C.Copenhagen, wins the Danish football championship for the tenth time. We pose with its mascot Leo.

Employees: 4

2014

After a break-in where all our gear is stolen. We get a smoke cannon installed to make it harder for thieves.

Employees: 7 + 1 intern



2015

We launch 'B&O Play X Rapha' and 'Beagle - Better proposals', two of our most award-winning projects.

Employees: 9 + 1 intern

2016

Great year, big party, lots of awards and more good people to help us make more great work.

Employees: 10

2016

We submit six cases to the Creative Circle awards, all get nominated and we win four circles.

Employees: 11 + 2 interns



2017

We introduce 'The Involver' - a new way of working, scoping, living and breathing projects at Spring/Summer.

Employees: 11 + 2 interns

"You have to strike a balance. Ideally you use animations to aid the user – not waste their time"

As mobile devices continue to proliferate, is digital design now a mobile-first exercise? "We have a lot of clients coming with a request of doing 'mobile first' design," says Pelle. "That often comes from a realisation that the conversions they are seeing on mobile on their current sites are not up to par with desktop, even though their visitor counts on mobile are now surpassing desktop. This is not necessarily a bad thing. It's reality that the platforms are used quite differently and often support each other well, and it is very easy to draw conclusions on a false basis. From a design point of view, it is much harder to scale up from mobile than to scale down from desktop, and we always work with a no-compromise mobile approach, but most often start with the big screens."

Has Spring/Summer identified any trends across the design space they are keeping an eye on? "At the moment, you see so many things that follow trends and you can often see these trends in the site designs created by many agencies," Pelle explains. "The ones that stand out are the ones that seem very original, but still retain sanity. It is most often the ones that simplify or add clever functions to behaviours that seem locked by conventions. We are at a time where we, like in the Adobe Flash days, see a lot of animation, which we use a lot as well. It is however, an area where this can easily become overused - you have to strike a balance. Ideally you use animations to aid the user – not waste their time."

Spring/Summer is a small agency, which means everyone that works there has earned their place. As Pelle has ambitions to expand the business, what's he looking for in his next hire? "We have had good success with hiring in young talent and building our business on that, and some of

Simply Chocolate simplychocolate.dk

Simply Chocolate makes chocolate in a simple way from natural ingredients. As they say, they just add a bit of new to the traditional formulas to create a modern, simple chocolate that still surprises. We created a website with eCommerce capabilities, so the entire world could get a taste.

Their thirteen chocolate bars look visually similar. However, unwrapping a Simply Chocolate bar is like unveiling a surprise. We incorporated this sense of wonder into the website by creating a pattern with the ingredients of each bar, showing the flavours that make the bar unique, while enhancing the consistent branding across the site.

The bar itself unwraps as you scroll down the page, revealing what's inside. The chocolate box sits in a panel on the side and follows you throughout the experience.

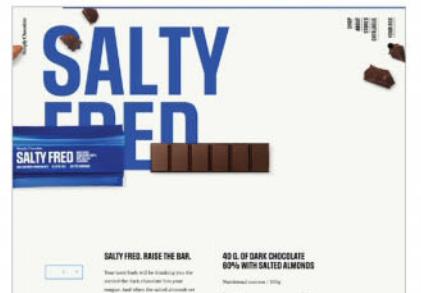
We created the site by using off-the-shelf tools, including WordPress and WooCommerce. It has a few restrictions, but we made a

big effort to make it feel integrated throughout. The concept is tied together when you finish your checkout and you get a little message from one of the bars that you have just purchased.

In the frontend, most graphic elements are drawn into a canvas. Each of these elements is placed on a layer with its own transformation

properties. The chocolate bar is a layer itself, composed of a bunch of other sub-layers. We used a 2D canvas library called Pixi.js to make it easier to manage these layers.

Since its launch in 2017, Simply Chocolate has won all the awards we have submitted to, and it has gained quite a lot of attention in the design community.



Above The smooth scrolling effect immediately grabs the visitor's attention. This illustrates how applying design expertise to WordPress can still result in an award-winning site

those people have now been here five years and are, of course, much more complete in their skillset than when they started out," Pelle explains.

"We look for two major things and I would almost go as far as to say, only these two things: We look for good chemistry and good work. Work does not have to be for clients, it can be school projects or fake homemade stuff, but it needs to be clear what that person's role has been, and it needs to knock our socks off. We only take people in that already can do great things. The chemistry part is hard to quantify but is extremely important. We do spend more time awake together at the office than some of us do with our families, so the office also has to be our family!"

And if you want to work in the digital industries, this is the advice Pelle would give: "Create a portfolio of fantasy projects if needed. I used to try and recreate sites that I liked pixel for pixel. I wouldn't show it to anybody, but I learned the techniques and you need that to be able to create original stuff. Be inspired by things outside of digital

design. Fashion design can show tendencies that trickle down to what we do after some time. Look at normcore (a fashion movement from a few years ago and still around) - this non-design tendency is now very much alive in graphic and digital design in the form of brutalism and other stripped styles. Philips' Ambilight TV came with a light effect you now see in shadows on Apple TV and in tons of designs on Dribbble. You can find inspiration in other places. Train your eyes to find these things."

And what of the future? Pelle explains that Spring/Summer will grow, but this isn't a priority at the moment. This will happen organically, as the work they do pushes the business into new areas that may mean the business must expand. As a design-led agency, the work will always come first. Striving to break new ground in the digital space is the core of what makes Spring/Summer a dynamic place to work, and an agency that global brands want to partner with. What's next? For Pelle this hasn't come into focus yet. Whatever Spring/Summer do, it's going to be amazing. ■

Spring & Summer

springsummer.dk

Founder

Pelle Martin

Year founded

2013

Current employees

13

Location

Copenhagen

Services

- Digital Concepts
- UI & UX Design
- Creative Development
- Brand design & Content creation

LAUNCH BEAUTIFUL UMBRACO WEBSITES WITH uSkinned

Whatever your organisation, you need a great website. Creating and maintaining one that suits your ever-changing needs can be difficult and expensive. Thankfully, uSkinned's starter kits are future-proof, adaptable and easy-to-use, so no matter how much your site changes, they'll grow with it. And right now, you can get 15 percent off of your next uSkinned purchase with the code 15OFFCB. Head over to <http://bit.ly/2F5PxgA> for more.

"uSkinned themes take Umbraco CMS to the next level"

Barney Blackhurst
Ministry of Sound

uSkinned's themes are designed with users in mind, and make it easy for anyone to create a beautiful, professional-looking site. Whether you're a web designer or developer, marketing professional or non-profit volunteer, run your own business or work for a digital agency, or just want to create an exceptional website, uSkinned is the perfect solution.

You need a website that's flexible and can be up and running quickly. uSkinned themes make it simple to launch a responsive content-managed site in no time – just customise the colour palette, add your logo and content, and hit publish. You'll have a beautiful, SEO-optimised site in moments.

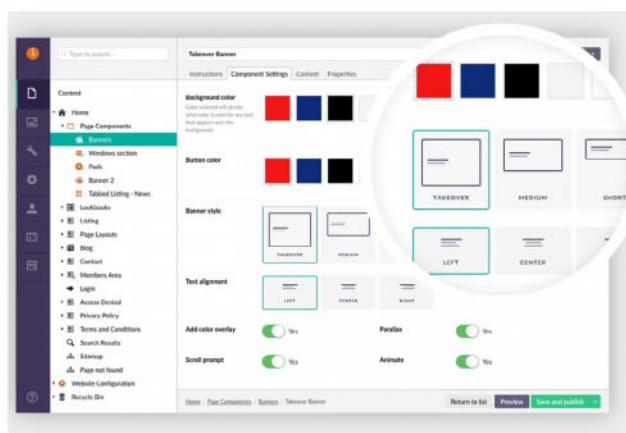
uSkinned sites are built on SEO best practice. It's easy to add metadata, as well as SEO-friendly URLs and code that will help you get to the top of the search results. With a fully featured blog you can keep your visitors up to date from day one. What's more, each theme integrates seamlessly with your tech stack, including connecting with MailChimp or Campaign Monitor, or adding video from Vimeo or YouTube.

Want to adapt the layout to fit your content? Every element is customisable. Make your content full-width, add columns, grids or stacked content. Need a

Get professional results with uSkinned's responsive starter kits for Umbraco CMS



 **USKINNED**



Left
Flexible configuration options for content editors

Above
Choose from a wide range of responsive themes

banner that really stands out? Add movement with a video or parallax image.

uSkinned's responsive themes work seamlessly on every device, be it desktop, tablet or mobile. This means you build your site once and your users get the same great experience every time they visit, however they view the site.

Together, uSkinned and Umbraco CMS give you powerful functionality – but if you want to add your own stamp, the source code is fully customisable. If you have the

"Each theme is an outstanding piece of work, packed with the features we need and our clients demand"

Jonathon Burton
NHS Webteam

coding skills, you can dig in and take your uSkinned site to the next level by adding your own elements. It's in your hands.

Some of the world's leading brands and development teams are already using uSkinned starter kits to launch amazing new websites for themselves and their clients. Check out some of their customer success stories (<http://bit.ly/2EuKJQW>).

Don't forget you can get 15 percent off of your next uSkinned purchase – just enter the code 15OFFCB at the checkout.



BETTER BUILDS WITH **WEB** **COMPONENTS**

HOW TO GET READY FOR THE FUTURE OF HTML

Build fully modular code for the
web today with the power of
Web Components and Polymer

THE STATE OF WEB COMPONENTS

Web components have been around for a while, but are they mainstream yet?

The web components specifications, which describe a number of HTML standards allowing modularisation of code on the web, have been around since 2011. The primary objective of web components is to allow you to break your code down into custom elements, or re-use those others have made. For example, a <google-map> element that replaces the need to write JavaScript to inject a map onto a page.

The benefits are clear, since you can not only import modules easily, but also lay out more manageable code (no more scrolling through pages of nested divs). Yet, arguably, uptake has been slow. It's now 2018 and the full set of web component specifications are still not supported by every current browser, meaning that developers are reliant on either polyfills or frameworks to ensure universal site compatibility.

The practical consequence of this is that there's not much incentive to build 'vanilla' web components right now. For most devs, there are two options. The prevalent approach is to use a front-end framework - Angular, React, Vue and so on are all built around a component model and their own syntax to define components. An alternative is Polymer. This aims to provide a more 'pure' standards-based web component experience.

"The benefits are clear, since you can not only import modules easily, but also lay out more manageable code (no more scrolling through pages of nested divs)"

WHICH BROWSER SUPPORTS WHAT?

The major browsers are getting closer to full support. Here's a quick glance guide

	CHROME	FIREFOX	SAFARI	EDGE
CUSTOM ELEMENTS	Yes	No (but can be enabled)	No	No
SHADOW DOM	Yes	No (but can be enabled)	No	No
HTML TEMPLATES	Yes	Yes	Yes	Almost
HTML IMPORTS	Yes	No (but can be enabled)	No	No



THE WEB COMPONENTS STANDARDS

Four separate HTML standards come together to enable web components to work

Custom elements

www.w3.org/TR/custom-elements

Custom elements are the foundation of web components, and essentially what it's all about. The specification introduces support for creation of new HTML tags, which mean that rather than being constrained to standard HTML syntax, you can define your own. The idea is that complex functionality can be hidden in a single custom element which behaves similarly to any standard HTML element. In addition, the custom elements specification allows support for the extension of existing HTML tags with custom functionality.

One of the end goals of web components is to allow these custom elements to be redistributed as self-contained modules. According to W3, custom elements are part of a larger effort to "rationalise the platform". See the latest Editor's Draft at <http://bit.ly/2o15v4u>.

Shadow DOM

www.w3.org/TR/shadow-dom

Shadow DOM, as you might expect, allows the creation of a 'shadow' DOM tree, which is attached to a normal parent DOM element but is self-contained.

This is important as it enables us to encapsulate web components so their functionality does not interfere with that of the pages you build, and vice versa. If you add a component to your page, document.querySelector() function on the page will not return any nodes within the component's DOM. Styles are also scoped within the shadow DOM.

To see this in action, think about how the <video> element operates. The video player it creates includes a number of buttons and other controls, yet these are encapsulated (hidden) from the page you build, and manipulating your own DOM will not affect them.

HTML templates

<http://bit.ly/2ogPrul>

The most widely-supported of the web component standards, this introduces a <template> element which allows you to define fragments of HTML which can be instantiated when needed, and are re-usable. This is ideal for building modular components. When a template is first loaded, the browser processes its contents to make sure they are valid, but renders nothing and doesn't run any of its scripts. It does not form part of the document at this point, so will not be picked up by getElementById() or querySelector(). It is only used when we instantiate it using JavaScript, which is usually done by creating a copy of its content using document.importNode(). Consequently, if we develop custom element's content as a template, we can utilise it whenever and wherever we want without worrying about artificially "hiding" it.

HTML imports

www.w3.org/TR/html-imports

The concept of HTML imports is to allow bundling of dependencies (HTML, CSS and JavaScript) into a single deliverable, added to a page with a single line of code. It's conceptually similar to #include in C. A good example use case is Bootstrap, which typically requires multiple JavaScript and CSS files to be added via <script> and <link rel="stylesheet"> tags. With an HTML import, this could be diluted to a single <link rel="import"> statement.

While it simplifies redistribution of components, this has proven a contentious standard. Mozilla have stated that they will not implement it, and Google have deprecated use of imports to apply styling to a master document. Polyfills are available, however, and there are alternative ways to import components such as ES6 modules.



BUILD PRODUCTION-READY WEB COMPONENTS

Google's Polymer library is one of the easiest ways to get you started on the path to creating your own components

Web components are a great idea. But there are a couple of problems to overcome before we can start using them. Firstly, there's the issue of browser support - which we can solve through polyfills. There's also the fact that they can be a little fiddly to set up using only vanilla HTML and JavaScript features. As a result, there are a number of libraries available which seek to make web components

more widely compatible and simpler to work with.

The most prolific of these is probably Google's Polymer library (www.polymer-project.org). Polymer doesn't set out to be a full-fledged front-end framework, but rather aims to keep as close to the standards as possible.

Polymer fundamentally does two key things. Firstly, it polyfills browser

support for the web components standards, so you can use the native web component functionality consistently across browsers. Secondly, it provides some additional features beyond 'vanilla' web components - including a simpler syntax for creating custom elements, and two-way data binding.

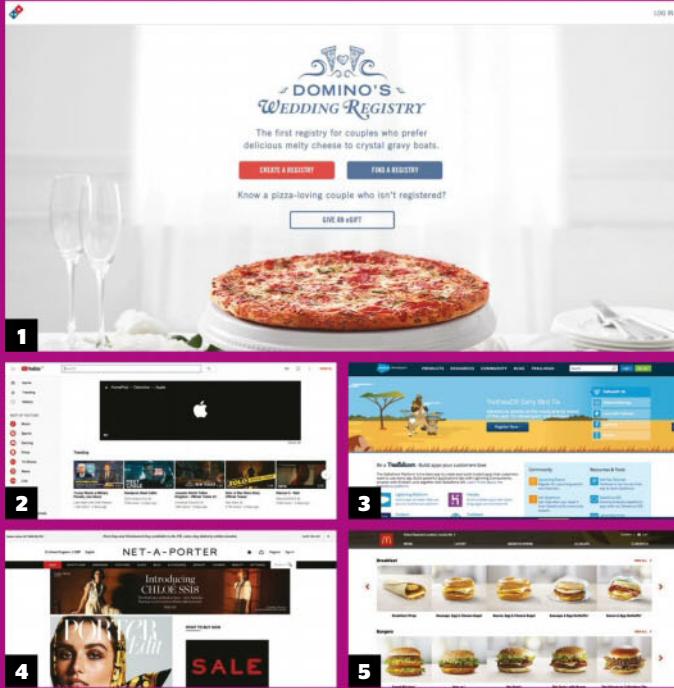
Alongside the Polymer library, the team also provide a Polymer App

Toolbox, which is a collection of pre-built components and templates to help quickly create Progressive Web Apps.

"Polymer aims to keep as close to the standards as possible"

5 PLACES POLYMER IS IN USE

Some big names are already using Polymer - and in some surprising places!



1 Domino's Pizza

<http://bit.ly/2kS7VbQ>

For many businesses, the newer pages start using Polymer first. Domino's Pizza's wedding service (yes, this is a thing!) uses it even though their main site doesn't yet.

2 YouTube

<https://www.youtube.com>

If you need proof that Polymer is ready for prime time, look no further than YouTube, one of the most highly-trafficked sites on the web.

3 Salesforce

<http://bit.ly/2EoJtZV>

Cloud computing provider Salesforce have built a set of Polymer components on top of the Salesforce SDK to quickly build Salesforce-driven mobile and tablet apps.

4 Net-a-Porter

<http://bit.ly/2uauF1f>

It's not just Google using Polymer, though. Net-a-Porter adopted it very early on, and still use it on their store pages to this day.

5 McDonald's

<http://bit.ly/2HcdpQz>

It's not just public websites which benefit from components. It seems McDonald's now use Polymer for the menu boards in their restaurants.

POLYMER VS FRONT-END FRAMEWORKS

With most popular frameworks already supporting modular development, do we really need Polymer?

You might be wondering whether Polymer is a better choice than the likes of Angular or React. If you've used any modern front-end framework, you're probably already doing component-based development, and utilising third-party modules through the likes of npm. So why look at yet another library?

The problem with front-end frameworks is that there are so many, each with differing styles of development, syntax, and module ecosystems. Furthermore, they have a

tendency to rise and fall out of favour. The consequence is a risk of constantly needing to learn the latest framework, and refactor code from those which are no longer popular. It also creates challenges for interoperability of modules between frameworks. If you want to use Bootstrap with Angular, you'll need a different module than you would to use it with React.

Polymer sets out with a fundamentally different objective in mind. Rather than offering its own

opinionated style of development, Polymer's motto is #UseThePlatform, which is indicative of their philosophy that developers should not need to fill gaps and add layers of abstraction to web technologies to work with them. This implication is that development should rely on native platform features built into browsers, and libraries and frameworks should be lightweight and complement these platform features. With Polymer, custom elements 'just work', like regular HTML elements, without a developer having to worry

about the details of Polymer itself. This means it is not mutually exclusive with the front-end framework of your choice. Modules such as react-polymer are designed to let you to use Polymer components in a React app.

A final consideration is performance. Frameworks can be large while Polymer's payload is extremely small and will shrink further if browsers do not require polyfills. This means Polymer offers improved page load speeds compared to a heavyweight framework.

GET STARTED WITH POLYMER

You can be up and running with a Polymer app in no time at all.
Let's take a look at the basics of creating modular web apps

1. GET THE POLYMER CLI

The easiest way to get started with Polymer is using the CLI. If you've used Node and npm before, this will be very familiar. If you haven't used these before, you'll need them and can find out how to get them at www.npmjs.com/get-npm.

Install the Polymer CLI using:

```
■ npm install -g polymer-cli
```

2. YOU'LL ALSO NEED BOWER

The current version of Polymer (2.0) uses Bower as its package manager. Therefore, you'll need to install Bower to install custom Polymer components, which you'll almost certainly want to do. Bower itself can also be installed via npm:

```
■ npm install -g bower
```

3. CREATE A POLYMER PROJECT

Now we can create a project. Make a new directory, navigate to it, and run:

```
■ polymer init
```

Amongst other choices, you'll be

prompted with a template option. Select 'polymer-2-starter-kit'. This will create a basic app with navigation and is the quickest way to see what Polymer is all about.

4. CHECK IT WORKS

This is a good time to check that the starter project is working. Let's fire up the HTTP server:

```
■ polymer serve
```

You should now be able to navigate to <http://127.0.0.1:8081> and see a simple app layout with some sample pages and text. As you make code changes, the server will automatically pick them up so you shouldn't need to restart it.

5. STARTING TO CUSTOMISE

Let's begin by making some changes to the main my-app component. The blue page header is defined in the <app-header> element. Go ahead and modify the main-title div:

```
<div main-title>Cat Browser</div>
```

You can also modify the <app-drawer> element to rename menu navigation items. For example:

```
<a name="view1"
  href="#"[[rootPath]]view1">Tabby
Cat</a>
```

6. EDITING PAGE CONTENT

We can now make some changes to each page's content. In my-view1.html, modify the <h1> element to change the page title:

```
■ <h1>Tabby Cat</h1>
```

You can also edit the paragraph content below to change the page's text. Go ahead and make some changes to each individual page. You might also want to look at my-view404.html, which is a 404 error page the router displays if it cannot find a requested resource.

7. ADDING NEW PAGES

We can also add our own new pages as custom components. Let's start by duplicating my-view3.html as my-view4.html.

You can tweak the content, but most importantly you'll need to update the dom-module identifier:

```
■ <dom-module id="my-view4">
```

And modify the script at the bottom to export a new component called MyView4, which will enable you to use a <my-view4> element.

```
class MyView4 extends Polymer.Element {
  static get is() { return 'my-view4'; }
}
window.customElements.define('my-view4', MyView4);
```

THE POLYMER STARTER TEMPLATE

Let's walk through the key parts of the polymer-2-starter-kit project (<http://bit.ly/2GoRi7X>) as mentioned in Step 3. polymer.json provides build configuration for Polymer. We generally won't make too many changes here during the tutorial, but notice that it defines the entry point (index.html), and a 'shell' (my-app.html) which is the main code to load the app and its resources.

If you look at index.html, you'll see various prefabricated features to support service workers and more. However, the key thing that it does is load the <my-app> component and places it onto the page.

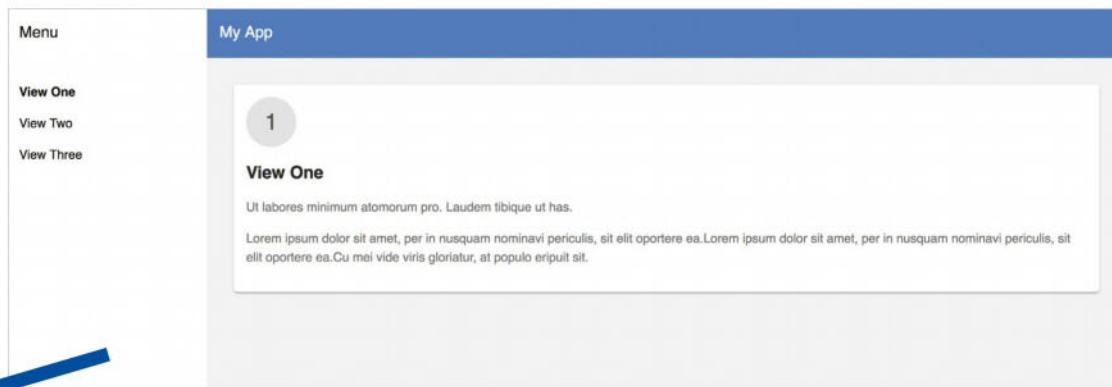
So let's take a look at my-app.html, which is where the heavy lifting happens. You'll notice immediately that it imports a number of components at the top, the syntax for which is remarkably straightforward. The <dom-module> element further down describes a custom element, and contains an HTML <template> (the presentation) and some JavaScript. The script defines some router behaviour (that is, links pages displayed to URLs as navigation occurs). The template includes a layout comprised of various custom elements, and some styling. Notice that it's common to integrate markup, presentation and scripting into one component file.

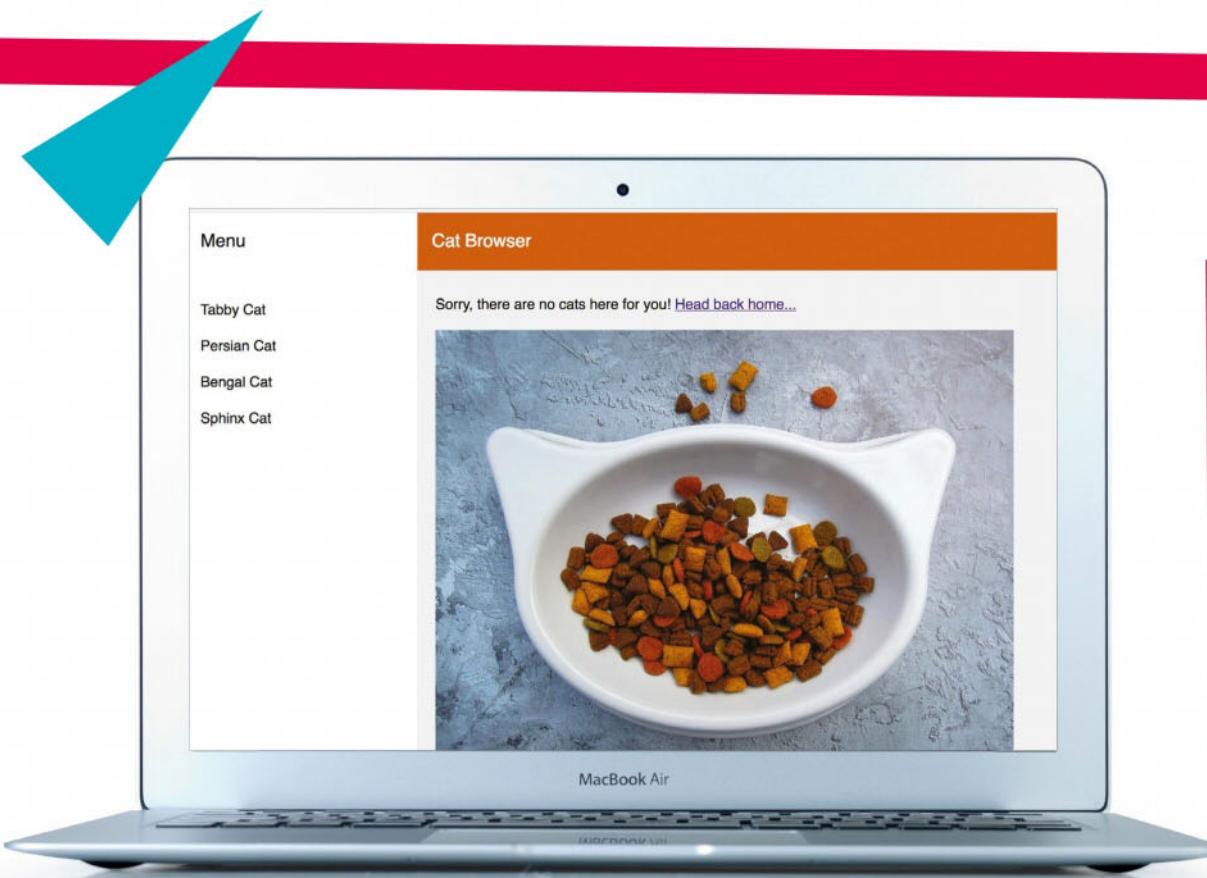
Each individual page of the app is implemented as its own custom component in the my-view[1-3].html files.

```
Simons-MBP:polymer-demo simon$ mkdir cat-app
Simons-MBP:polymer-demo simon$ cd cat-app
Simons-MBP:cat-app simon$ polymer serve
? Which starter template would you like to use? polymer-2-starter-kit
info: Running latest "3.0.0" release of PolymerElements/polymer-starter-kit
info: Downloading v3.2.0 of PolymerElements/polymer-starter-kit
info: Unpacking template files
info: Finished writing template files

I'm all done. Running bower install for you to install the required dependencies. If this fails, try running the command yourself.

bower cached   https://github.com/PolymerElements/iron-iconset-svg.git#2.1.1
bower validate 2.1.1 against https://github.com/PolymerElements/iron-iconset-svg.git#2.0.0
bower cached   https://github.com/PolymerElements/iron-flex-layout.git#2.0.0
bower validate 2.0.0 against https://github.com/PolymerElements/iron-flex-layout.git#2.0.0
bower cached   https://github.com/PolymerElements/iron-selector.git#2.0.1
bower validate 2.0.1 against https://github.com/PolymerElements/iron-selector.git#2.0.0
bower cached   https://github.com/PolymerElements/iron-media-query.git#2.0.0
bower validate 2.0.0 against https://github.com/PolymerElements/iron-media-query.git#2.0.0
bower cached   https://github.com/PolymerElements/iron-pages.git#2.0.1
bower validate 2.0.1 against https://github.com/PolymerElements/iron-pages.git#2.0.0
bower cached   https://github.com/PolymerElements/paper-icon-button.git#2.0.0
bower validate 2.0.0 against https://github.com/PolymerElements/paper-icon-button.git#2.0.0
bower cached   https://github.com/webcomponents/webcomponentsjs.git#1.1.0
bower validate 1.1.0 against https://github.com/webcomponents/webcomponentsjs.git#1.0.0
bower cached   https://github.com/Polymer/web-component-tester.git#4.5.4
bower validate 4.5.4 against https://github.com/Polymer/web-component-tester.git#4.5.3
bower cached   https://github.com/Polymer/polymer.git#2.5.0
bower validate 2.5.0 against https://github.com/Polymer/polymer.git#2.0.0
bower cached   https://github.com/PolymerElements/app-layout.git#2.0.0
bower validate 2.0.0 against https://github.com/PolymerElements/app-layout.git#2.0.0
bower cached   https://github.com/PolymerElements/iron-location.git#2.1.0
bower validate 2.1.0 against https://github.com/PolymerElements/iron-location.git#2.0.0
```





8. UPDATING THE MAIN COMPONENT

Now we can use our new page element in the my-app component. There are several places we need to update. Firstly, we must import the new component:

```
<link rel="lazy-import"
      href="my-view4.html">
```

Next, we add a navigation item in the <app-drawer>:

```
<a name="view4"
   href="[[rootPath]]view4">Sphinx
   Cat</a>
```

Finally, we add the new element within <iron-pages>:

```
<my-view4 name="view4"></
my-view4>
```

9. POLYMER.JSON

The final place we need to update with our new page component is polymer.json - specifically, the 'fragments' parameter. polymer.json defines build configuration for Polymer, and "fragments" defines pages which are loaded asynchronously or on demand by the app.

```
"fragments": [
  "src/my-view1.html",
  "src/my-view2.html",
  "src/my-view3.html",
  "src/my-view4.html",
  "src/my-view404.html"
],
```

10. INTRODUCING NEW ELEMENTS

You should now have a customised version of the starter kit template, with a new page added. Now let's install a couple of custom elements available online and put it to use. Elements are installed using Bower:

```
bower install --save
polymerelements/iron-image
bower install --save
FabricElements/skeleton-carousel
```

The <skeleton-carousel> element adds an image carousel to the page. <iron-image> is a more customisable image tag provided by the Polymer team, which we can easily use within the carousel.

11. ADDING THEM TO THE PAGE

Let's add a carousel to each of our pages. First we import the components:

```
<link rel="import" href="..
bower_components/skeleton-
carousel/skeleton-carousel.
html">
<link rel="import" href="..
bower_components/iron-image/
iron-image.html">
```

Then we utilise the custom elements in our content:

```
<skeleton-carousel dots nav
loop direction="vertical" auto>
<iron-image data-src="."/>
```

```
images/cat1.jpg"
sizing="cover"></iron-image>
<iron-image data-src="./
images/cat2.jpg"
sizing="cover"></iron-image>
<iron-image data-src="./
images/cat3.jpg"
sizing="cover"></iron-image>
</skeleton-carousel>
```

12. THE FINISHING TOUCHES

Congratulations! You've built your first, simple Polymer page using custom elements. To finish it off, try adjusting some of the styling of the pages. You'll find styling of the app container, such as the header colour, in my-app.html. Styles shared between pages are in shared-styles.html - and notice that this is imported into each individual my-view#.html page.

FINDING COMPONENTS FOR YOUR NEEDS

One of the objectives of web components is to create an ecosystem of pre-built components available online. If you've used a framework like Angular, think of something similar to the packages you install via npm or yarn.

Polymer components are currently installed using Bower, although this is changing soon. www.webcomponents.org has an extensive catalogue of components available for you to use. It's generally worthwhile to check whether a component already exists before you embark upon creating one yourself. Conversely, of course, as you become more proficient with Polymer, you may want to think about sharing your own creations with others.

What you will find at this point is that the ecosystem is very much in its infancy. While the Polymer team's core Polymer Elements catalogue covers much of what you're likely to need, the third-party ecosystem is nowhere near as extensive as something like Angular at this time. Furthermore, where components do exist, you'll likely find them at a very early stage, and possibly lacking some of the functionality or parametrisation you expect.



BUILD CUSTOM ELEMENTS

We've built a simple Polymer app and used elements other people have created, but building your own elements is what web components is really about. Let's take a look at how to do that...

1. DEFINING AN ELEMENT

We'll extend our app from the previous tutorial. A custom element is defined by extending a class from `Polymer.Element`, which we'll do in a new `title-card.html` file:

```
<script>
  class TitleCard extends Polymer.Element {
    static get is() { return 'title-card' }
  }
  customElements.define(TitleCard.is, TitleCard);
</script>
```

The `is` property defines the name of the element, so we can use `<title-card>` later.

2. CREATING A TEMPLATE

The content of a custom element is defined with markup inside a `<template>` tag. Let's start off with something very simple to show how this works:

```
<template>
  <div id="content">
    This is my new custom
    element!
  </div>
</template>
```

Notice that we're including both scripting and markup (and later styling) from the component in a single HTML file.

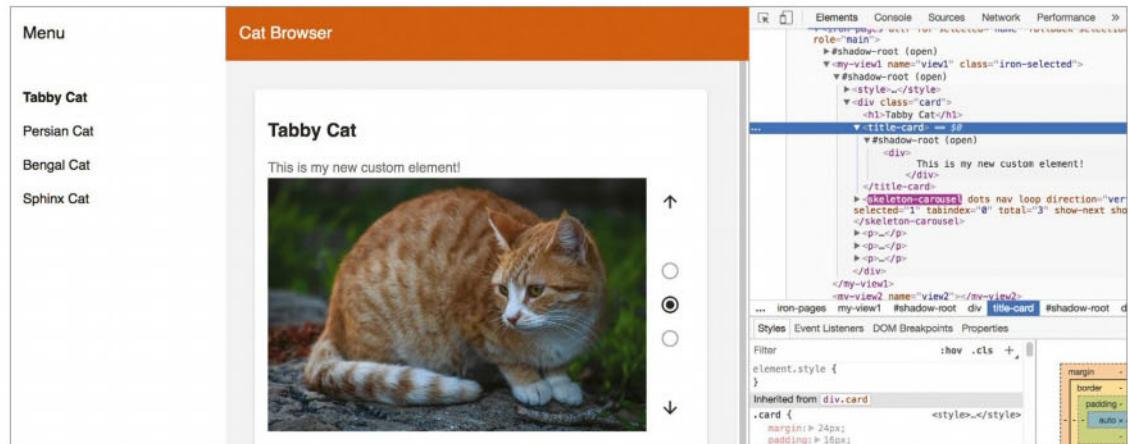
3. SHADOW DOM

There's something else we need to do, though. We want to encapsulate the details of our template within Shadow DOM. We do this by wrapping our scripting and template within a `<dom-module>` element. This also means that when we add styling, it is scoped within the Shadow DOM.

```
<dom-module id="title-card">
  // Script and template code
  from steps 1 and 2
</dom-module>
```

4. USING OUR NEW ELEMENT

That's actually all you need for a basic new element. We can now import it into one of our existing pages (which actually are themselves custom components):



`<link rel="import" href="title-card.html">`

And then use it in our markup:
`<title-card></title-card>`

5. STYLING THE ELEMENT

Our element is a little bland. Let's style the component. Your `<style>` tags need to go inside the `<template>` element. Remember the styles are scoped to the component's Shadow DOM, so this won't affect styling of the rest of your page.

```
<style>
  #content {
    margin-top: 10px;
    margin-bottom: 10px;
  }
</style>
```

6. INTRODUCING PROPERTIES

At the moment our element isn't very customisable. Let's introduce a

`<title-card color="">` attribute. To do this, we need to add a new function to our component class:

```
static get properties() {
  return {
    color: {
      type: String,
      value: "#ffffff"
    }
  };
}
```

This defines 'color' as a usable property of the `<title-card>` element.

7. USING THE ELEMENT'S PROPERTIES

We now have a 'color' variable available within the component. There are a couple of ways we could use this. We could create a constructor function and use JavaScript to apply it to the component. However, there's an easier way:

```
<div id="content"
  style$="background-
  color:{{color}};">
  <h1>This is my new custom
  element!</h1>
</div>
```

This uses data binding to apply the 'color' variable to the background-color part of the div's style property.

8. CUSTOMISING THE TEXT

Lastly, we need to customise the text our element displays. Really we want the text displayed to be the content between the `<title-card>` and `</title-card>` tags. This can be achieved using `<slot>`:

```
<h1><slot></slot></h1>
```

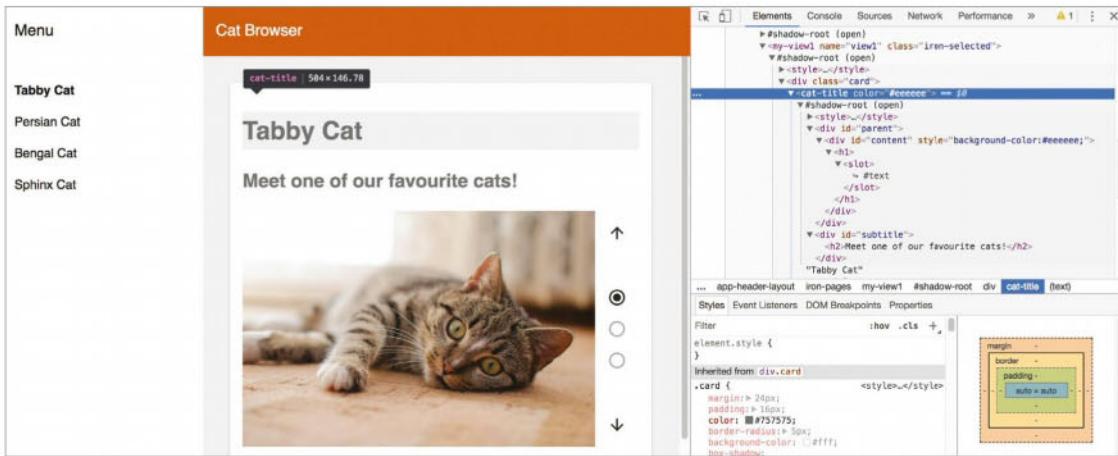
Then we can use our custom element like this:

```
<title-card
  color="#eeeeee">Tabby Cat</
  title-card>
```



HOW TO EXTEND AN EXISTING ELEMENT

Web components allow you to extend existing ones to add your own functionality. Polymer doesn't currently support extending built-in elements, but here's how you do it for third-party components



1. DECLARE THE COMPONENT

We'll create an extension of our <title-card> element. The <cat-title> element will add some additional text underneath the breed of cat. To start off, we need a new cat-title.html with a script defining the class:

```
<script>
  class CatTitle extends
    customElements.get('title-card')
  {
    static get is() { return
      'cat-title' }
    constructor() {
      super();
    }
  }
  customElements.
  define(CatTitle.is, CatTitle);
</script>
```

Notice that we now no longer extend :Polymer.Element, but rather locate the class behind the <title-card> element (we could also reference the class directly rather than using customElements.get).

2. THE TEMPLATE

Once again, we also need a template for our element:

```
<template>
  <div id="parent"></div>
  <div id="subtitle">
    <h2>Meet one of our favourite
    cats!</h2>
  </div>
</template>
```

Notice that we've placed an empty 'parent' div at the top. We'll use this

later on to place the content of the element we're inheriting into our new element.

3. COMPONENT STYLING

We can add styling as usual to the new component. We'll also inherit styling from the parent component we are extending, so anything we write here supersedes the parent styling.

```
<style>
  #subtitle {
    margin-bottom: 20px;
  }
</style>
```

Remember that styles go within the <template> element.

4. GETTING PARENT AND CHILD TEMPLATES

The key thing we need to do is combine the templates of the parent <title-card> element that we're inheriting, and the new <cat-title> element we've created. To do this, we can add scripting (outside the class definition) to obtain the parent and child templates:

```
var childTemplate = Polymer.
  DomModule.import('cat-title',
    'template');
var parentTemplate =
  customElements.get('title-card').
    template;
```

5. COMBINING THE TEMPLATES

What we now need to do is add the parent template to the child template. We'll use the 'parent' div we created

earlier as the placeholder to do this:

```
var clone = document.
  importNode(parentTemplate.
  content, true);
childTemplate.content.
  getElementById("parent").
  appendChild(clone);
```

This means childTemplate now contains a DOM tree of content from both <title-card> and <cat-title>.

6. OVERRIDING TEMPLATES

Finally, we need to put our new childTemplate variable to good use. This is straightforward. We can override the template property of the CatCard class to return our newly-constructed variable:

```
static get template() {
  return childTemplate;
}
```

7. PUTTING THE ELEMENT TO USE

That's all there is to it. If you modify your my-view.html pages, you can now utilise our new element like this:

```
<cat-title
  color="#eeeeee">Tabby Cat</
  cat-title>
```

You'll find it inherits the behaviour of <title-card>, but now handily adds the extra markup we placed in the <cat-title> template.

ALTERNATIVES TO POLYMER

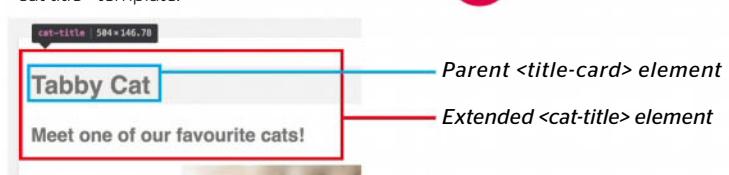
Polymer is arguably the most prolific library for the construction of web components, and is likely to continue to grow in popularity. However, it isn't the only solution on the table to develop them.

Vanilla web component development, without libraries, is more or less off the table at this point. Not only is it fiddly compared to the syntactic abstraction of something like Polymer, but more importantly the level of native browser support is insufficient for it to be viable.

One alternative is skate.js (<https://github.com/skatejs/skatejs>), which offers similar functionality to Polymer, including all the things you'd expect such as element lifecycle hooks. It's lighter than Polymer, and likely to be faster as a result.

Another lightweight option is slim.js (<http://slimjs.com>). In addition to all the things you'd expect, slim.js offers a plugin mechanism that allows you to extend the behaviour of an application by modifying all elements at a particular lifecycle stage.

A few years back, x-tag was a promising library from Microsoft and potentially Polymer's main rival. However, development hasn't been active for a while so it may not be such a good choice these days.





WHAT WILL POLYMER 3 BRING?

A new version of Polymer is coming soon, but what changes does it bring?

The current version of Polymer is 2.0, which was released in 2017 and brought about fairly wide-reaching changes compared to the library's original incarnation. Polymer 3.0 is due at the end of Q1 2018, and while it aims to deliver most change under-the-hood with no API impact, there are still some interesting things to take note of.

The first major change is a move from Bower to npm. Currently, Polymer components are distributed

as Bower packages. npm has been the more popular of the two for some time, and Bower is now no longer under active development. As a result, Polymer is moving to npm.

The other particularly significant change is a move away from HTML imports for components in favour of ES6 modules. As we've mentioned already, there's been some disagreement amongst browser makers around HTML imports, and it's

possible that the standard may never be fully implemented. ES6 modules offer very similar functionality, enabling modules to be loaded from JavaScript files via a `<script type="module">` tag, and are much more widely accepted. As a result, the Polymer team have decided to move in this direction for the future. A beneficial consequence of this change is that Polymer apps and elements will now run on the latest versions of

Chrome, Safari and Opera without need for polyfills.

You might be concerned that the move to ES6 modules would require existing components to be rewritten for Polymer 3.0, since the way you'd package a module is now different, relying on bundling into a JavaScript file. Fortunately, the team have produced a tool, polymer-modularizer, which converts HTML import packages to JavaScript modules.

5 POLYMER ELEMENTS TO CHECK OUT

The Polymer team provide a catalog of core elements, but there are also some great third-party ones out there

1 friendly-animation

<http://bit.ly/2sta2kV>

The `<friendly-animation>` element allows you to render After Effects animations from JSON as either HTML canvas or SVG elements on the page.

2 instagram-post

<http://bit.ly/2CI75SV>

Does what it says on the tin. You can use `<instagram-post postid="xxx">` to embed a post from Instagram into your page.

3 gold-password-input

<http://bit.ly/2suQWqg>

Password input is a great use case for re-usable components, and the `<gold-password-input>` element comes with a strength meter and reveal function.

4 polymer-tilt

<http://bit.ly/2CjMApX>

Interaction effects can subtly improve interaction with your site. The `<polymer-tilt>` element will add a subtle on-hover 3D tilt effect to whatever's inside it.

5 scary-cookie-consent

<http://bit.ly/2F3L6TA>

In the EU, you need consent to store cookies. The `<scary-cookie-consent>` element can display the prompt for you, and handle storage of user consent.

THE FUTURE OF WEB DEVELOPMENT

The web continues to evolve at a remarkable rate, with more and more features available natively

Developing for the web today is a very different experience to several years ago, due to the rapid emergence of new standards and technologies. You can do more in the browser than ever before, without reliance on plugins. Web components are one of a number of standards and APIs which drive this progress.

Web development is steadily converging on a situation where it is possible to build and maintain 'Progressive Web Apps' with all the

functionality you'd expect from desktop or native mobile software, using vanilla web technologies and without the need for heavyweight frameworks. This is nearer than you think - take web components alongside service workers (which allow apps to work offline) and the latest APIs (things like the Push API), and you have almost everything you need.

As a result, libraries are likely to become smaller and lighter, and focused on augmenting the native

functionality (think of how three.js uses WebGL, but offers abstraction to make it easier to get to grips with).

Whether this supplants the benefits brought by popular frameworks for many developers remains to be seen. Ultimately it's likely to come down to preferences around style, syntax and code structure. However, what may ultimately swing the balance is the longevity of standards-driven code. Apps built purely using native browser APIs and features will work fine long

after any individual opinionated framework falls out of fashion.

"Ultimately it's likely to come down to preferences around style, syntax and code structure"

web workshop

How to create animated mouse effects

Inspired by charlyzenger.ch/en

Regular menu

As well as using the video to navigate, the menu in the top right-hand corner can be used to navigate also. This has an interesting rollover animation and the menu covers the whole screen by animating over the top.

Going home
Wherever you are on the site the logo in the top right will take the user back to the home page and this logo spins around when the user rolls over it.

All change
At various times during the playback of the film, the outer circle grows larger and a word appears in the centre of the circle to emphasise interactivity, this can be clicked on to make the film interactive.

New cursor
The small white dot on the screen takes over from the usual mouse pointer, which is hidden and this follows the mouse exactly. The ring follows with a slight easing to the cursor position.

Growing up
When the mouse cursor moves over the text to play the film, the outer ring grows larger to emphasize that this is an interactive element.



EXPERT ADVICE

Quick access

With a unique way of navigating the site using video, it is important that returning customers who want to get to a piece of jewellery quickly can do so and not have to sit through the video to navigate to the part they want to see. The site features a regular navigation panel which is hidden offscreen until needed.



<comment>

What our experts think of the site

Creating unique navigation

Creating a unique approach to navigation is completed by enabling users to directly interact with the contents of the video on display. Navigation is done in a similar way to Kinect experiences, using a circular holding bar to show the user wants to click an option

Mark Shufflebottom, Professor of Interaction Design

Technique

1. Circle cursor

To get a circle cursor similar to the one found in Charly Zenger, add two div tags to the body of your HTML document, one will hold the small dot circle and the other will hold the outer ring circle.

```
<div id="dot"></div>
<div id="circle"></div>
```

2. Create the CSS

Either in a separate CSS file or in style tags on your head section add the following CSS rules. The first removes the regular mouse pointer from the page so that the new one can be seen. Next the 'dot' div is styled up to be a small circle on the screen.

```
html,
body {
cursor: none;
}
#dot {
position: absolute;
width: 12px;
height: 12px;
background-color: aquamarine;
border-radius: 50%;
}
```

3. The outer ring

Next up is the outer ring this will follow the dot but with a little easing. The CSS here will make this a larger circle but only using a simple outline rather than a filled in circle like the dot. The border radius of 50% makes a square div into a circle.

```
#circle {
position: absolute;
width: 64px;
height: 64px;
border: 1px solid aquamarine;
border-radius: 50%;
}
```

4. Adding JavaScript

At the bottom of your web page, before the closing body tag, add 'script' tags and inside those tags add the following variables. They will hold positions and speed of movement and a reference to the two div elements being controlled.

```
var speed = 4, _x = 0, _y = 0, endX = 0,
endY = 0;
var dot = document.getElementById("dot");
var circ = document.getElementById("circle");
```

5. Detecting the mouse

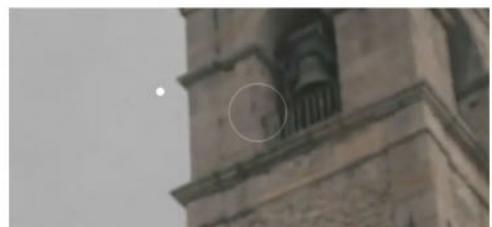
Inside the same style tags the mouse movement for the page is captured and the position of the mouse is stored in endX and endY. The div with the ID of 'dot' will be made to follow this exactly, becoming the new cursor.

```
document.onmousemove = function(e) {
endX = e.pageX;
endY = e.pageY;
dot.style.top = endY - 6 + "px";
dot.style.left = endX - 6 + "px";
}
```

6. Moving the outer circle

The outer ring will have a little easing into place so this needs to be continuously animated using the browser's 'requestAnimationFrame' function. An easing equation is worked out and applied to the circle so that this follows the dot just as on the Charly Zenger site.

```
function animate() {
requestAnimationFrame(animate);
_x += (endX - _x) / speed;
_y += (endY - _y) / speed;
circ.style.top = _y - 33 + "px";
circ.style.left = _x - 33 + "px";
}
animate();
```



Create a stunning 3D WebGL game

In the first of a two-part tutorial, you will set up the project for creating a stunning endless flying 3D game using ThreeJS





Any of the tasks that once needed to be apps are becoming more and more possible in the web browser.

One such area is games. The HTML5 Canvas element allowed for 2D games based on images and with all modern web browsers able to utilise WebGL, 3D games can be played on any device. In this tutorial we are going to take advantage of that and create a variation on the 'endless runner' type of game, by creating a 3D endless flying game down a track with obstacles.

Because we are not using a games engine, many of the things that game engines offer, like inputs and collisions, will have to be coded from scratch. As such, there are a lot of things to set up, so in this first part of the tutorial a lot of the game setup will be done. These will be things like creating a preloader to hold the screen until all the models have loaded, a title screen, enabling the game to start and end, updating the score and also updating the control of the ship. The game will run on desktop and mobile so the ship will be controlled by mouse and touch input to steer around obstacles. In next month's issue, we will complete the game by adding all of the challenges with obstacles and collision detection, while tying up the loose ends and bringing them into a fully-working game.

1. Starting off

Open the 'start' folder in your code IDE and open the javascript file 'game_pt1.js', which is just an empty file. Add these variables at the top of the empty page. This code will control various elements in the game as it's developed. As this isn't a games engine, many things have to be coded by ourselves.

```
var SCREEN_WIDTH = window.innerWidth,
    SCREEN_HEIGHT = window.innerHeight,
    QUART_SCREEN = window.innerWidth / 4,
    loaded = 0, itemsToLoad = 2,
    windowHalfX = window.innerWidth / 2,
    windowHalfY = window.innerHeight / 2,
    camera, scene, renderer, ship, c, m, o,
    l, active, inactive, raycaster, SPEED, dead,
```

```
delta, score, scoreEl, pCounter = 0, playing
= false;
var textureLoader = new THREE.
TextureLoader();
var composer, filmPass, renderPass,
copyPass, effectVignette, shaderTime = 0;
var mobile = isMobileDevice();
```

2. Listening in

Now a bunch of event listeners are attached to the mouse moving on desktop or the touch events on mobile to get the user input to the game. The function checks if this device is mobile by querying if it has orientation built into the browser or it's IE Mobile.

```
var screen = document.
getElementById("title");
var clock = new THREE.Clock();
document.addEventListener('mousemove',
onDocumentMouseMove, false);
document.addEventListener('touchstart',
onDocumentTouchStart, false);
document.addEventListener('touchmove',
onDocumentTouchMove, false);
window.addEventListener('resize',
onWindowResize, false);
function isMobileDevice() {
    return (typeof window.orientation !==
"undefined") || (navigator.userAgent.
indexOf('IEMobile') !== -1);
};
```

3. Setting the scene

The next function sets up various elements in the 3D scene like the camera and how much fog to display, the background colour is also created. The div that will display the score for the user is stored in a variable for easy updating of the score each frame.

```
function sceneSet() {
    var container = document.
createElement('div');
```

```
document.body.appendChild(container);
scoreEl = document.
getElementById('score');
camera = new THREE.PerspectiveCamera(75,
SCREEN_WIDTH / SCREEN_HEIGHT, 1, 10000);
camera.position.set(0, 6, 18);
scene = new THREE.Scene();
scene.fog = new THREE.FogExp2(0xb6d9e6,
0.005);
renderer = new THREE.WebGLRenderer();
renderer.setClearColor(0xadcd9d);
```

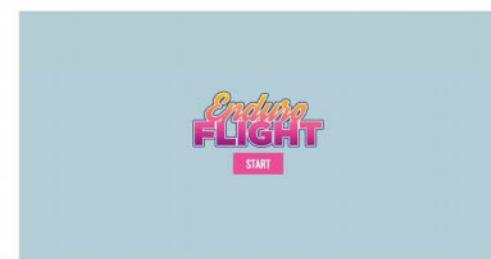
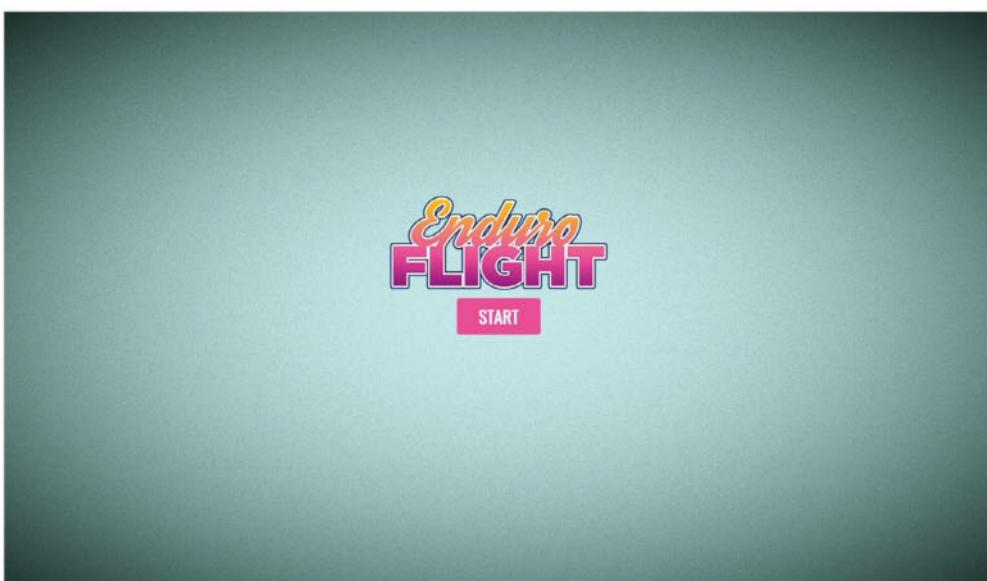
4. Lighting up

The renderer is set to the pixel density of the screen that it's being viewed on and it's set to fill the full width and height of the browser. If it's not a mobile, soft shadows will be used. A hemisphere light is added which puts a light blue colour for the sky and a dark orange for the ground.

```
renderer.setPixelRatio(window.
devicePixelRatio);
renderer.setSize(SCREEN_WIDTH, SCREEN_
HEIGHT);
renderer.shadowMap.enabled = true;
if (!mobile) renderer.shadowMap.type =
THREE.PCFSoftShadowMap;
container.appendChild(renderer.
domElement);
var light = new THREE.
HemisphereLight(0xa1e2f5, 0x6f4d25, 0.5);
scene.add(light);
light = new THREE.SpotLight(0xffff6c7,
0.5);
light.position.set(0, 200, -20);
```

Post-processing

This refers to sending all the pixels on the screen to the GPU to have a special filter applied. This happens as close to 60fps that the browser can run.



Top

Here is the basic interface of the game, with the logo and the start button, this is all added in a layer of HTML over the top. The 'beginGame' function is called when the start button is pressed.

Left

As the 3D scene is initialised the post-processing effects add a film grain and vignette effect over the top of the screen.

Tutorials

Create a stunning 3D WebGL game

5. In the spotlight

A spotlight is used in ThreeJS to cast shadows, so we're adding one here, and these settings set the properties of the spotlight. The size of shadow map and light decay are worked out. If on mobile these shadows will not be drawn since it reduces the amount of work in each frame and so the game should run faster.

```
light.target.position.set(0, 0, 0);
light.castShadow = true;
light.shadow = new THREE.LightShadow(new
THREE.PerspectiveCamera(90, 1, 90, 5000));
light.shadow.bias = 0.0008;
light.shadow.mapSize.width = 1024;
light.shadow.mapSize.height = 1024;
light.penumbra = 1;
light.decay = 5;
scene.add(light); }
```

6. Post-processing

The next function sets up the post-processing for the project. If on mobile, both the tilt-shift shader and the vignette shaders are ignored. These only need to run on the better processing power available through desktop computers and it wouldn't be smart to drain our user's mobile battery!

```
function postFX() {
  renderPass = new THREE.RenderPass(scene,
camera);
  if (!mobile) {
    hblur = new THREE.ShaderPass(THREE.
HorizontalTiltShiftShader);
    vblur = new THREE.ShaderPass(THREE.
VerticalTiltShiftShader);
    effectVignette = new THREE.
ShaderPass(THREE.VignetteShader); }}
```

Going fullscreen

In order to go fullscreen in the browser, the game uses a library called 'Screenfull' (<https://github.com/sindresorhus/screenfull.js>) that enables an easy call to fullscreen across multiple browsers.

```
filmPass = new THREE.ShaderPass(THREE.
FilmShader);
copyPass = new THREE.ShaderPass(THREE.
CopyShader);
composer = new THREE.
EffectComposer(renderer);
```

7. Completing the passes

Each post-processing effect has to be run through the effects composer as a pass. Every device will have a film grain pass, but mobiles and tablets will ignore the tilt-shift and vignette passes. Each pass means all the screen pixels need to be processed and this is where it could have a big impact on mobile.

```
composer.addPass(renderPass);
if (!mobile) {
  composer.addPass(hblur);
  composer.addPass(vblur);
}
composer.addPass(filmPass);
if (!mobile) composer.
addPass(effectVignette);
composer.addPass(copyPass);
copyPass.renderToScreen = true;
params(); }
```

8. Post settings

In the 'params' function, all of the parameters of post-processing are set up so that the screen gets the right effects added to it. A tilt-shift with a blurriness of five pixels is set, and then how dark and how far onto the screen the vignette should be displayed is added.

9. Setting a preloader

The last of the film grain settings are added, and that concludes all the post-processing. Next is the preloader. Every time an element is loaded this function is called and when all the elements are loaded the overlay message of 'loading' is taken off the screen and the game interface will display.

```
filmPass.uniforms['sCount'].value = 0;
filmPass.uniforms['sIntensity'].value =
```

```
0.4;
filmPass.uniforms['nIntensity'].value =
0.15; }
function checkLoad() {
loaded++;
if (loaded == itemsToLoad) {
render();
document.getElementById("preloader").
style.visibility = 'hidden';
} }
```

10. Resizing the screen

The game will make use of the fullscreen API, which will put it fullscreen on browsers that support this feature. The function here just makes sure that if the window is resized the display and the camera aspect ratio are made to match those new sizes on the screen.

11. Touch and go

The map function is used to map the position of the mouse in the width of the browser onto the movement of the spaceship. The movement is controlled either by following the mouse pointer or the position of the first finger on the touch input. The touch start event will update the mouseX position.

```
function map(n, start1, stop1, start2,
stop2) {
  return ((n - start1) / (stop1 - start1))
* (stop2 - start2) + start2;
}
function onDocumentTouchStart(event) {
  if (event.touches.length > 1) {
    event.preventDefault();
  mouseX = event.touches[0].pageX;
} }
```

12. More input

On mobile, the touch move event is used to update the finger movement so this is being detected here. The 'mouseX' movement on desktop gets the mouse's position rather than a finger position. This covers all the event handling of input no matter what device this is on.



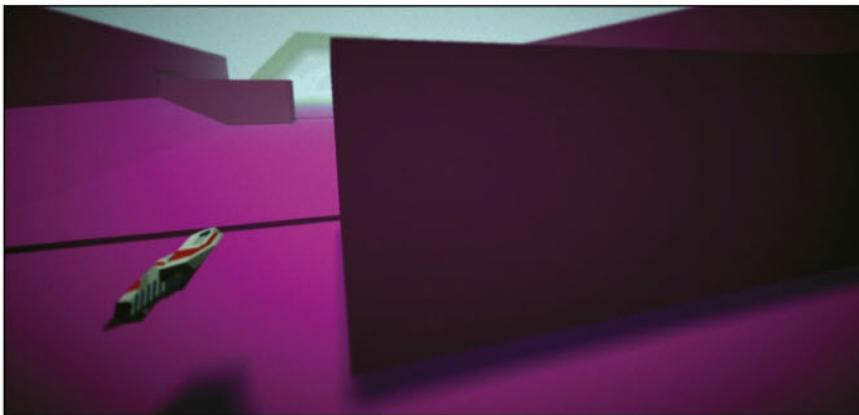
Top

This ship is added to the scene in Step 15 and this begins to fill out the title page for the user.

Right

The track panels are added as they load. When the final game is completed, this won't display here - it's just to check the model has loaded and is at the right scaling for the game.





Controlling the movement of the ship

Because this game is being made to run on both desktop and mobile, there are a number of different elements that need to be brought together. Firstly, the ship is being controlled by either the position of mouse or finger on touchscreens. To get this working the game needs to grab the position of the finger or mouse, which is stored in the variable 'mouseX'. The second part is to translate that position, but we don't want the ship to just follow where the user is at. Instead there needs to be some easing that allows for skill and challenge when steering around objects. Sure, the user can move their mouse fast to steer but the ship has to feel responsive while not following too closely and making the game too easy. We think we got it just right but you can play with the numbers in Step 21 if you disagree!

```
function onDocumentTouchMove(event) {
  if (event.touches.length == 1) {
    event.preventDefault();
    mouseX = event.touches[0].pageX;
  }
}

function onDocumentMouseMove(event) {
  mouseX = event.clientX;
}
```

13. Starting the game

This function is what is called when the user clicks the start button on the screen. Using the fullscreen API a call is made to display the browser in fullscreen. The mouse position is set to the centre of the screen and things like the score are set to 0 and the initial speed the spaceship is to move at is set.

14. Start playing

Continuing the start of the game, the internal clock is started and any active track panels are cleared ready to play. You will notice that there is a large comment about building track panels, this will be done in the second part of this tutorial, next issue. The 'game over' function is also started here with title screen being displayed and the screen set to grey.

15. Ending it all

When the game comes to an end, all of the active track pieces are removed from the 'active' array and from the display in the scene. The game clock is also stopped so that will cancel all animations from continuing to run on. The 'init' function is started and here the scene setup is called and post processing effects are run.

```
for (i = active.length - 1; i >= 0; i--) {
  var mdl = active[i];
  active.splice(i, 1);
  scene.remove(mdl.obj);
  inactive.push(mdl);
  clock.stop();
}

function init() {
  sceneSet();
  postFX();
  inactive = [];
}
```

16. Loading the ship

As part of the game initializing, a raycaster is created, this will be used later to detect collisions as it brings back a list of elements in front of the spaceship. Speaking of the ship, that model is loaded and it's set to cast and receive shadows once it's loaded.

17. Updating the ship

The ship is scaled down by half of its original size and positioned into the scene. The 'checkLoad' function is called to see if all game assets have loaded. Another loader is set, but this time it will load in all of the track panels. The track and ship have been placed in different files, but it would all still work if it was the same file.

```
dae.scale.x = dae.scale.y = dae.scale.z =
0.5;
dae.updateMatrix();
ship = dae;
ship.position.set(0, 0, 6);
ship.rotation.y = 0;
scene.add(ship);
checkLoad();
};

var loader2 = new THREE.ColladaLoader();
loader2.options.convertUpAxis = true;
loader2.load('panels.dae', function
(collada) {
```

18. Adding the track

Continuing with the track panels, these are all set to cast and receive shadows and to be scaled down. Another comment exists as next issue the static model of the track will have animations and random positions of various hazards placed in here. The track is placed into the scene for now just to get a sense of the design.

```
var dae = collada.scene;
dae.traverse(function (child) {
  if (child instanceof THREE.Mesh) {
    child.castShadow = true;
    child.receiveShadow = true;
  }
});
dae.scale.x = dae.scale.y = dae.scale.z =
0.5;
dae.updateMatrix();
//////// PANEL SETUP TO DO //////////
scene.add(dae);
```

19. Making updates

After the track panels are all loaded the 'checkLoad' function is called to see if all assets have been loaded. The 'init' function is called and the 'render' function is set up. The render function will run as close to 60fps as the browser can manage and will update the screen. The comment here will be filled in with code next issue.

```
checkLoad(); });
init();
function render() {
  requestAnimationFrame(render);
  delta = clock.getDelta();
  if (playing) {
    ////////// UPDATE PANELS TO DO HERE //////////
    updateShip();
```

20. Updating positions

The score is increased every frame that the game is running, as it will just go up with how long the player stays alive. The camera is updated to look at the ship and move with the ship as controlled by the user. The post-processing effects are updated and the collision tests will be added in the follow-up tutorial.

21. Final step

The update ship function moves the ship as per the player's mouse movement, but adds easing so it slides into place. Save the project and at this stage you will see the game loads, and the title screen and the mouse movement work. Next issue the challenge will be added with different elements to avoid.

```
if (dead == true && playing == true) {
  playing = false;
  gameOver();
}

function updateShip() {
  var newX = map(mouseX, QUART_SCREEN,
QUART_SCREEN * 3, -15, 15);
  ship.position.x += ((newX) - ship.
position.x) * 0.05;
  if (ship.position.x < -15) ship.position.x =
-15;
  if (ship.position.x > 15) ship.position.x =
15;
  ship.rotation.z = (ship.position.x - newX)
* 0.1; }
```

Convert visitors into customers with CRO

Discover the benefits of Conversion Rate Optimisation (CRO)
and convert more of your existing traffic





onversion Rate Optimisation is a critical element in your business' digital marketing process. CRO looks at converting more of your existing traffic,

aligning your focus on making more of what you already have. It's also one of the quickest ways to improve a digital advertising campaign.

By increasing the percentage of website visitors who take your desired action (goals), we increase both micro and macro-conversions. Micro-conversions are your smaller conversions such as filling out a form or signing up to an email. And macro-conversions are your primary goals, such as your users purchasing a product or service.

The CRO process involves digging deeper, understanding your key audience better, their interaction across your website and what's stopping them from completing your goals.

Testing is the key - you can form hypotheses about your user's interactions, but you need to test and analyse what your users really need. It's often the small changes, which can end up making the biggest impact. Let's get started by helping you to increase your conversions.

1. Where should I start?

Begin by analysing your user experience and identify any obvious barriers for conversion. Ease the journey of your audience that actively converts, so they can quickly and confidently reach a converting decision. Look for a solution in line with your goals and develop a hypothesis to test, ensure you can track the interactions, analyse the results and implement the solution.

2. Does colour have an impact?

There is a psychology behind colour, and gains can be

Premium for your whole family. Just £14.99.

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made by understanding what colour resonates better with your audience and enables your call to actions to stand out more. Test what combinations of colours in both your CTAs, backgrounds and fonts increase your overall conversion rate. For example, test the colours red vs green vs orange - does one colour have an effect when used in the background of your CTAs? Look at a contrast in particular, as well as those colours that compliment your overall design. You can also combine this with the 'language' used within the CTA, understanding what resonates better with your audience as well as highlighting to them where to click.

3. Find language and messaging that resonates

By understanding your key audience better and what messaging resonates with them, you can make the necessary changes to your copy, headlines and CTAs to push them closer to conversion. Your website copy and language will steer your audience to take action, for

example, to click a button to buy, download or move onto the next step. We have to therefore give them a reason, compelling enough to take action by adding value and relevancy. Split test generic words within your CTAs, such as 'click here' or 'buy now' with more tailored messaging, highlighting the benefits or scarcity.

Utilise personal terminology such as 'my' and 'your'. You can also add value-based terminology such as 'free', 'want', 'need', 'save' and urgency-based terms such as 'now', 'today' and 'ends'. Understand what their motivation is, and how you can speak to their needs consistently across their user journey.

4. Bullet points and numbers

People love lists and concise sentences. Split out your copy with bullet points, numbers and concise sentences to keep your users attention. Test the introduction of lists,

Positive vs negative

As well as focusing on the positives, look at flipping content and CTAs to highlight the negatives and the subsequent positive actions from it. For example, ten things you're doing wrong with SEO?

pink faux mongolian gilet

£40.00 £16.00

this gilet features a pink hue, faux mongolian fur fabric and a relaxed fit, finished with a hook fastening to the front.

[read more](#)

colour: pink

size: 6

11 others have checked this out in the last few hours

good choice... 6 purchases in the last 48 hours

Booking.com

Find deals for any season

Accommodation Flights Packages Train Holidays Rental cars Airport tickets Restaurants

Bournemouth Book your stay

Left

A great example of social proofing, highlighting how many like-minded individuals have looked at and purchased the product you're considering

Above

A useful pop-up, immediately attracting attention and building rapport to sign in and gain the irresistible offers available

Tutorials

Convert visitors into customers with CRO

remove the clutter and avoid waffle as this will increase your audience's confidence in you and the chances of them moving onto the next step.



5. CTA placement

Take advantage of the reading and scanning habits of your users. By understanding how they interact with your pages you can place your CTAs to direct their eye more effectively. Utilise heat-mapping tools to understand how they interact with your design. From these insights test the placement of your CTAs, as well as the introduction of visual clues such as arrows to direct their eye to where you want them to look.

6. Shape and size

Size and shape can also have an impact on the likelihood of your target audience clicking your CTAs and navigating across your website. Increase the size of your CTA buttons, making them easier to find as well as changing the shape to see if they get interacted with more. Test different shapes such as square, rectangle, oval and irregular shapes to catch your user's attention and stand out further.

7. Build trust with social proofing

Social proofing is another trust signal that builds confidence with your website visitors. It highlights how other like-minded individuals have purchased your products or services and are happy with their decision to do so. It's about eliminating fear and overcoming objections, which can have a positive impact on sales and conversions. If not already added, ensure you test the addition of different social proof statements across different parts of your website.

For example, adding testimonials, reviews, number of items sold and the number of customers purchased in the last hour/day/week. Test these across different pages and placements, such as within your hero image, above and below the fold, within your header hierarchy and in formats such as video.

8. Do trust marks and badges help?

Trust marks are also an indicator of quality and assurance, which further increases your customers' trust in your product or service. This can ultimately have a positive impact on your conversions, removing the doubt from your users taking the next step. Add trust marks to your website and landing page copy – in particular around your CTAs. For example, adding logos which indicate that you are government endorsed, members of legal bodies and federations as well as fully trained and certified. Test if

Above

Take advantage of instant messaging on high performing webpages, encouraging interaction to push users closer to conversion

Right

Simplify the user experience from your basket to checkout and remove any unnecessary steps to lift conversion

Test & Optimize

A/B Testing Multivariate Testing Split URL Testing

example.com/a.html 22% CONVERSION

example.com/b.html 52% CONVERSION

Design. Upload. Test.

Split URL testing allows you to distribute traffic to two different URLs of the same landing page. Unlike A/B testing, you create and host your own landing pages in Split URL testing.

- Sends traffic to two different URLs of a landing page
- Best suited in case of large design changes
- Test between two completely different websites/domains

Landing pages

Landing pages are where your website visitors become a lead, engage more with your brand or convert. Start by identifying the pages with high levels of web traffic, but low conversion rates. Run A/B tests to get the most from them; test new variations of layout, design, imagery, content and CTAs to drive action and increase conversion. Long vs short form copy is a particular test worth performing on your landing pages, in particular by traffic source to see what is more effective to your audience. You can then look at pages with high conversion rates but low web traffic, drive more traffic to these pages by their existing sources and test new.

their inclusion affects your results, but be mindful if you have multiple badges as the combination of these would also need to be tested.

**9. Pop-ups**

Adding pop-ups designed to attract attention and offer value, can be particularly useful in lifting conversion. They can aid in your efforts to keep users on your website and shop for longer or convert before they leave. Test the introduction of pop-ups in varied formats and placements, such as a slide-in box, drop-down banner or pop-up box. A particularly useful placement is on your exit page. Test conversion-driven copy and an irresistible offer to create urgency and encourage visitors to act now.

**10. Real-time messaging**

Look at the addition of instant messaging capabilities,

A/B Testing and Conversion Optimization Platform

VWO is the ideal platform to bring together all your conversion optimization program, from visitor research to A/B testing, at one place.

START PRODUCT TOUR

PLAN ANALYZE TEST

VWO
Hello there,
Do you want to understand how VWO can help you grow your business faster?
Happy to answer any questions that you might have.

such as live chat to high-performing webpages. These could include your pricing or product pages, encouraging interaction, rather than users leaving. Test the benefits of answering questions, building relationships and offering incentives pushing them closer to converting.

upon them. As you have a better understanding of the user experience, you will be able to take what works and expand on it further. Inevitably building on the positives will increase engagement and result in a lift in conversion.

11. Simplicity can cause a positive uplift

We tend to always migrate to the easiest option to achieve a desired result. Test simplifying your CTAs and messaging to lift conversion. Tell your audience exactly why they should buy from you and what they will get out of it. You can also adopt this approach to your checkout process, by simplifying the experience from basket to checkout and removing any unnecessary steps to lift conversion.

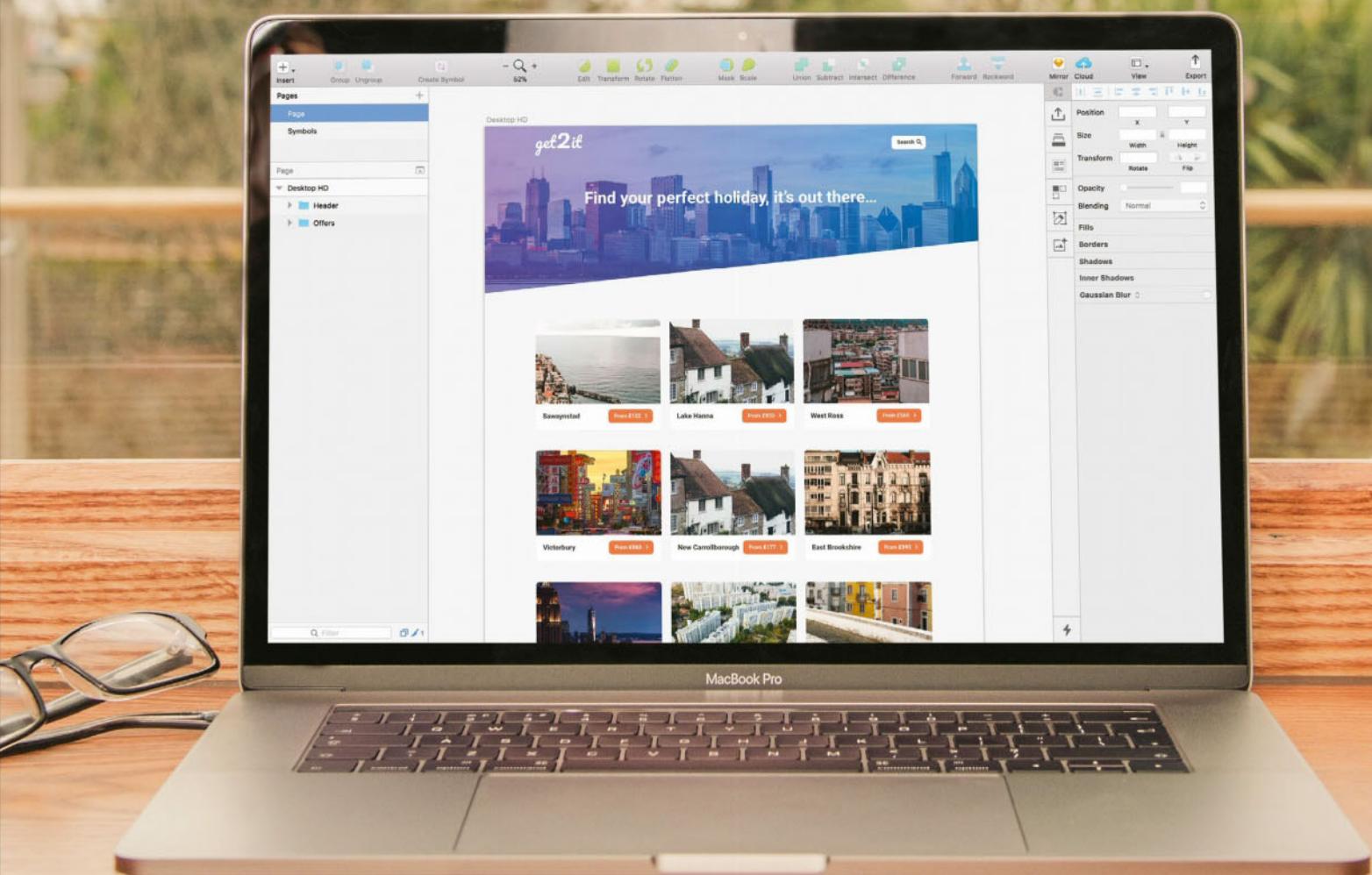
12. Take what works and expand on it

With CRO you are trying to understand what is working well on your website, and from these valuable insights, act



Design for the web with Sketch

Learn how to create a simple webpage design using Sketch, and discover essential tips and tricks along the way



 **DOWNLOAD TUTORIAL FILES**
www.filesilo.co.uk/webdesigner



Sketch is a popular macOS app, which is built from the ground up for designing user interfaces. Due to its ease of use, great performance and countless

community-built plugins, it's been slowly taking over the mantle of de-facto design app from Adobe Photoshop.

In this tutorial, we'll be working in Sketch to create a simple webpage. Along the way, we'll learn tips, tricks and how to leverage one of its most useful plugins, Craft.

First things first, download the tutorial files from FileSilo. Next, open Sketch and create a new document. We need to create the artboard where we'll design our webpage. Thankfully, Sketch comes with quite a few default sizes out of the box.

Click Insert>Artboard, then select Responsive Web in the drop-down menu, followed by Desktop HD. This should give you a blank canvas that is roughly the size of a desktop window. The first thing to do is check the Background Colour option and change the colour to '#F4F4F4', which is light grey. Next, change the height of the artboard to 1800px to give us ample space. During this tutorial, Layers list will refer to the left menu, while Inspector toolbar will refer to the right. So, without further ado, let's begin!

1. Create website header

Press the R key and then draw a rectangle in the middle of the artboard. Any size will do. On click, you'll see its dimensions in the inspector toolbar. In addition to accepting pixel values, you can also use percentages. Set the width to 100% to fill the artboard horizontally, and then its height to 493px. Move it to the top left (or set X and Y position to 0), then remove its border via the checkbox in the status bar.



2. Header background image

From the 'support-images' directory, open 'photo.jpg' and then copy and paste it into your design. We'll use this as the background image for the header. In the Layers list, right click on the rectangle layer and click Mask. Then select the Photo layer and set its X/Y coordinates to '-215' and '-357' to set it into place.

3. Point Editing

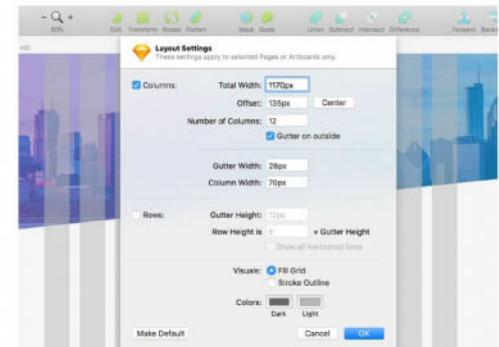
Let's edit our header to make it a more interesting shape. With the rectangle selected, press the Enter key to trigger Point Editing mode. Select the bottom right point and set its Y coordinate to 342. Then press Enter again or click Finish Editing in the Inspector toolbar.

4. Adding a linear gradient

In the Layers list, right click on your rectangle and click duplicate. Move this copy above the photo layer. With the copy still selected, click Fill in the Inspector toolbar, followed by the Linear Gradient option (second one along), setting its first colour to '#9877F8', and the second to '#26B2F8'. Then back on the artboard, drag the top of the gradient to the top left of the banner, and the bottom to the bottom right, so the gradient is diagonal. Give it an opacity of 50%. Finally, select all the layers and press Command+G to group them together to isolate the masking effect.

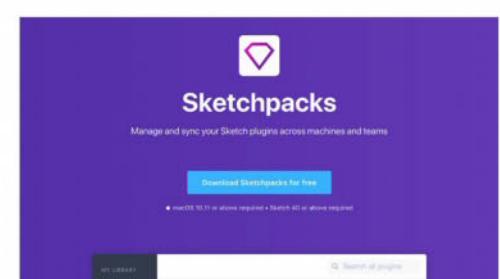
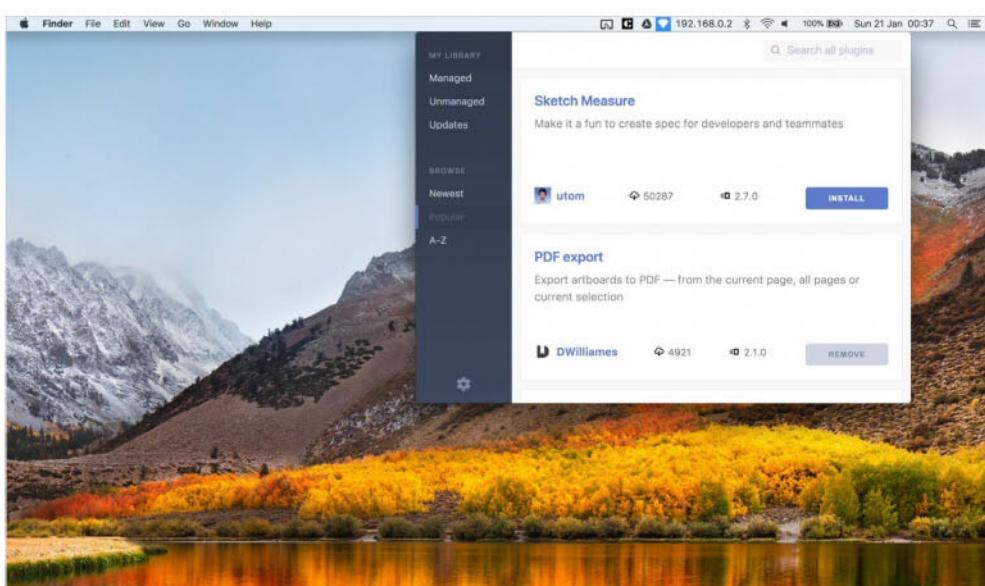
5. Setting up columns

One great thing about Sketch is that a layout columns system is available out of the box. You can configure it by clicking the View button, then Layout Settings. Copy the settings from the screenshot below and make sure to click the Center button to align it. You can then make it visible it with Ctrl+L.



Sketch version

One of the good things about Sketch is that new features are being developed all the time. This tutorial was written using Sketch v48.2, which at the time of writing was the most up to date version available.



Above

One of the best ways to install and manage Sketch plugins is through an app called Sketchpack, which you can download from sketchpacks.com

Left

In addition to providing easy access to Sketch plugins from your desktop, it allows you to sync plugins across machines and teams

Tutorials

Design for the web with Sketch

6. Adding a logo

Open 'support-images/icon-logo.svg' and then copy and paste it into your design. With the Layout column active, drag the logo to the top left of the first column. When you get close enough, it should snap into place. So it's not touching the top of the page, select the logo and then hold Shift and press the down key twice to move it 20px.



7. Create your first symbol

Symbols allow easy reuse of elements across a design. With the logo layer selected, click the Create Symbol button and call it 'Icons/Logo'. Icons refers to the symbol category and Logo refers to the symbol name. Above the layers list, you should see a new page appear called Symbols. This stores all the master versions of the symbols, and any changes to these will filter down into all of the different places they're used (known as Symbol Instances).

8. Colour the logo symbol

Open the Symbols page and on the logo artboard create a 15px x 15px rectangle and remove the border. With it selected, click Create Col Symbol and call it 'Colours/Orange'. Edit your new symbol's master and change its fill colour to '#FF8654'. Back in the logo symbol, resize the orange block to the 100% width/height of the artboard, rename it Icon Colour and then right click on the logo layer and select Mask. Back in the main artboard the logo will be orange.

Sketch versioning

One handy feature included in Sketch is version control. If you need to go back to a previous version of a design, you can do so by going to Fill>Revert To>Browse All Versions.



Above

One useful plugin available via Sketchpacks is called Symbol Organizer. As you've probably guessed, it allows you to organise symbols.

Right

It handily rearranges disarrayed symbols into ordered groups based on categories.



9. Create more colour blocks

The more colours we create, the more options we'll have to pick from to colour our icons. Duplicate the Colours/Orange symbol and create one for each of these colours: '#3B3B39', '#CCCCCC' and '#FFFFFF', renaming to 'Colours/Dark-Grey', 'Colours/Grey' and 'Colours/White' respectively.

10. Working with symbol overrides

Select the logo in your main artboard and you'll notice an Overrides option has appeared in the Inspector toolbar. If you click the Icon Colour drop-down menu, you'll see all the colours we've just added, and if you select one, it replaces the colour used in the symbol. Sketch allows you to replace nested symbols with any other that match its dimensions. Let's make the logo white, so it's clearly visible against the background.



11. Building a reusable button symbol

Create a 100px x 40px rectangle, click Create Symbol and call it 'Components/Button'. Open it up on the Symbols page (easily done by double-clicking a Symbol Instance), remove the border and then change its Radius to 10 to add rounded corners. Next click Insert>Symbols>Colours>Dark Grey to import the colour blocks we previously used for the logo. Stretch the block to the full width/height of the button artboard, rename it 'Button Colour' and then activate the mask property on the button rectangle.

12. Add text to button

To add text to the button, when editing its master, go to Insert>Text (or the T key). Type Text, resize it to 16px and change its weight to bold and its colour to white so you can see it. Align it slightly to the left (X:17, Y:9) so we have a bit of a gap to the right. The tutorial uses the Roboto font, available to download from Google Fonts, but feel free to use an alternative if you don't have it.



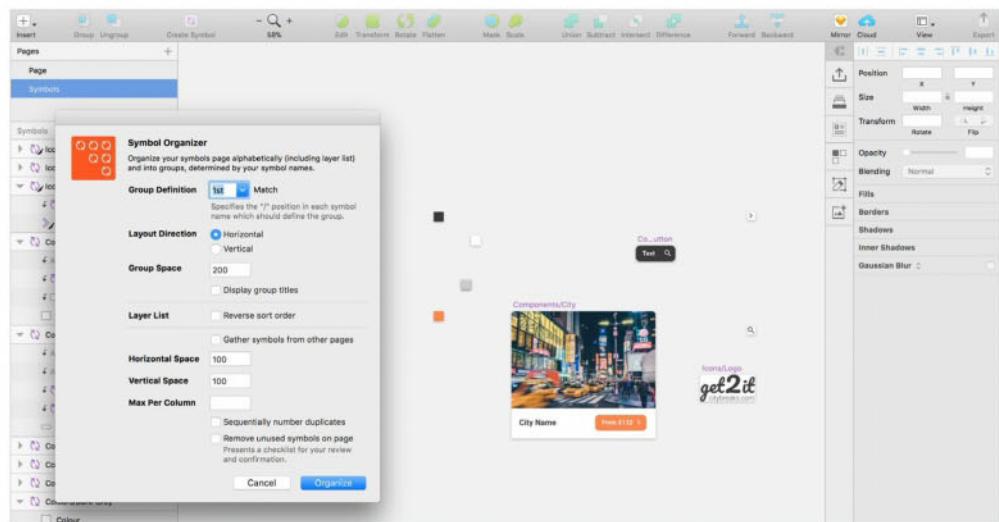
13. Add icon to button

Open 'support-images/icon-search.svg', copy and paste into your button and then reposition so it's vertically centred and right aligned (X:71 Y:11). Convert it into a symbol called 'Icons/Search' and rename its layer name in the button to Icon. You'll want to make the icon's artboard bigger, as like with colours, if we keep icon artboards the same size, they can be swapped. Click on 'Icons/Search' in the Layers list and then set the artboard size in the Inspector toolbar to 20px x 20px. Then, centre align the search icon (X:2, Y:2).



14. Add colour to search icon

Open the search icon master again and import a colour symbol, resize it to 100% and then toggle the Mask setting on the icon, as before. Name the colour symbol in this instance 'Icon Colour'. Back in the button symbol, because we've resized the search icon artboard, it may be a little distorted, so set its width/height to 20px. You will then need to reposition it slightly to vertically centre it again (X:71 Y:9).



Zoom to actual size	CMD + 0	Distance, group layers	ALT + CMD
Fit artboard to screen	CMD + 1	Toggle fill	F
Toggle columns	CTRL + L	Toggle border	B
Toggle pixel grid	CTRL + G	Hide layer	SHIFT + CMD + H
Move canvas	SPACE + DRAG	Lock layer	SHIFT + CMD + L
Hide menus	CMD + Full Stop	Find layer by name	CMD + F
Distance to other layers	ALT	New artboard	A

Useful keyboard shortcuts

One way to maximise your productivity in Sketch is to master the use of keyboard shortcuts. In this tutorial, we've learned a few already. R opens the rectangle drawing tool, Enter activates point editing mode on a selected shape, holding Shift moves layers by 10px with the arrow keys, whilst T activates the Text tool. Obviously, there's plenty more to learn, so we've included many of the most useful shortcuts in the screenshot to the left. These commands assume all of your keys still have their default bindings, so for people like me, who swap around Cmd and Ctrl, you'll need to take that into account.

15. Explore the button overrides

Back in the main artboard, if you click the Button symbol, you'll notice many more options in the Overrides panel. You're now able to change the text, icon, icon colour and button background colour. Let's change the text to 'Search', the background to dark grey and the icon colour to white.

16. Changing button text colour

A problem with the button at the moment is if you use a light background colour, you won't be able to see the white text. Open the button master, rename the Text layer to 'Light Label', duplicate it, naming the new one 'Dark Label' and changing its text colour to '#3B3B39'. Back in the main artboard, change the button colour to white, the icon colour to dark grey, move the Search text to Dark Label and add an empty space to Light Label. Finally, move the button to the top right of the header, aligning with the last column (X:1191 Y:33).

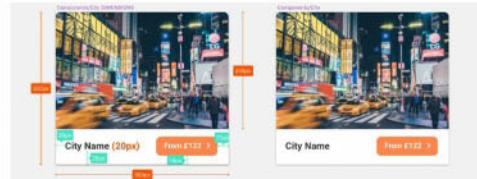


17. Setting resize rules

If you resize the button horizontally, you may notice the text moves and the icon distorts. Let's add resizing rules to control this behaviour. In the Button symbol, click the Icon layer, and in the Inspector toolbar you will see a Resizing area. Toggle the fixed width and height options, and set it to right aligned. For the light and dark labels, you just need to set them to align left.

18. Finish header

To finish up the header, add a white 48px heading saying 'Find your perfect holiday, it's out there..', which you should then centre within the header (X:286 Y:183).



19. Create city symbol

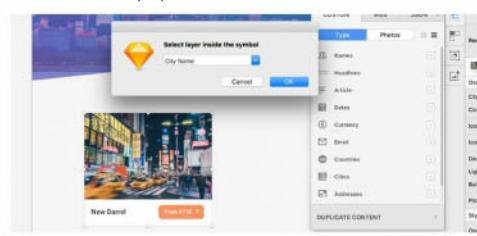
Use what you've learned to create the above symbol. You can find the arrow at 'support-images/icon-arrow.svg'. For the image, draw a rectangle and instead of masking, add the same image from the header as a fill (it's the fifth option along in the Fills menu). Once done, convert it into a symbol called 'Components/City', and add it to your main artboard (X:148, Y:585). If you'd prefer, you can also grab the symbol from 'support-images/city-component.sketch', which you should copy and paste directly into your Symbols page.

20. Adding Craft

There's plenty of useful plugins that dramatically extend Sketch's functionality. A particularly great one is called Craft, which can be found at invisionapp.com/craft. Once installed, six new buttons appear next to the Inspector toolbar.

21. Using placeholder data

With Craft, we can quickly generate placeholder content. Select the city symbol, then select the third Craft icon down. This brings up a menu with all the different types of placeholder content. Under Type, select Cities and then the city name text layer. This should add a random city name to the city symbol.



22. Add placeholder currency

Next, select the currency option, entering 'From £' into the text input and selecting 100-999. In the pop-up menu, choose the Light Label layer. This should randomise the price in the button text.

23. Using placeholder photos

In the Craft placeholder menu, select the Photos tab and then choose Unsplash. Select a category of City, the Place Photos button and then select your symbol's picture layer. This adds a random city photograph to your symbol.



24. Duplicating Content

Now for the final, fun part. Select your city symbol again and then the fourth craft menu, called Duplicate. Tick the Vertical option, enter a count of 3, followed by a gutter size of 60. Then tick Horizontal, select a count of 3, with a gutter size of 27. Click Duplicate Content.



25. You've built a webpage in Sketch - congratulations!

There you have it - duplicated, randomised content. You can tweak the initial duplicate values by opening the Craft Duplicate menu again and then selecting the Duplicate Control layer. Any edits to the original city symbol will filter down to all these instances, saving you lots of time.

ACCESSIBILITY

A WEB

FOR ALL

Ashley Firth gives the lowdown on
how to design and develop your
websites to be truly inclusive

6 SIMPLE WAYS TO ACCESSIBILITY

Some of the key areas to explore



“

WE'RE ALL ONLY TEMPORARILY NOT DISABLED – BY CONDITIONS OR CONTEXT. PLUS ACCESSIBLE DESIGNS ARE BETTER FOR EVERYONE. SO CREATE INCLUSIVE SERVICES FOR: YOU, THOSE YOU LOVE AND ALL USERS, NOW AND IN FUTURE. IT'S RIGHT, SENSIBLE AND COST-EFFECTIVE

James Buller
Access needs team – Home Office Digital

ARIA ROLES

Accessibility starts with markup. ARIA tags cover everything from annotating a page to identifying states and properties of elements, and help users with screen readers understand everything about your web page. The 'markup' section (pg. 76) covers all of this, and how to both show and hide content for this platform.

IMAGE & SVG ACCESSIBILITY

Imagery can be one of the biggest barriers to user interaction. Learn how screen readers interpret imagery and, with the advent of SVGs, find out the different ways you can make your graphics accessible, and the potential pitfalls of using icons to infer meaning.

The World Health Organisation (WHO) first published its formal definitions of disabilities in 1980, but updated them at the turn of the 21st century to not simply refer to a disability as a "personal attribute", but to be "context dependent... reflecting the interaction between features of a person's body and features of the society in which he or she lives."

The WHO's point was that disability happens during interactions between a person and society on a physical and cognitive level, and the web is a huge part of that. There are mismatches between how a user interacts with the web, or even their computer, that differs from that of the people that made it.

These conflicts can prevent a person from engaging, and sometimes even interacting, with the content of a site.

It is the job of designers and developers to factor in these cases and create inclusive web experiences that work for the largest number of people possible.

The W3C has a comprehensive list of requirements that can be completed to achieve web accessibility, be that at AA or the stricter AAA level. However these are not enforced and, as a result, often overlooked, and the last full version of the WCAG (Web Content Accessibility Guidelines) was released nearly a decade ago. However, there are in fact many simple ways to make your sites more accessible, and ensure that the most people possible can enjoy your content.

Last year the Home Office released some posters offering guidance for designers and developers on how to make sites accessible to everyone.

They outlined rules to help those with low vision, deafness, dyslexia, anxiety, users on the autism spectrum, or those using screen readers.

We will look over some of the basic changes you can make in markup, styling, and imagery to improve your site's accessibility, and then use these pointers to tackle some of the design and development challenges associated with specific disabilities.

My own approach to accessibility is with Octopus Energy. As an energy supplier, we need to cater to a very wide range of needs. Everybody needs energy and it's a basic human right. However in this industry it's dominated by large suppliers using legacy systems and generally poor support for accessibility. There will be some improvements and advancements we've made in this article as practical examples.



“

THE W3C HAS A COMPREHENSIVE LIST OF REQUIREMENTS THAT CAN BE COMPLETED TO ACHIEVE WEB ACCESSIBILITY, BE THAT AT AA OR THE STRICTER AAA LEVEL

CONTRAST LEVELS

This is an area that affects not just users with low vision, but those with dyslexia and autism. You may be pleased with your design, but is the colour scheme preventing some users from interacting with your content? It's easily tested for, and there are ways to turn this issue into a positive addition to your website.

SKIP TO MAIN CONTENT

As part of making your website accessible to keyboard-only users and screen readers, learn how to implement a small 'skip to main content' button to save your users time and unnecessary stress. It requires only a few simple lines of markup and styling to achieve, and you can see how in the 'styling & imagery' section (pg. 77).

COLOUR BLINDNESS

Colour blindness can encompass such a wide range of things visually, meaning that it's very likely that users are seeing your site aesthetically from thousands of slightly differing perspectives. In the 'low vision' section (pg. 79) we talk about the different types, how to test pages under those circumstances, and how to plan for them.

SUBTITLES & CAPTIONING

Videos are a great way to provide information to your users in an engaging format, however without subtitles or captioning, they can alienate users who are deaf and even those who don't speak the language in your videos. Check the 'deaf/hard of hearing' section (pg. 80) to learn more about subtitles and captions.

BETTER MARKUP

The easiest first step towards an accessible site



HEADING STRUCTURES

All headers in a web page should have a hierarchy, beginning with the most important header to the least, and the markup of the page should reflect that. In HTML, the most important title is an `<h1>` tag, and can go all the way down to an `<h6>`. You can use as many or as few of these as you like, but they must start with an `<h1>` and must always be used in order. The reason for this is that heading tags denote importance to screen readers, and out of order headers may well confuse a user. Proper heading structure also benefits the SEO of your page.

You can check this using the HeadingsMap extension for Chrome. When run on a page, this generates a tree based on the headings on your page, and highlights any that are out of place or have been skipped entirely. **Tip:** To dispel a common myth, having multiple `<h1>` tags in a page is no longer a huge taboo. Google itself states that you can have up to three `<h1>` tags in a page that are used to garner its content. It's important that those `<h1>` tags remain on the same hierarchical level as each other, and that as you make your way down the heading ladder, no rung is skipped or added out of place.

HTML5 OUTLINE

HTML5 Outline is the concept that – rather than being restricted to a cascading style when it comes to headers – the structure of a document

could be split into sections through markup and that each of these sections could have their own heading hierarchy. The user agent could then more easily apply this information to generate a table of contents which could then be used by assistive technology to help the user navigate.

For example this would be the current approach with headings always cascading:

```
<div class="section"
id="brazil-weather" >
  <h1>Brazil weather</h1>
  <p>...</p>
  <div class="subsection"
id="brazil-landmarks">
    <h2>Landmarks</h2>
    <p>...</p>
  </div>
</div>
```

You could have a system like this:

```
<section>
  <h1>Brazil weather</h1>
  <section>
    <h1>Landmarks</h1>
    <p>...</p>
  </section>
</section>
```

The key here would be to make sure that each `<section>` tag is easily identified, and has an appropriate header, and that no parts of the page are “marooned” from a screen reader’s perspective without context. Although this feature has been in the W3C spec since 2008, it has yet to make it beyond a theoretical stage. However, it’s possible that it could make the whole page – not just its headers – more digestible for screen readers.

OFF-SCREEN HEADERS

Whilst auditing your site, you may find that certain sections lack context as they don’t have – and in many cases visually need – a header. A common example of this would be navigation. With this example you can tackle it with the ‘navigation’ aria-role or using the `<nav>` tag, but what about less obvious sections?

You can create a header with a small class that visually hides it, but will show up on a screen reader like so:

```
<h1 class="screenreader-
visible">This is my section</
h1>
```

```
.screenreader-visible {
  position: absolute;
  width: 1px;
  height: 1px;
  padding: 0;
  margin: -1px;
  overflow: hidden;
  clip: rect(0,0,0,0);
  border: 0;
}
```

Tip: Bootstrap has utility classes built in that can include content for screen readers only and enables only those assistive devices to focus on it, see ‘.sr-only’ and ‘.sr-only-focusable’ in the latest version.

ARIA ROLES

Accessible Rich Internet Applications (ARIA) defines a way to make web content and web applications more accessible to people with disabilities.

ARIA Landmark Roles help assistive device users navigate your site, enabling them to tell the difference between different sections. There is a full list on the W3C website, but these are the important ones to remember since they cover the core area of a typical page:

banner – Typically the header of your web page that includes the name of the website

search – For the search form

main – This would designate the main content area on your site

navigation – Use on any navigation list, typically on the nav element

contentinfo – Typically the footer of your web page

To add an ARIA role, you simply add the ‘role’ attribute to your element with one of the attributes.

```
<header role="banner"
class="site-header">
```

As well as the above landmark roles, there are also roles relating to ‘widgets’ (button, slider), composite roles (menubar, tablist), and document structure roles (region, toolbar).

States and properties

As well as properly marking the sections and roles of a page, there are also ARIA tags related to state and properties, enabling you to provide context as an action is being carried out. For example, you can inform people with screen readers of certain visual functionality such as an autocomplete, if a radio button is checked or not, or even the min, max, and current values of components like sliders. There are even ARIA state roles for drag and drop functionality.

It’s worth taking some time to look over the full list (<http://bit.ly/2EB2JJb>) to acquaint yourself with them, as it is one of the biggest accessibility gains you can make on a website.

Tip: HTML5 implicit mapping

In HTML5, several of the landmark roles are implicitly defined within certain tags to make things easier.

main = `<main>`

navigation = `<nav>`

contentinfo = `<footer>`

article = `<article>`

complementary = `<aside>`

region = `<section>`

Aria hidden

Sometimes it can be just as important to hide content as it is to label and annotate it. The ‘aria-hidden’ property is really handy for hiding components that are on a page for purely visual purposes, such as icons, so people who are using screen readers don’t have to spend time listening to them needlessly.

```
<p aria-hidden="true">
This content is hidden.
</p>
```

STYLING & IMAGERY

Making a site better for eyes and ears

Focus styles

There are default browser styles for focused elements, but it's fairly common for developers to apply blanket rules to these selectors due to the less than preferable blue line it shows when a user clicks them. However, these are really important. For example, try navigating a web page using just the keyboard and you'll see how important focus styles are to make you aware of where you are on a page.

Since they're seen when a user clicks the element as well as when they're focused via keyboard, focus styles need to tread the line between being obvious and not negatively impacting a page's design. Nice alternatives to the typical outline rule can be box shadows or changes in background and border colour.

Skip to main content

A massive gain you can make in accessibility primarily through styling is the 'skip to main content' link. As most pages on a site have a common navigation or header at the start of every page, it can leave users on screen readers listening to the same content as they navigate around your site, or having to skip through elements and guess where each page's unique content starts. Instead, you can make a simple link to take them right to it in two easy steps:

1. Add the markup for the link as the first piece of content on the page

semantically, and have the link point to a '`<div>`' containing your page's main content:

```
<a class="skip-to-content"
  href="#content">Skip to main
  content</a>
...
<div id="content">
  ...
</div>
```

2. Use CSS similar to the '`screenreader-visible`' class we mentioned in the 'markup' section to effectively hide the link from the normal page style:

```
.skip-to-content {
  position: absolute;
  top: -400px;
}
```

As screen readers are only interested in the content of the page, this will mean that, as the first item on the page, the user will be immediately presented with the option to use the link to skip down to the main content.

This feature can be useful for users navigating your site using just a keyboard with a small addition, and it saves them a lot of tabbing! Add some styles to your link when it's focused to undo the absolute positioning, and it will appear as the user starts tabbing through the page's content:

```
.skip-to-content:focus {
  position: relative;
  top: 0;
}
```

Base font sizes

Raising the base font size of your site will really help those with low vision. The gov.uk site has 19px as the lowest font size, ensuring everyone can easily read its content, and prevent the need for them to zoom in on content. Make sure you don't have large text in paragraph tags masquerading as headers. The visual meaning attributed to it by styles will never be conveyed via a screen reader.

No text in imagery

The main problem with using an

image to show text is it takes away the accessibility for blind and visually impaired users. For instance, a blind user might have a screen reader set up on their computer to read out the text and menu items for them, but it can't read text that's contained in an image unless specified in the '`alt`' tag; it simply reads any text it comes across on the screen.

It is left to the '`alt`' tags to describe not only the image contents itself, but the text within the image, and so you should try and keep the two separate as much as possible.



ALT TAGS

Ever questioned the importance of '`alt`' tags? Have them read out to you at speed by a screen reader and you'll be persuaded. The only real rule here is to ensure that the text used actually describes what is in the image, rather than the image's purpose within the page. For example, the '`alt text`' for an image of a tree used as an "About Us" page banner should be "an image of a tree," rather than "About us banner image."

CSS LAYOUTS

CSS makes it possible to create intricate layouts and designs in order to make a web page more attractive. But, taking this idea too far can end up excluding certain users. You need to avoid the assumption that it's obvious that two pieces of content are linked because they are close to one another visually. A good example is creating a layout that isn't ambiguous and is capable of adapting to all screen sizes.

ICONOGRAPHY

Icons are a neat way to display a status or action without the need for too much text. However, sometimes an icon is obvious to you but perhaps not to others. If it's a custom icon it could become open to interpretation and misunderstanding, meaning that your attempt to create something cleaner and less cluttered actually results in confusion. It's important that you ground icons that are not universally used in context.

“

THE GOV.UK SITE HAS 19PX AS THE LOWEST FONT SIZE, ENSURING EVERYONE CAN EASILY READ ITS CONTENT

AUTISM

COMPLEX LAYOUTS

Autistic people often have heightened sensory awareness, and so can find busy pages overwhelming. It is particularly important to avoid complex layouts and 'walls of text'. Look at condensing paragraphs into a series of bullet points, or providing a small 'overview' section for longer prose.

MOBILE-FIRST APPROACH

This idea of logic and simplicity in layout and content comes up in relation to a few different disabilities, and realistically almost all users. Visitors don't want to be overwhelmed. A mobile-first approach is good here, and a good thing for accessibility in general. Learn to make the simplest layout due to screen restrictions and then working up is a good mentality for web in general.

DESCRIPTIVE BUTTONS

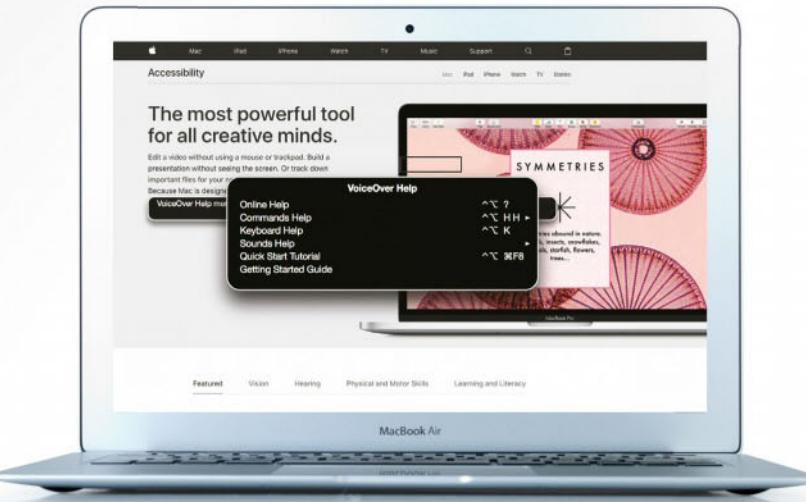
Phrases like 'click here' and 'get started' may seem obvious but are ambiguous and say very little independently. Whereas links such as 'attach files' or 'subscribe to feed' are clear, concise, and unambiguous.

FIGURES OF SPEECH

You should always attempt to write in plain English instead of using figures of speech or idioms. They can create ambiguity and lead to a complete misunderstanding of the point that you're trying to make.

SELF-CONTAINED ACTIONS

Regardless of the context within which you display a button/checkbox/radio button on a page, you should look at each action you ask a user to perform as an independent function; does it make sense by itself?



SVG ACCESSIBILITY & SCREEN READERS

How to make the new wave of imagery work with audible software

Screen readers have become much more prominent in the last decade, and where previously third-party software was a necessity to enable blind and visually impaired users to operate a computer, there is now an in-built system for every major operating system.

Not only is this great for users requiring the software, it's also made it universally accessible to developers; enabling them to hear a site they may have only ever seen before.

They're made more powerful by the upgrades we've covered already on the previous pages, but it's still important to consider accessibility when new technology is introduced. A great example of this is the surging popularity of scalable vector graphics (SVG) - here are a few approaches to make sure they can be heard.

Alt & Role attribute

If you are displaying SVGs through the '' tag, it's important to have both the 'alt' attribute describing the asset, but also an aria 'role' tag of 'img' to make the asset's purpose clear. There have been issues with VoiceOver on Safari where it will skip the image entirely, even if it has an 'alt' attribute, if its role is missing.

```

```

aria-labelledby and

aria-describedby

The better way to give your SVGs the same level of accessibility as images is to have them inline in your markup, and provide a '' and '' tag just inside of the main '' tag. You can then match up the 'labelledby' and

'describedby' tags with the IDs of these elements like so:

```
<svg aria-labelledby="logo-title" aria-describedby="logo-desc" role="img">
  <title id="logo-title">Apple logo</title>
  <desc id="logo-desc">A silhouette of an apple with a bite taken out of it</desc>
  ...
</svg>
```

This enables screen readers to understand the SVG much like an 'alt' tag would.

Hidden element

A common and recommended approach when it comes to browser support and consistency across screen readers is to add a screen-reader-only element next to the ''. It's a little bit more involved in comparison to the others, but tests have proven that all browser and screen reader combinations are able to announce the link with the expected text.

```
<div>
  <svg class="icon" aria-hidden="true">
    ...
  </svg>
  <span class="visuallyhidden">Close</span>
</div>
```

If you choose this approach, it's also worth adding the 'aria-hidden="true"' attribute to the SVG itself. As covered in the 'markup' section, we don't want screen readers to try and interpret the asset itself if we provide it with a separate description instead.

FINDING A SCREEN READER

Mac - VoiceOver

Built into macOS, iOS, tvOS and watchOS, VoiceOver is an excellent screen reader that provides audible assistance for blind and visually impaired users across the entire operating system.

Google - TalkBack

Google TalkBack is an accessibility service for Android that helps blind and visually impaired users to interact with their devices. TalkBack handles user interactions with the entire OS and not just the web, but is fully capable of acting as a screen reader inside the default Chrome app or any other downloadable browser from the Google Play store.

Windows - Narrator

Narrator has been part of the Windows OS in some form since Windows 2000. It was originally designed as a way to help users install a fully-featured screen reader. Now in Windows 10 it is available in twelve languages and is also included on all Windows phones.

There is also a popular screen reader for Windows called JAWS (Job Access With Speech) that can be installed to read the screen with either text-to-speech like Narrator, or a refreshable Braille display.

Linux - LSR & Orca

There are two popular Linux-based screen readers that are based on open source. LSR was started in 2006 by IBM and uses speech, Braille and screen magnification to aid users. Orca is GNOME's default screen reader.

LOW VISION

Understanding the different conditions and how to design for them

Contrast levels

This is a tricky issue to spot sometimes, but easy to test. W3C states that the contrast level between foreground and background colours should be at least 7:1 for regular text to be AAA compliant, and 4.5:1 for AA compliance. This is especially important for users with low vision or certain types of colour blindness, who may have trouble focusing on text coloured similarly to the background.

The trick here is walking the line between creating the design and style that you want aesthetically, whilst not compromising the content or experience for those with visual difficulties.

One approach that is quite involved, but can have brilliant results is allowing for customisation within your design. This way you don't end up alienating your users for the sake of the design.

We tackled this problem at Octopus Energy. The typical design style for us is white text on a dark blue background. Although this passes AAA standards for contrast ratio, customers with visual impairments - and even some with dyslexia - reported problems being able to read or focus on the content. The solution we implemented was to enable each customer to invert the colours of the communications they received, meaning they could choose an alternative option of dark text on a light background;

The contrast levels between the two are essentially identical, but there was a barrier with the former that there wasn't with the latter. More importantly, it empowered users to customise their experience with us and helped them engage with the communications more freely.

COLOUR BLINDNESS

When using colour to convey meaning or action, it is important to

always support it with text and sometimes shapes. A reliance on colour can create a hugely confusing experience for colour-blind users, and sometimes result in a complete loss of contextual meaning

One added complexity is ensuring that the colour scheme you're using works for the multiple types of colour blindness that a user could have:

Red-green confusion

This is the most commonly known type of colour blindness. However within spectrum there are several types of red-green confusion:

- **Deuteranopia & Deutanomaly (also known as green-blind)**

- Reduced sensitivity to red light, and a missing or reduced wavelength cone for seeing green hues.

- **Protanopia & Protanomaly**

- This is where the 'L-cones' in the eye are either missing or defective, meaning that the user cannot see reds. The challenge here is that red and green are the most commonly used colours to infer positive or negative messages. This makes it more important to remember to ground that status with a message and/or icon.

TESTING YOUR WORK

This may seem daunting, but there are some great online tools for you to check your work against quickly and easily that cover every contrast ratio and major strain of colour blindness mentioned. Check out the tools section for more information



However it's not the only colour combination that causes issues with colour-blind users:

Yellow-blue confusion

- **Tritanopia or Tritanomaly**

- Users have normal red and green vision, but have trouble distinguishing yellow and red from pink, and blues appear greener.

A very famous example of this was the white & gold / blue & black dress argument that gripped the internet a couple of years ago. The ramifications of this colour confusion aren't as dramatic on websites as red-green, but it is worth keeping in mind, particularly for things like graphs that use colour to associate segments with a legend of names. As always, it's worth testing your pages just in case!

Monochromacy

This is the most severe form of colour blindness, and prevents the person for seeing anything but black, white, and shades of grey.

Colour blindness can encompass such a wide range of things visually, it's very likely that users are seeing your site from thousands of slightly differing perspectives. The reality is you won't be able to create a colour scheme that can be fully interpreted, which means that you shouldn't rely on colour to convey meaning.

DYSLEXIA

USE IMAGES & DIAGRAMS

Try and use images and diagrams to support text you're displaying, rather than using blocks of heavy text. Not only does it look more appealing to engage with, but it makes it more manageable to those with dyslexia.

DON'T REQUIRE ACCURATE SPELLING

You shouldn't demand accurate spellings for certain data. Components such as autocorrects (that we will cover later) allow for spelling errors and offer suggestions based on the text that the user has input.

PROVIDE REMINDERS

Rather than forcing users to remember things from previous pages, you can provide reminders or suggestions to alleviate the need to use short-term memory.

CONSIDER OTHER FORMATS

People with dyslexia often find information easier to learn or digest when it's provided in different ways - consider producing materials in other formats such as audio or video to add variety.

ALLOW FOR A CONTRAST CHANGE

Some dyslexic users have trouble reading on certain foreground/background colour combinations (such as white text on a black background) even though it has a high contrast ratio. Consider offering the ability to change it.

DEAF/HARD OF HEARING

Make sure that those who can't hear aren't missing out

SUBTITLES/CAPTIONS

It's worth noting that captions and subtitles are not the same thing: Captions are intended for deaf and hard-of-hearing audiences. The assumed audience for subtitled is hearing people who do not understand the language of dialogue. Also captions move around a screen to denote who is speaking, whereas subtitles are almost always set to the bottom centre of the screen.

They are however implemented in the same way technically, and so whichever challenge relates to your site, here's how to tackle it:

The <track> element

HTML5 enables us to specify subtitles for a video using the '<track>' element. This lets us specify the type of content that we're adding, the language it's in, and a reference to the text file that contains the subtitle information.

```
<video controls
preload="metadata">
  <source src="videos/video.mp4" type="video/mp4">
  <source src="videos/video.webm" type="video/webm">
  <track label="English"
kind="subtitles" srclang="en"
src="captions/vtt/video-en.vtt"
default>
  <track label="Deutsch"
kind="subtitles" srclang="de"
src="captions/vtt/video-de.vtt">
</video>
```

You'll see in the example above that can specify the source, track type and source language - the default is English.

VTT files

The files that contain the actual subtitle data are simple text files that follow a specified format. The format is Web Video Text Tracks (WebVTT), the specification is still being worked on, but major parts of it are stable and ready to be used today. They are simple text-style files, in the following format:

```
WEBVTT
00:01.000 --> 00:04.000
- This is the common sloth in
its natural habit
00:05.000 --> 00:09.000
```

- It moves very slowly along a branch
- in search of food

You simply specify the start and end time for the part of the video you want to annotate and then add the text within that time frame. You can also place this text over multiple lines if you want.

Taking it further

In addition to what we've covered, you could create your own 'closed caption' button to allow toggling between showing and hiding subtitles/captions. We don't have space to cover this here but implementation is straightforward and a quick online search will find some instructions.

VTT files also allow for 'voice spans' to distinguish certain subtitles. For example, the following markup:

```
00:00:00.000 --> 00:00:12.000
<v Test>[Test]</v>
would allow you to target that
particular caption in CSS like this:
::cue(v[voice='Test']) {
  color: white;
  background: red;
}
```

FORMS OF COMMUNICATION

Placing a phone number on your website can be useful to some, but restricting to others.

Therefore you should ensure that you offer multiple means of communication so as not to exclude a certain demographic - it's good for accessibility and for your business!

Your customers should be able to contact you in a mode of communication that works for them. Email is the natural alternative to the phone, since it doesn't require an audible interaction. However some people still want the instant responses that often comes with phoning. In this case live chat, or even Facebook Messenger integration provides the best of both worlds. We offer all of these forms of communication at Octopus Energy, and have found that it not only enables us to communicate effectively with all of our customers, but the freedom often results in them taking the time to provide more feedback on how we're doing in general, which is invaluable.

CAPTIONS MOVE AROUND A SCREEN TO DENOTE WHO IS SPEAKING, WHEREAS SUBTITLES ARE ALMOST ALWAYS SET TO THE BOTTOM CENTRE OF THE SCREEN



MOTOR DISABILITIES

SHORT TIMEOUTS

Commonly seen on eCommerce sites, and becoming more of a problem as they become more popular. For users that haven't had a lot of practice with journeys - checkout processes, for example, or who like to take time to read content and check input data - short timeouts encourage hastily completed actions and invite human error. The end result is frustration.

LARGE HIT AREAS

This is a design pattern that would help the web as a whole. Making clickable actions on a web page large rather than demanding precision means that you can avoid more of the frustration mentioned above by allowing for a much larger margin of error. This is especially important on mobile devices.

PROVIDE SHORTCUTS

Designers and devs should look at a page and work out if there are areas that could be simplified. It can improve conversion.

A good example of this is converting a series of manual address inputs into a postcode lookup followed by the user selecting their one from a list.

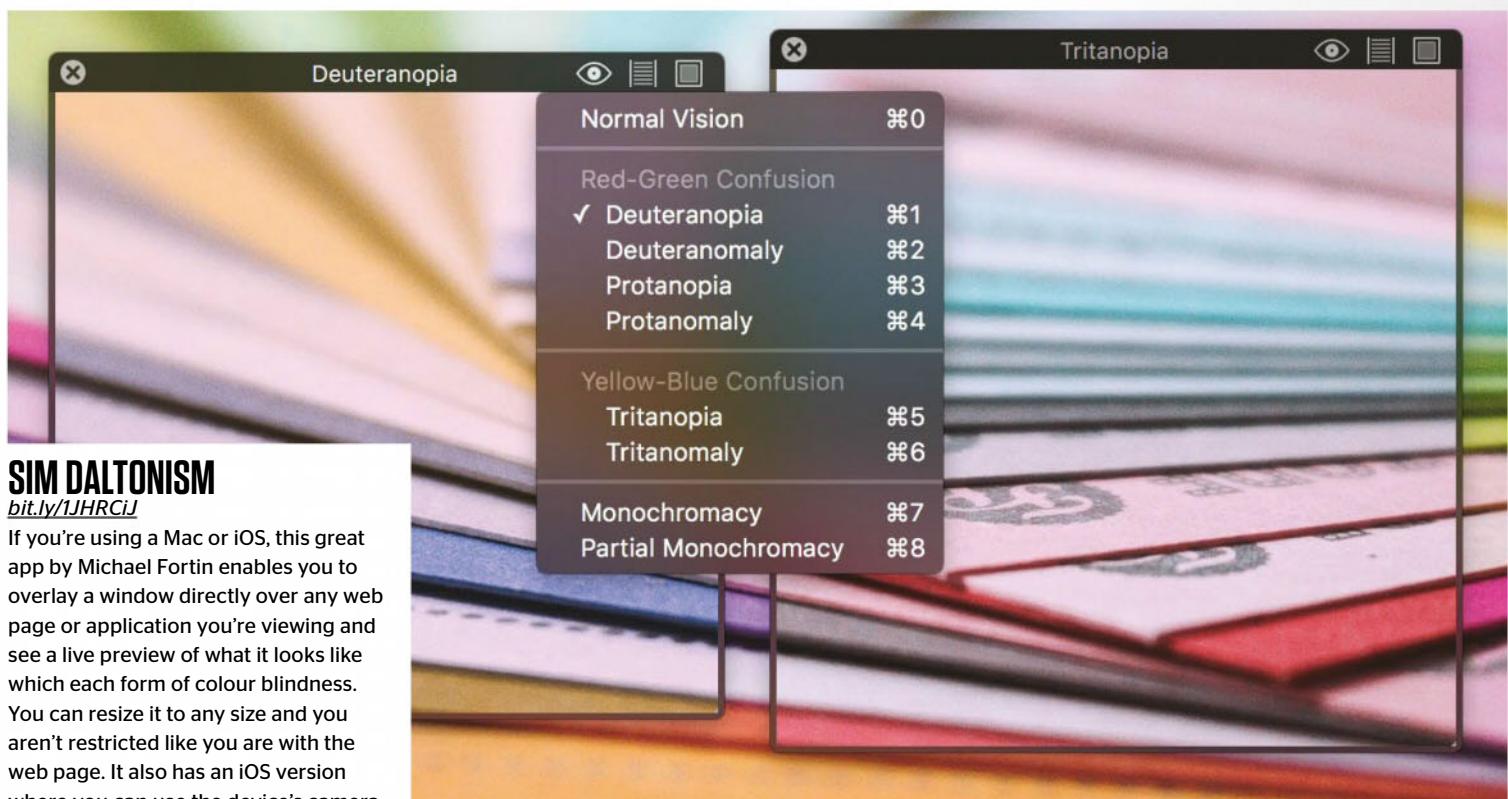
TAB INDEX

Many users prefer a keyboard to navigate. Most browsers are very good at allowing keyboard interaction. However, sometimes there are a series of elements that would be easier to understand in an order different to how they're displayed visually.

The 'tabindex' attribute specifies the tab order of an element (when the Tab button is used for navigating). A value of '1' keeps it in sequential order, and anything higher works on a priority system with the highest number being focused first.

7 TOOLS FOR BETTER ACCESSIBILITY

Finding problems are sometimes just as hard as fixing them. This collection offers some of the most important tools out there



SIM DALTONISM

bit.ly/1JHRCiJ

If you're using a Mac or iOS, this great app by Michael Fortin enables you to overlay a window directly over any web page or application you're viewing and see a live preview of what it looks like which each form of colour blindness. You can resize it to any size and you aren't restricted like you are with the web page. It also has an iOS version where you can use the device's camera.



A11Y CHECKLIST

a11yproject.com

The A11Y project work tirelessly on providing clear advice and tips on web accessibility. It contains its own list of resources, an accessible widget and pattern library, and is worth visiting for its blog on new approaches.



LIGHTHOUSE

bit.ly/2jnLfpG

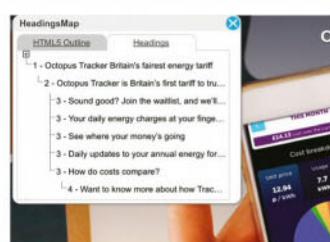
Lighthouse is a tool that audits the accessibility performance, best practices, and PWA standards of any web page. It's built into Chrome's audit panel in the web inspector, is brilliantly detailed, and can be run instantly.



CONTRAST RATIO

leaverou.github.io/contrast-ratio/

Want to test a combination of two colours before using them in a design? Lea Verou has made a neat online checker that will show you an example of how it looks, and displays the contrast ratio level and what level it passes.



HEADINGSMAP

bit.ly/2ER31NF

The HeadingsMap extension generates a tree, based on the headings on a page and highlights any that are out of place in terms of hierarchy, or have been skipped entirely. It's important for both screen readers and SEO.



VALIDITY

bit.ly/2BLqlx3

A nice and easy Chrome extension to perform inline HTML validation checks on your pages, with the results being outputted to the browser console (yellow for warning, red for error). This extension is also available in Firefox.



VOICEOVER

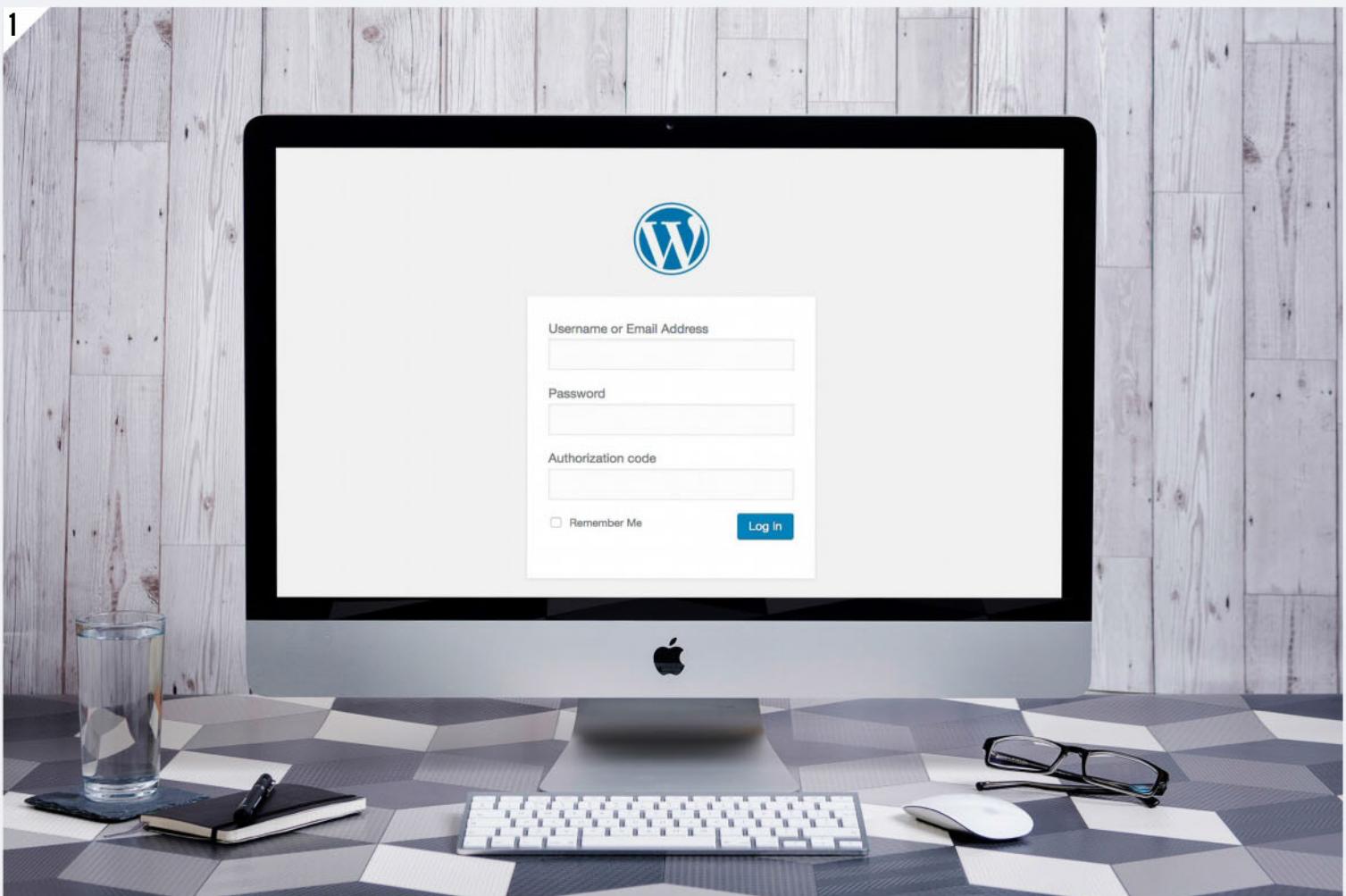
apple.co/2rlUKtI

The most comprehensive of the screen reading software mentioned, VoiceOver is built into every major Apple operating system and gives you a great insight into your web page's performance for those with blindness or low vision.



8 WordPress **SECURITY SECRETS**

LEARN HOW TO PREVENT, DETER AND RECOVER FROM ATTACKS ON
YOUR WORDPRESS WEBSITE WITH THESE MUST-KNOW TIPS



1 ADD EXTRA SECURITY TO USER ACCOUNTS

A great deal of vulnerability comes from the user accounts that intentionally give access to your site, particularly administrator and editor roles. If a hacker gains access to one of these accounts, of any user on the site not just the main admin's one, then they can make changes at will on the website.

Always make sure accounts only have the access they need. For example, if a user is only going to be writing articles, consider giving them only contributor or editor access, never administration. Keep in mind the level of ability of your users, ensuring that anyone with admin or editor access is fully trained to use all the account's features to avoid accidents.

You can add features to allow temporary access to a certain role level, ie if you have a contractor working on the site and they need temporary admin access, you could

give it to them with a set time to expire so that you don't need to remember to revoke their access later down the line.

If a certain role level does not need all of the default permissions, you can install a roles and permissions plugin to turn off certain permissions that will never be used. You can also create other roles with only specific access. Restrict users to only the permissions they need to avoid accidental or intentional misuse of a feature.

To help prevent attacks coming from user logins, put a limit on the number of times an account can make a failed login attempt before that username is locked out for a period of time. This mostly catches out bots who are guessing passwords, but remember to warn your users that they should not attempt to log in more than the number of times you set in a row. If they can't remember their

password, and if they forget their password, they should reset it instead of trying to guess!

It's also good practice to remind users to use secure passwords (over eight digits, with upper, lowercase, numbers etc), and to change them every so often. Remind them never to write their passwords down, and log out when they are finished with their session to avoid unauthorised access to their accounts.

Two-factor authentication is an extra level of security that can be added to logins. They require users to use their authenticators when logging in to increase the number of credentials needed from just the standard. Users will need an extra code or pin to log in, usually randomly generated by an app or sent to a phone by text. It can feel like an extra barrier to login for users, but it's also an extra barrier for hackers.

"IF A CERTAIN ROLE LEVEL DOES NOT NEED ALL OF THE DEFAULT PERMISSIONS, YOU CAN INSTALL A ROLES AND PERMISSIONS PLUGIN"

2 CHANGE OLD DEFAULTS

New WordPress installs make you choose a custom username for your admin account, but if you installed your site a while ago, your admin account may have the default name of 'admin' - this makes it easier for hackers to guess your login credentials as half the work is already done for them. Change the default admin username to something else to improve security. You can do this manually via the database in the wp_

users table, or you can create a new admin profile and delete the old one via the Admin panel (be sure to attribute all the old account posts to the new one).

You can also change the default database prefix to something other than wp_ to add a further layer of obscurity to your default setups. The easiest way to do this on an existing install is via a plugin, but backup your databases first.

Table	Action
wp_commentmeta	Browse Structure Search Insert Empty Drop
wp_comments	Browse Structure Search Insert Empty Drop
wp_itsec_lockouts	Browse Structure Search Insert Empty Drop
wp_itsec_log	Browse Structure Search Insert Empty Drop
wp_itsec_temp	Browse Structure Search Insert Empty Drop
wp_links	Browse Structure Search Insert Empty Drop
wp_options	Browse Structure Search Insert Empty Drop
wp_postmeta	Browse Structure Search Insert Empty Drop
wp_posts	Browse Structure Search Insert Empty Drop
wp_termmeta	Browse Structure Search Insert Empty Drop
wp_terms	Browse Structure Search Insert Empty Drop
wp_term_relationships	Browse Structure Search Insert Empty Drop
2 wp_term_taxonomy	Browse Structure Search Insert Empty Drop

3

The screenshot shows the WordPress.org homepage with the number '3' in the top left corner. Below it is the 'WORDPRESS.ORG' logo. The main navigation menu includes 'Showcase', 'Themes', 'Plugins', 'Mobile', 'Support', 'Get Involved', 'About', 'Blog', and 'Hosting'. A search bar is located at the top right. The main content area features a large 'Download WordPress' button. To its left is a sidebar with links like 'Stable Download', 'Requirements', 'Beta Releases', 'Nightly Builds', 'Download Counter', 'Release Archive', and 'Source Code'. The main content area contains sections for 'What's Next?' and 'Looking for a Mobile App?'. On the right, there's a 'Download WordPress 4.9.4' button with file sizes (.zip and .tar.gz) and a 'Release Notification' section with a 'Join' button.

Download WordPress

Stable Download

The latest stable release of WordPress (Version 4.9.4) is available in two formats from the links to your right. If you have no idea what to do with this download, we recommend signing up with one of our [web hosting partners](#) that offers a one-click install of WordPress or [getting a free account on WordPress.com](#).

Requirements

Beta Releases

Nightly Builds

Download Counter

Release Archive

Source Code

What's Next?
With our famous 5-minute installation, setting up WordPress for the first time is simple. We've created a handy guide to see you through the installation process. If you're upgrading your existing installation, we've got a [guide for that](#), too. And should you run into any trouble along the way, our [support forums](#) are a great resource, where seasoned WordPress experts volunteer their time to help you get the most out of your blog.

Looking for a Mobile App?

You can find the right app for your mobile device on our [mobile apps](#) page or use the button below to find the app in the app store on your device.

[Get a Mobile App](#)

3 KEEP WORDPRESS UPDATED

WordPress is always updating and improving its built-in security, so make sure that your version is the most up to date to stay ahead of old vulnerabilities and exploits. Most WordPress installations update automatically, but if yours doesn't, keep an eye on your Admin panel or Inbox to be notified of when new updates are ready to install. Hackers are on the lookout for sites that

haven't been updated, and only 22% of WordPress sites are running the latest version. Since WordPress runs almost 30% of all websites on the web, that's a lot of outdated websites! (<http://bit.ly/2G6b1JF>)

If you're running a staging site, you can test all updates for compatibility with your current theme and plugins before pushing live. This is good practice to avoid any automatic

updates accidentally conflicting with existing installations. It gives you a chance to catch any problems before going into production. Don't forget to update your Plugins and Themes too. It's not just old core WordPress vulnerabilities that can give hackers a way in; anything you install on your WordPress website needs to be secure as well. The next tip will tell you more on choosing trustworthy plugins.

"HACKERS ARE ON THE LOOKOUT FOR SITES THAT HAVEN'T BEEN UPDATED"

4

The screenshot shows the WordPress.org Plugins page. At the top, there's a navigation bar with links like Showcase, Themes, Plugins (which is highlighted), Mobile, Support, Get Involved, About, Blog, and Hosting. Below the navigation is a search bar labeled "Search WordPress.org" and a "Download WordPress" button. The main title "Plugins" is displayed in large letters, with the subtitle "Extend your WordPress experience with 54,180 plugins." Below this is a search bar labeled "Search plugins". The "Featured Plugins" section contains two items: "Akismet Anti-Spam" (Automattic, 5+ million active installations, Tested with 4.9.4) and "Jetpack by WordPress.com" (Automattic, 4+ million active installations, Tested with 4.9.4).

4 INSTALL TRUSTED PLUGINS AND HOUSE CLEAN REGULARLY

There's a temptation to install as many plugins as you have problems to solve, but too many plugins can cause bloat and one unreliable plugin can cause a security risk. Always check that plugins are trustworthy before installing. Download through the official WordPress interface or website, and always check the star rating and reviews for negative feedback that may indicate a security flaw.

Plugins are created by developers with all different levels of ability. Even though plugins are vetted before being added to the WordPress site, you should always do your own

research to make sure the code you are installing is solid.

The WordPress website will tell you how old a plugin is, when it was last updated, and most importantly, if it's compatible with your version of WordPress. A plugin that has not been updated in a while is not necessarily a bad one, it may just mean it hasn't needed an update in that time. Check for recent reviews to confirm the plugin is still viable, and that it's still compatible with your version. An old plugin with recent low star reviews and an unknown compatibility is worth avoiding.

Regularly delete unused themes and plugins, as even a deactivated plugin can be a security risk if a vulnerability is found and exploited. Keep your plugin directory clean. You should only have plugins installed that you are currently using. Check older plugins when you update to see if they're still compatible.

Review your plugins periodically to make sure you still have the best one for the job. There could be a new plugin that combines the features of a few that you already have and might be better supported, more secure and easier to maintain.

6

```

1 # BEGIN WordPress
2 <IfModule mod_rewrite.c>
3 RewriteEngine On
4 RewriteBase /wordpress/
5 RewriteRule ^index\.php$ - [L]
6 RewriteCond %{REQUEST_FILENAME} !-f
7 RewriteCond %{REQUEST_FILENAME} !-d
8 RewriteRule . /wordpress/index.php [L]
9 RewriteRule ^(.*)$ /index.php?/$1 [L]
10 </IfModule>
11
12 # END WordPress

```

6 MASK, LOCK AND HIDE

Hackers have less leverage if they don't know where to start. Hide your WordPress version number from your code so only admins know which version of WordPress you're running. That way, hackers don't know which vulnerabilities are present to exploit.

Move your login page from /wp-login to something that's not default. This makes a huge stumbling block for DOS and brute force attack bots that trawl sites looking for login forms to target. It also adds a more aesthetic value, in that you can change the URL to something more memorable for your users.

Deny external access to wp-config.php and .htaccess using the following code in your .htaccess file:

```

<Files wp-config.php>
order allow,deny
deny from all
</Files>
<Files .htaccess>
order allow,deny
deny from all
</Files>

```

You can also disable file editing from the Admin panel if you know that your themes are only going to be edited via file uploads on an FTP. This prevents anyone with access to the Admin panel from directly editing files accidentally or as a hacker with malicious intent. Insert the following into your wp-config.php file:

```

define('DISALLOW_FILE_EDIT',
true);

```

5

The illustration shows a white cloud shape containing a large blue "W" logo, representing the WordPress brand. The number "5" is in the bottom left corner of the image area.

5 MANAGED HOSTING

It's not just the security of your own site you need to think about. If you host your sites on shared servers, you run the risk of cross-server contamination, where hackers gain access through a different site and are able to damage other sites sharing the same space. Consider managed hosting or Virtual Private Server (VPS)

hosting to eliminate this threat, where your site is hosted separately.

Cost is an obvious implication, but for sites with high loads and traffic, dedicated servers can improve performance as well as security. Different hosts have different solutions; compare a few to assess which best suits your needs.

7 RUN BACKUPS FREQUENTLY

Make sure that your site is backed up in the event that your site is hacked and you need to roll back to an earlier clean version. How often you should run backups depends on how often your site is updated.

It's integral to back up in a place where your site isn't hosted to avoid any malicious activity on your WordPress hosting from infecting your backups too. Backups can be stored on your own computer or a cloud-based service like Google Drive, Dropbox or Amazon S3.

Backing up in a location that is not your current server also helps if you have an unresolvable plugin or theme conflict and can't access your site, or if there's a catastrophic server malfunction and you lose all your work.

Dedicated backup plugins exist to help you keep on track, most with options for scheduled or manual backups. Free and premium versions give you various options, BackupBuddy being the most popular paid service as they have their own third-party storage for your files, plus the ability to restore from a backup directly. Compare other plugins like UpdraftPlus and BackWPup for their free and premium versions to see which has the features you most value.

7



8



iThemes Security

SUCURI

8 INSTALL SECURITY AND ANTI-SPAM PLUGINS

Many security features can be added with a comprehensive security plugin, such as iThemes Security or Sucuri, both of which both have free and premium versions. Security plugins come with a suite of tools to lock down vulnerabilities on your site such as those already mentioned in this article; from masking your version number, to installing two-factor authentication for logins, the feature lists are often extensive.

These types of plugins can be invaluable in making your WordPress site more secure, and most security plugins are easy to use with single-click installation for the most important features, and optional installation for the more advanced or complex features. This makes them perfect for WordPress beginners, as there's no coding needed to get a well-protected site in minutes. More advanced users will have access to features that can further secure your site, such as closing down unneeded

access to protocols such as XML-RPC, and updating the WordPress salts used in encoding.

Such plugins will help to protect your site against brute force and DOS attacks, which can take your sites offline if there is too much load on the server. They can also firm up the login process with additional levels of security to prevent your user accounts being used as a method of attack. Malware scanning and activity logs keep records of any suspicious behaviour or corrupted files for review, warning you of any attacks in progress and giving you an idea of where your site's vulnerabilities lie so you can resolve them.

Some security plugins also come with backup options, for that all-inclusive service. Having all of your security needs organised by one plugin means that the features are easy to organise, with less risk of conflict between similar plugins. Make sure you do your research, however,

as this plugin is going to be the thing standing in the way of your site and anyone wanting to cause it harm. You will need to pick one that will do the job admirably.

Additionally, an anti-spam plugin such as Akismet will keep spammers from clogging up your site with unrelated comments. If your security plugin isn't already doing so, it can assist the security plugin by adding an extra layer of security to your community interaction by using validation tools like CAPTCHA and other anti-bot devices to make sure only real people are commenting. An anti-spam plugin helps keeps your site clean, as well as your database behind the scenes. Screening for valuable comments has the added bonus of giving your content more weight by only showing proper engagement from readers.

Each plugin comes with its own different tools, so compare the options for something that suits your needs. Consider premium versions of plugins for additional features since this is an integral part of your site and generally speaking, paid plugins will give you the most comprehensive service. Ideally you want a suite that covers at least the basics of security, such as the other tips named in this article.

"SECURITY PLUGINS COME WITH A SUITE OF TOOLS TO LOCK DOWN VULNERABILITIES, SUCH AS MASKING VERSION NUMBER TO INSTALLING TWO-FACTOR AUTHENTICATION"

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Developer tutorials

Visualise data mashups with APIs

Discover how to aggregate Twitter and Flickr data, plot it on a map and keep up with what's happening around you



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There is a staggering amount of data available to us nowadays from all kinds of different sources. On average, nearly 8,000 tweets are sent every second, which creates a wealth of information that can be sifted through and analysed as needed.

Social networks allow access to all this information through their public APIs. Popular sites such as Twitter and Flickr offer free use of their systems once an application has been registered. With information such as locations, images and trending topics easily available, the possibilities are endless.

But while a large set of information can be great, it can also be difficult to obtain any significance from it. We need to be selective with what we pull out and how it gets displayed. It can be useful to focus on one aspect of data, such as the words of a tweet or the location of a photo and extract importance from there.

Data mashups are a quick and easy way to start gathering meaning from multiple sources. By tracking a point of data and visualising it, we can see at a glance what impact that is having. They can also serve as an approachable way to get acquainted with various data sets and what they offer.

In this tutorial, we will be mashing up the Twitter, Flickr and Google Maps APIs to help see what's happening on the web around a given location. Queries will hit an Express server to pass JSON to the front-end. This application might be useful for tracking social media chatter around an event or simply to see what is popular around you right now.

1. Install dependencies

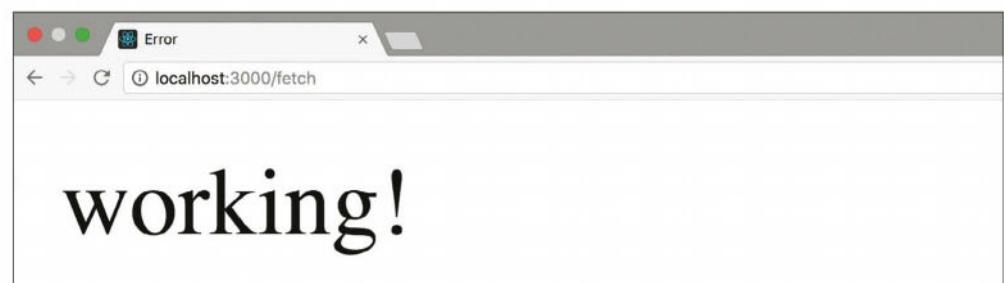
Before we get started, we need to pull down everything we will be using in this project. To fetch the data from Twitter and Flickr we need separate packages to help perform the requests and Express to help serve them up.

Make sure Node and npm are installed first, then run the following command in the terminal.

```
> npm install
```

There is a staggering amount of data available to us nowadays from all kinds of different sources. On average, nearly 8,000 tweets are sent every second,

which creates a wealth of information that can be sifted through and analysed as needed.



2. Register for Twitter API

To get anything from Twitter, we need to register an application first. Visit apps.twitter.com and click Create New App. Give it a unique name - Twitter will stop you now if not - as well as a description and a URL.

Once complete, find the Consumer Key and Consumer Secret values, copy and paste them into the .env file at the root of the project.

3. Register for Flickr API

We also need to register for a Flickr API key in their App Garden. Head to flickr.com/services/apps/create and request a non-commercial API key. Once we give our application a name and description, we get presented with a couple of keys.

Copy over the main key and paste that into the .env file as well. Our application does not use the secret key, so it can be discarded.

4. Fetch Twitter bearer token

We will be using application-only authentication for Twitter, which means we need a bearer token. While this means we cannot use certain user-specific endpoints, we get higher rate limits for the ones we can.

Once we have one, it remains valid for the life of the application. Right at the top of server.js, import a function that fetches the token and keeps it for when it's needed later on.

```
const twitterBearerToken =
  require('./TwitterBearerToken.js')();
```

5. Set up fetch router

The server only needs one route to allow the map to fetch data. Adding a route with Express requires a function call on the main server object.

Add a route that picks up calls to '/fetch' just before we start the server with the 'listen' method. After that, start the server by running 'npm start' on the command line, go to localhost:3000/fetch and check everything is working correctly.

```
app.get('/fetch', (req, res, next) => {
  const { lat=0, lng=0 } = req.query;
  return res.send('working!');
});
```

6. Set up Twitter client library

The 'bearer token' function imported in step 4 returns a promise that we can use to be sure we have it before moving on.

Replace the 'working!' test line with a new block that waits for the bearer token before setting up the client. The client only needs the bearer token for now.

```
twitterBearerToken.then(token => {
  const twitterClient = new Twitter({
```

Keep keys separate

Always include any sensitive data like API keys from a separate file. That way they are easier to keep out of source control and quicker to change if they ever need updating.

Web Designer Social Mashup

Details Settings Keys and Access Tokens Permissions

Access

What type of access does your application need?

[Read more about our Application Permission Model.](#)

- Read only
- Read and Write
- Read, Write and Access direct messages

Note:

Changes to the application permission model will only reflect in access tokens obtained after the permission model will need to re-negotiate existing access tokens to alter the permission level associated with each of your applications.



Top

On some machines, the .env file may be hidden by default. To open it when hidden, either find it through IDE navigation or the command line

Left

Set the permissions of the application to 'Read only' to limit the damage if any of these tokens were accidentally made public

Developer tutorials

Visualise data mashups with APIs

```
bearer_token: token,  
});  
});
```

7. Query the Twitter API

Once the client is set up we can use it to request tweets. Calling the 'get' method on the client object makes GET requests on our behalf.

Set up a query that gets 50 tweets within a 1km radius from a supplied set of co-ordinates. These will be sent from Google Maps later on.

```
const twitterParams = {  
  geocode: `${lat},${lng},1km`,  
  count: 50,  
};  
const tweetRequest =  
  twitterClient.get('search/tweets',  
    twitterParams)
```

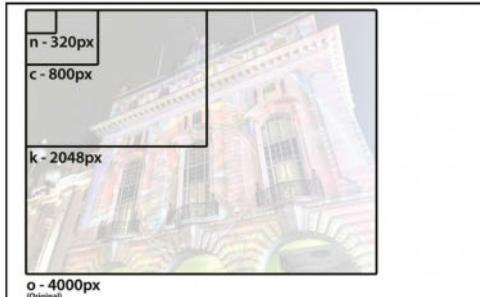
8. Create objects for the map

The client call returns a promise, which lets us chain any modifications to that data afterwards. Not every geotagged tweet comes with exact coordinates, as they relate to a general area that matches our query. Filter out any tweets without coordinates and take the first ten. Finally, make a new object containing only the data we need that will get sent back to the map. Note that coordinates are reported as GeoJSON, which lists longitude before latitude.

```
.then(tweets => tweets.statuses.filter(  
  ts => ts.coordinates).slice(0, 10))  
.then(ts => ts.map(t => ({  
  id: t.id_str,  
  tweet: t.text,  
  timestamp: t.created_at,
```

Keeping things local

This application makes use of the Geolocation API to detect where the user is located. Some users may have this disabled, so always have a fallback to set location, such as clicking the map.



Right

Certain code editors such as Visual Studio Code can run Node applications, which can aid debugging with breakpoints and variable inspection

Top

Flickr provides several different sizes of an image depending on developer requirements. Use the smallest image possible for each project

```
username: t.user.screen_name,  
lat: t.coordinates.coordinates[1],  
lng: t.coordinates.coordinates[0],  
}))
```

9. Set up Flickr client

With the tweets collected we can move on to the Flickr API. Thankfully all the Flickr client needs is the API key we helpfully collected earlier. The library will then authenticate each request on our behalf.

After the set of Twitter promises from the previous steps, now is the time to initialise the Flickr client, which you do with the key from our .env file.

```
const flickrClient = new Flickr(  
  process.env.FLICKR_API_KEY);
```

10. Define the photos required

The Flickr API behaves a little differently to Twitter. We need to be more explicit with exactly what we need it to return. For this project, we need the five most recent photos taken 1km away from our given position. The 'extras' parameter defines the other information we need such as who owns it, when and where it was taken, and its URL.

```
const flickrParams = {  
  lat:  
  lon:  
  radius: 1,  
  has_geo: 1,  
  sort: 'date-posted-desc',  
  per_page: 5,  
  extras: 'owner,owner_name,date_upload,  
  geo,path_alias,url_m' };
```

11. Fetch the photos

With the query set up, we can send off the request. As this client is made by Flickr themselves, the structure of the client object mimics the documentation.

Send the request off to the 'photos.search' endpoint and map over the results. Leave the map return value empty for now.

```
const flickrRequest = flickrClient  
.photos.search(flickrParams)  
.then(response =>  
  response.body.photos.photo.map(  
  photo => ({  
  /* next step here */  
}));
```

12. Populate the map value carefully

Mapping over the results from Flickr lets us specify only the ones we need. Latitude and longitude are returned as strings, which Google Maps does not like. Convert these to floats instead.

Likewise, 'dateuploaded' is a UNIX timestamp, which needs to be in milliseconds for it to work in perfect harmony with JavaScript.

Finally, an image link is made up of the user and the ID. In cases where a user has no specified alias use their user ID instead, which works just as well.

```
id: photo.id,  
url: photo.url_m,  
title: photo.title,  
lat: parseFloat(photo.latitude),
```

```
WEB-DESIGNER-SOCIAL...  
  .vscode  
  node_modules  
  public  
    Keys.js  
    main.js  
    Messenger.js  
    Point.js  
    SocialMap.js  
    style.css  
  .env  
  .gitignore  
  index.html  
  package-lock.json  
  package.json  
  README.md  
  server.js  
  TwitterBearerToken.js  
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL  
Debugging with inspector protocol because Node.js v8.9.4 was detected.  
node --inspect-brk=26122 server.js  
Debugger listening on ws://127.0.0.1:26122/72c3679c-6ee3-4b81-ac4d-632e9474f47a  
Debugger attached.  
App running at http://localhost:3000  
server.js:123
```

The screenshot shows a map of London with a dark, moody aesthetic. The map includes street grids and major roads, with a prominent river running through the center. The overall color palette is dark, matching the theme of Assassin's Creed IV. The map is displayed on a website interface with navigation controls and a legend.

Assassin's Creed IV

Sarah Frisk
August 20, 2016

138408 views
457 favorites

Themed map matching the colors from Assassin's Creed IV.

JAVASCRIPT STYLE ARRAY:

```
[{"featureType": "all", "elementType": "all", "stylers": [{"visibility": "on"}]}, {"featureType": "all", "elementType": "labels", "stylers": [{"color": "#000000"}]}]
```

[EXPAND CODE](#)

Need a bit more help? Download a simple example

Add colour to Google Maps

The default Google Maps styling is familiar to anyone who has used the platform before. It may not, however, fit in with every website design. Thankfully Google has provided a mechanism to restyle every part of the map in order to suit the needs of any site.

Every Map object created can take an optional 'styles' parameter, which consists of an array of changes to make to the default styling. Every feature of the map can be restyled or removed completely, including the water, roads and points of interest.

These customisations can run pretty long, so it may be easier to use an existing one as a starting point. Sites such as snazzymaps.com showcase existing map styles that can be easily copied into a project.

The screenshot shows the Google Maps API console. A modal window is open with the message "You're all set! You're ready to start developing with Google Maps JavaScript API". It displays a generated API key: "xxxxxxxxxxxxxxxxxxxxxx". A note says "To improve your app's security, restrict this key's usage in the [API Console](#)". There are "GET A KEY", "VIEW PRICING AND PLANS", "SEND FEEDBACK", and "DONE" buttons.

```
lng: parseFloat(photo.longitude),
username: photo.username,
timestamp: parseInt(photo.dateupload, 10) * 1000,
link: `https://www.flickr.com/photos/${photo.pathalias} ? photo.pathalias : photo.owner}/${photo.id}/`
```

13. Create a response

With all the data collected all that remains is to return it back as the response to the original request. Once the requests to Twitter and Flickr are carefully complete, combine their promise return values into one object using ES2015 destructuring and send that out as JSON. Restart the server and check the values are coming out correctly.

```
Promise.all([
  tweetRequest, flickrRequest])
  .then(data => {
    const [tweets, images] = data;    return
    res.json({
      tweets,
      images
    });
})
```

14. Register for Google Maps Key

With the server complete, it's time to turn to the front-end. Before we can use the API, we need to get a special Google Maps JavaScript API key. Head to [developers.google.com/maps/documentation/javascript](#) and click Get a Key. As long as you are logged in with a Google account, all that is needed is an application

name. After the key is generated, simply copy it into the public/Keys.js file.

15. Initialise the SocialMap

All of the heavy lifting with Google Maps will happen inside the 'SocialMap' module. The job of main.js is to load the data points and tell 'SocialMap' what to do with them. Towards the bottom of main.js, initialise the 'SocialMap' module at the default location, which in this application is London. We also add in callback functions to call when certain actions happen on the map.

```
SocialMap.onReady(onReady);
SocialMap.onLocationChanged(
  updatePoints);
SocialMap.init(new Point(lat, lng));
```

16. Download Google Maps API

When we initialise 'SocialMap', we have to pull in the Google Maps API. To do that we add another <script> to the page linking to the API files and passing through our application key.

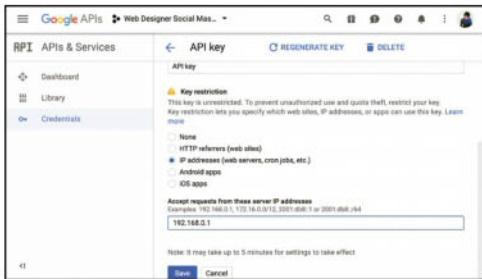
We also need to tell Google what function to call once that file has finished downloading. In this case it's the 'mountMap' method within the 'SocialMap' module.

Open up SocialMap.js and add the following to the 'init' method. Don't forget to save the initial location for later.

```
location = initialLocation;
var script = document.createElement('script');
script.src = 'https://maps.googleapis.com/maps/api/js?key=' + KEYS.GOOGLE_MAPS
```

Developer tutorials

Visualise data mashups with APIs



Above

Before going live, limit the use of the API key to the addresses in use. This can be done inside Google's Developer API Console.

Right

The west coast of Africa is at 0° latitude and longitude. If things end up here, it's likely Google Maps hasn't understood the coordinates supplied.



```
+`&callback=SocialMap.mountMap';
document.head.appendChild(script);
```

17. Mount the map to the page

The map needs to be added to the page before it can be seen. This can be done by creating a new Map object with the newly downloaded API object. This takes a few settings, including the zoom level and location to start at.

At the top of the 'mountMap' method, create a new Map object as well as an 'InfoWindow' object that will be used later to display data.

```
map = new google.maps.Map(container, {
  zoom: 16,
  center: {
    lat: location.getLat(),
    lng: location.getLng(),
  },
  clickableIcons: false,
});
infoWindow = new google.maps
  .InfoWindow({});
```

18. Mark search location

The first thing to display is the point we are searching around. Each point on a map is a Marker object, which can take many different options. For this application, we need to supply it a map to attach to and coordinates to display at.

Add the following to the 'setLocation' method, which is called whenever the location changes either by loading or clicking the map.

```
location = setLocation;
if (typeof google !== 'undefined') {
  locationMarker = new
    google.maps.Marker({
      position: {
        lat: location.getLat(),
        lng: location.getLng(),
      },
      map: map
    });
  resetBounds(); }
```

19. Add each data point

Once 'main.js' knows the coordinates, it will pull in the data for that location, create either a 'TweetPoint' or 'ImagePoint' object for each point and pass those through to 'SocialMap'.

Now you can update the 'addPoint' method to add markers for each point. Mark the tweets with a 'T' and Flickr images with 'F'.

```
var m = new google.maps.Marker({
  position: {
    lat: point.getLatitude(),
    lng: point.getLongitude(),
  },
  map: map,
});
if (point instanceof TweetPoint){
  m.setLabel('T');
} else if (point instanceof ImagePoint){
  m.setLabel('F'); }
```

20. Set and open an InfoWindow

'InfoWindows' are the bubbles that display what a marker is for. Instead of creating a new one for each marker, we reuse the same one as to only have one on the screen at a time.

After creating the marker, set up a listener to update the 'InfoWindow'. The content is HTML generated based on the data from the sever. Now you can add the marker to the array to keep track of it when they need to be cleared.

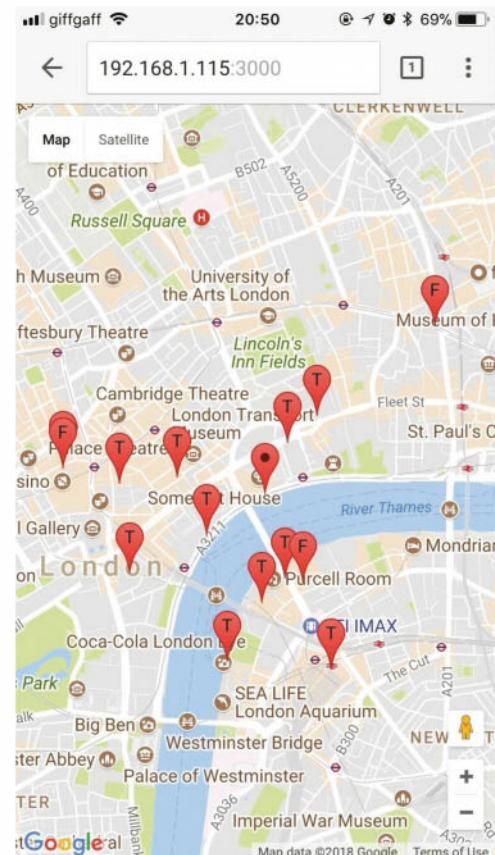
```
m.addListener('click', function() {
  infoWindow.setContent(
    generateInfo(point));
  infoWindow.open(map, m);
});
markers.push(m);
```

21. Clear markers on new request

Finally, when a new request is made by clicking the map, all existing markers need to be removed. This is done by removing the link between the markers and the map. Inside the 'clearMarkers' method, remove the map from

each marker then empty the array to discard them. If there is a location marker, remove that too.

```
markers.forEach(marker => {
  marker.setMap(null);
});
markers.length = 0;
if (locationMarker) {
  locationMarker.setMap(null);
  locationMarker = null;
}
```



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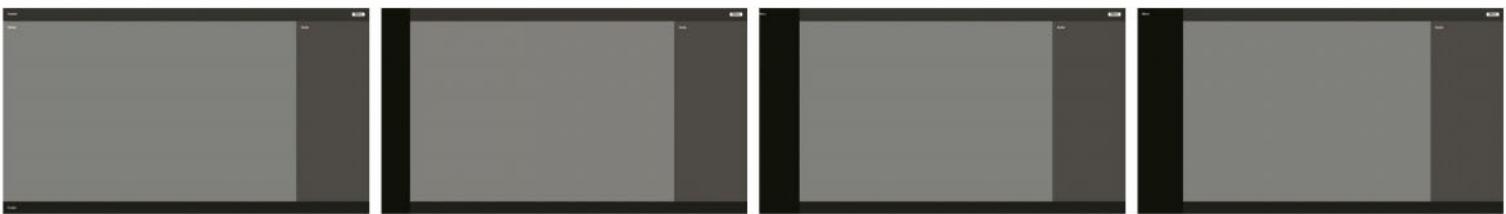
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Make animation more performant

Take an in-depth look at how to create silky smooth animations. Find out which properties perform best and why



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Animation on the web is awesome, you can use CSS or JavaScript to animate just about anything. So when we begin animating elements, we just go for it – using any property we see fit – and for a while everything seems fine, and then suddenly your animations start to stutter and the response from the browser feels heavy, this alone can be enough to have users leave your site.

In order to fix these janky animations and have them run at a silky smooth 60fps – or as close as we can get to it – we need to understand what's going on under the hood in the browser.

The explanation here is a huge simplification but should give you enough of an understanding to improve your animation performance;

The browser receives the HTML code and parses it to create the DOM Tree. The browser then (using CSS and JavaScript) moves on to create the Render Tree. Once the browser has the Render Tree it can calculate layout and geometry (the width, height and position of elements) – and, in turn, animations. Before it can show anything on the screen, though, it needs to go through the render process, then finally painting to the screen.

The render process is a lot of work for the browser to do, so we need to see how we can make things easier for it by carefully choosing how we animate our elements.

1. Browser rendering

The bulk of the work is done during the rendering process and in order to do this as quickly as possible the browser will split the workload across three different threads; the main, the raster and the GPU.

2. Browser rendering process

Everything we've talked about the browser having to do so far is all done on the main thread, except for drawing bitmaps from SVG and other elements, which are handled by the raster thread. The main thread is also where all of your JavaScript is running so is most likely the source of any performance issues.

3. Browser painting

Painting is the last step in the process. This is where the browser finally displays elements on the screen. Because painting can only be completed after the layout and geometry calculations have been made, painting is expensive in terms of performance due to the calculations the browser needs to perform beforehand.

4. Properties which are 'expensive' to animate

Properties referred to as "expensive" are properties that will cause a reflow or a repaint. Here are just some of the properties that will cause a reflow or repaint and unfortunately reflows can often force the browser into a repaint in order to redraw the element in its new position: width, height, margin, padding, top, bottom, left, right, font-size, line-height, colour, background-color, background-position, background-size, box-shadow, border-radius, etc.

5. Properties which are 'cheap' to animate

Cheap properties on the other hand are GPU accelerated and won't force the browser to do a reflow or repaint.

These properties are handed off to the GPU thread leaving the main and raster threads free. If we stick to these properties we can animate elements cheaply and keep them running: transform, opacity, filter.

6. The list is short but get creative

So the list is short but actually we're not as limited as you might think. The 'transform' property offers us a lot of versatility; we can move elements around the page with 'translate'. We can change the size of elements using 'scale'. We can 'rotate' and 'skew' elements and even change their 'perspective'.

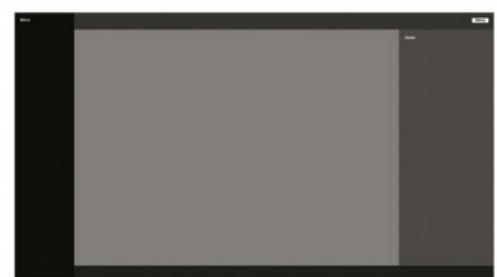
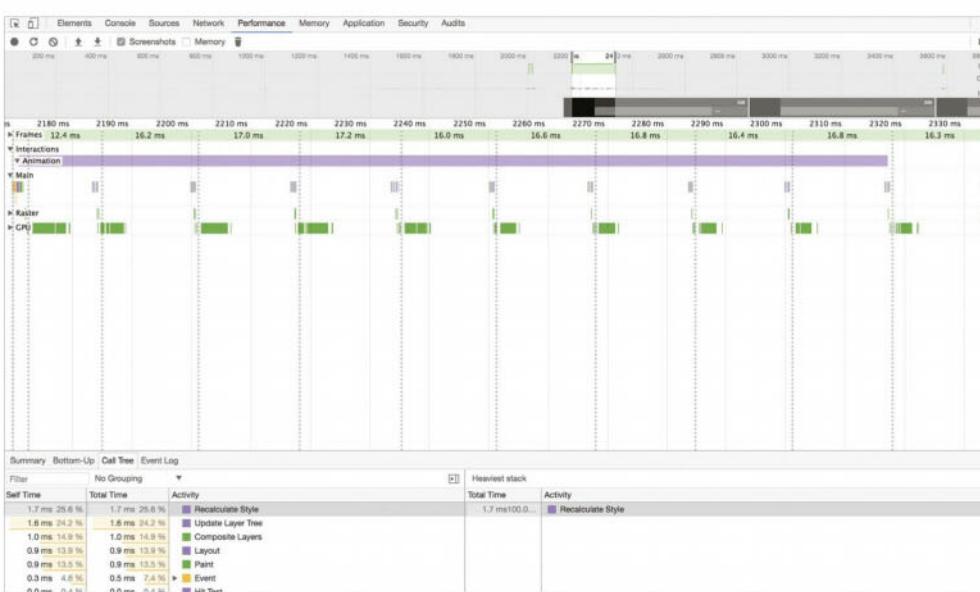
7. The proof is in the pudding

That's if the pudding is made of performance tests and statistics. Let's create a simple demo so we can test this out. We'll create a simple menu pop-over. We'll be using CodePen and the SCSS compilation for these demos. We'll start with the HTML structure:

```
<div class="menu"></div>
<div class="grid">
  <header>
    Header
  </header>
  <button>Menu</button>
```

Reflows and repaints

A reflow is when an element's geometry changes – making an element taller by changing its height, for example. The browser is then forced to recalculate the positions of every element below, and repaint all of the pixels which have changed.



Above

This screenshot shows us the layout we've created in order to animate it. We'll be moving the menu panel left and right using the button in the header

Left

Clicking the Call Tree tab will show us how long the browser calculations took to perform. The total calculation time using the 'left' property was 1.7 milliseconds

Developer tutorials

Make animation more performant

```
</header>
<article>Article</article>
<aside>Aside</aside>
<footer>Footer</footer>
</div>
```

8. Basic CSS structure

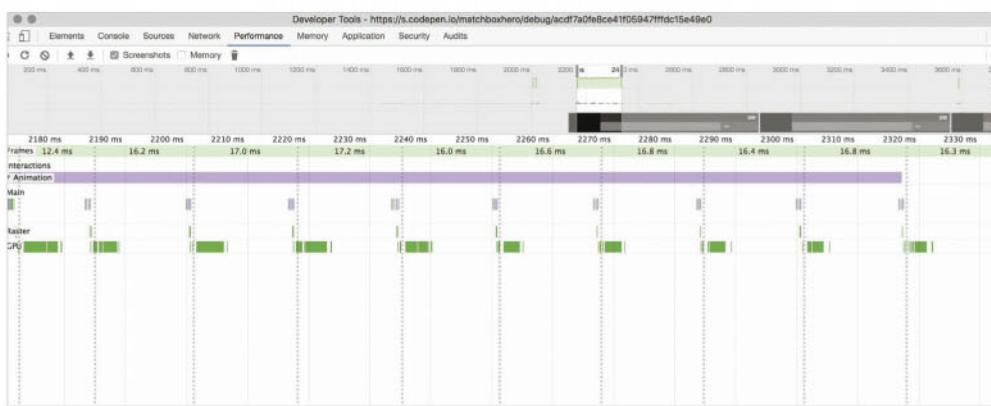
Next we need to create our page layout to force the browser into doing at least a little bit of work to load the page. We can use CSS Grid and Flexbox to very quickly create our page layout.

```
.grid {
  ...
  grid-template-areas:
  "header header"
  "article aside"
  "footer footer"
  ;
  ...
}
```

9. Careful planning

The way we have structured our HTML will enable us to absolutely position the menu over the top of the page. By doing this we're already eliminating the possibility of a reflow and the browser will only need to do a repaint.

```
.menu {
  position: absolute;
  top: 0;
  left: 0;
  width: $menu-width;
  height: 100%;
  ...
}
```



10. Toggle a state class

Using JavaScript we can toggle the class 'is-open' when the menu button is clicked. The new ES6 syntax makes this really simple. We start by creating a 'const' for the menu, then a simple class toggle function, followed by running the function when the menu button is clicked.

```
const menu =
  document.querySelector('.menu');
function menuToggle() {
  menu.classList.toggle('is-open');
}
document.querySelector('button')
  .addEventListener('click', menuToggle);
```

11. Animate left

From here we can animate different properties and record their performance by using the browser's developer tools. We'll start by using the most obvious - we'll animate the 'left' property. To do this, we need to set the initial 'left' value to be the negative amount of width of the menu and then transition it to '0'.

```
.menu {
  left: -($menu-width);
  transition: left 150ms;
  ...
  &.is-open {
    left: 0; } }
```

12. Animate left performance

Using the developer tools in Google Chrome we can record the performance of our animation. We can narrow the test to just the animation frames. The performance test will give us a visual representation of the activity on each of the browser's threads.

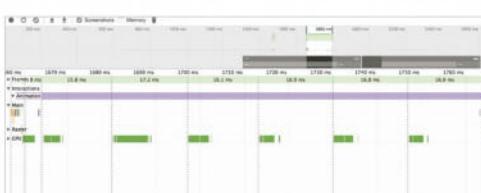
13. Animate margin

Next we'll animate the 'margin' property. By setting the margin again to the value of negative the width of the menu and transitioning it back to '0' we'll be able to achieve the same visual result. We'll fork the last pen and change the 'left' property to 'margin-left'.

```
.menu {
  margin-left: -($menu-width);
  transition: margin 150ms;
  ...
  &.is-open {
    margin-left: 0;
  }
}
```

14. Animate margin performance

We'll record the performance and narrow the test to the animation again. If we compare this to animating the 'left' property we can see there is slightly more activity on the main and GPU threads. Animating the 'margin' property took slightly longer than the 'left' property.

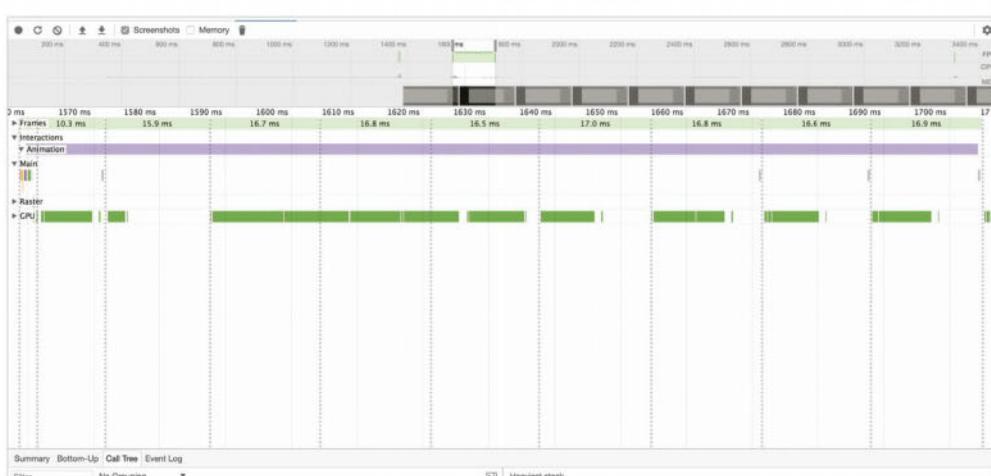


Above

We can see in the Call Time tab that the total animation calculation time was much shorter than the 'left' and 'margin' properties at 0.8 milliseconds

Right

The GPU thread is much more spread out and has less stops making for a smoother animation when using hardware acceleration



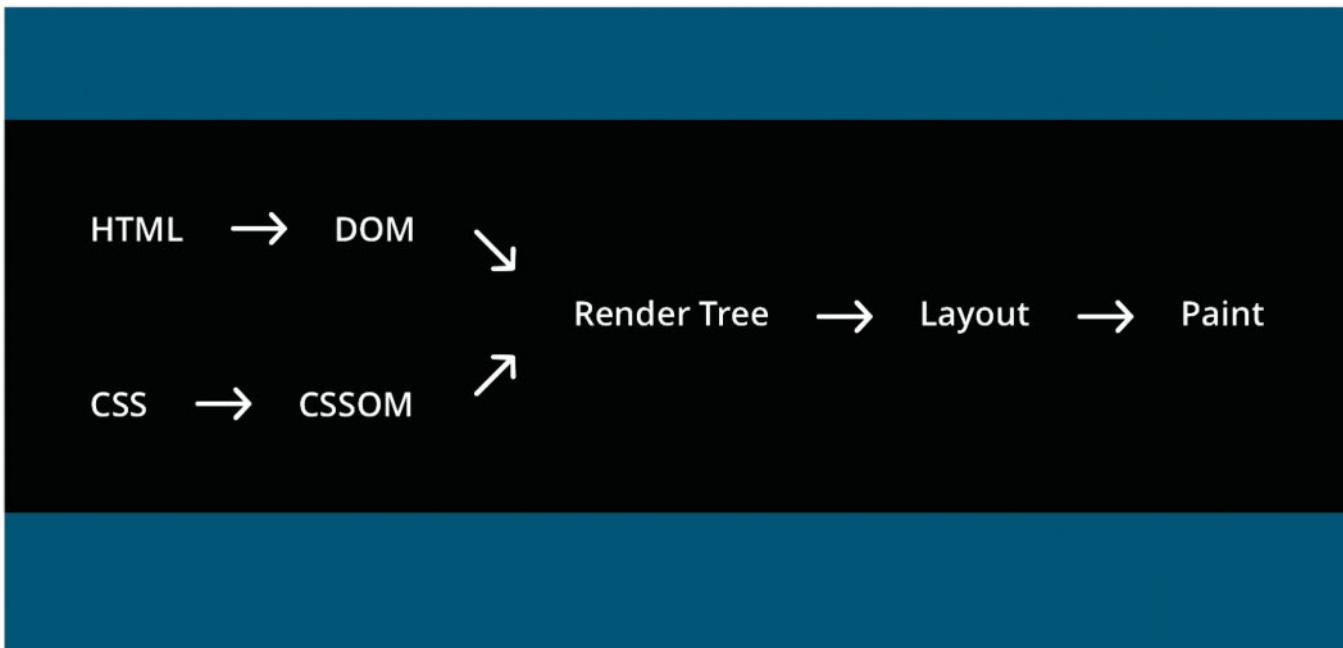
CSS or JavaScript?

The rendering process described in this tutorial is used no matter how you apply your animations be it with JavaScript, CSS keyframes or Transitions. The work required by the browser is always the same. Equally it doesn't matter which elements you are

animating, be it a 'div' or a shape in SVG, as again the same work needs to be done by the browser. Utilising the cheap properties to animate these elements will always create smoother, more performant animations.

Desktop browsers are pretty good at

handling most of what is thrown at them and will - in simple demos and websites - manage to display most animations somewhere near 60fps. It's lower-powered mobile devices which will benefit the most from performance considered animations.



15. Animate transform

Animating the 'margin' and 'left' properties is expensive in terms of performance, so we'll fork the last pen and this time update the CSS to animate the 'transform' property, using the 'translateX()' function.

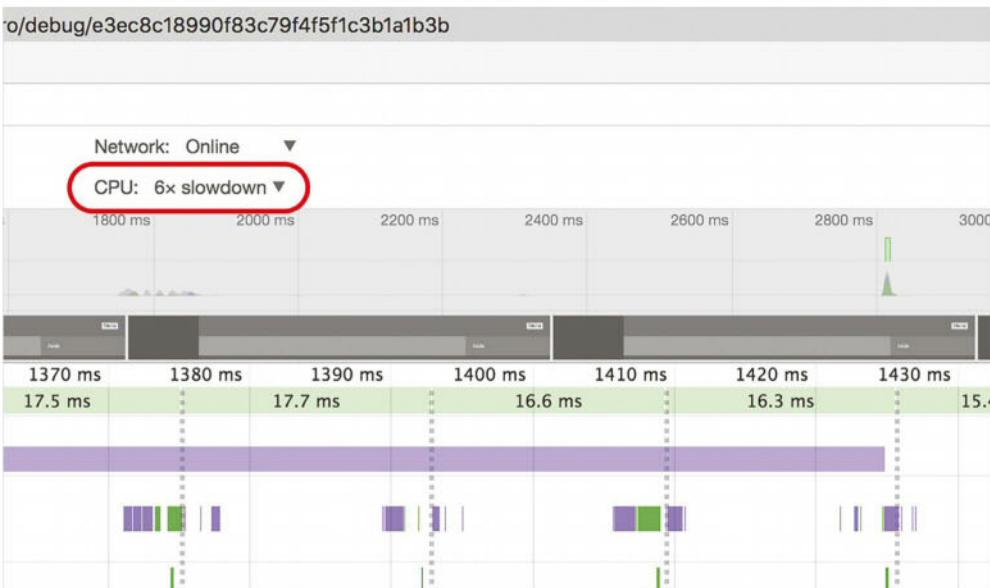
```
.menu {
  transform: translateX(-$menu-width);
  transition: transform 150ms;
  ...
}

.is-open {
```

```
  transform: translateX(0);
}
```

16. Record the animate transform performance

Again using the developer tools in Google Chrome we can record the performance. This time we can see that there is very little to no activity on the main and raster threads, and that the entire animation has been moved



to the GPU thread. It's important to remember that the main thread will often be handling many other operations than in our demo.

17. Hardware-accelerated animate transform

As well as utilising the cheap properties to animate we can also take advantage of hardware acceleration. We do this using the new 'will-change' property and the 'transformZ()' function for the older browsers that don't yet support the 'will-change' property.

```
.menu {
  transform: ... translateZ(0);
  will-change: transform;
  ...
}
```

18. Hardware-accelerated animate transform performance

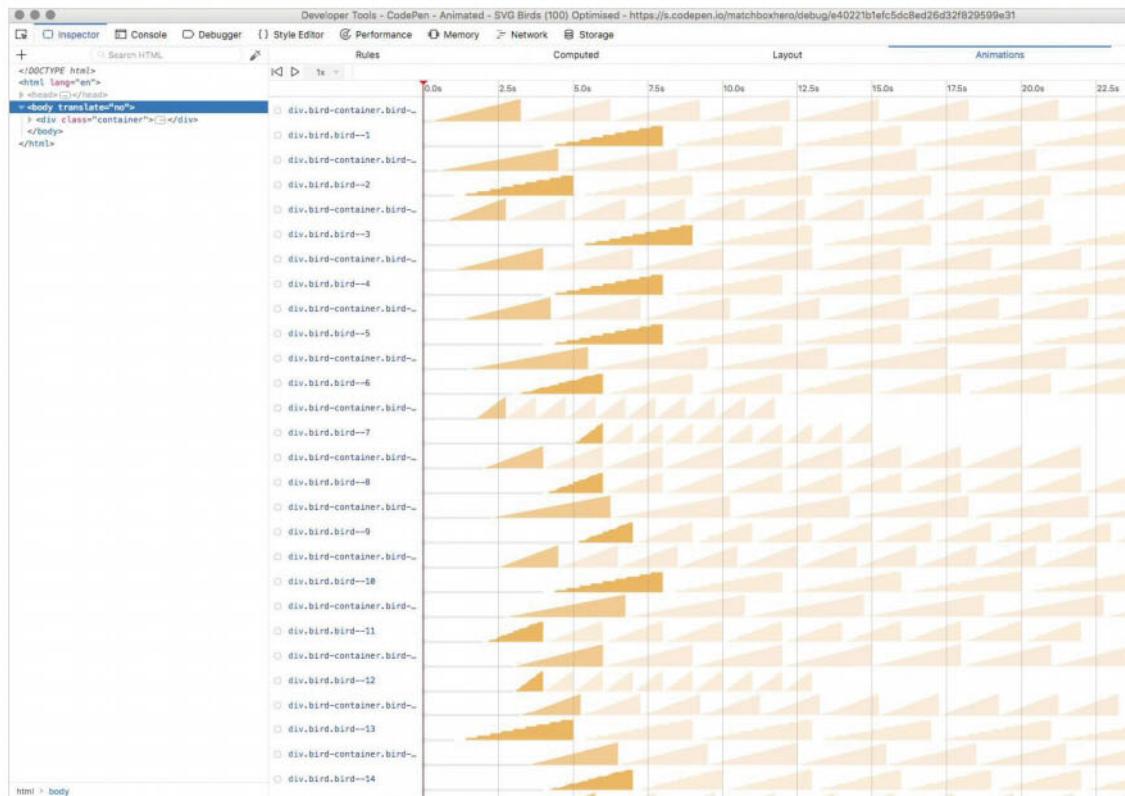
Running the performance test we can see the calculation time compared to the non-hardware accelerated version is only very slightly improved. However the GPU thread now has much less stopping and starting while performing the animation.

19. CPU throttling

The developer tools in Google Chrome enable us to throttle the processor (CPU) and, in turn, the main thread. By doing this we can see how our animations perform by running the tests again while the CPU is throttled and then compare the results.

Developer tutorials

Make animation more performant



Web Animations API

Animation standards on the web have been tricky to nail down but fortunately after many many years of trying we finally have an API. The API standardises the way animation is handled by the browser. It brings with it the ability to create animations that work the same across browsers, but it also means browsers are able to implement animation developer tools - like those found in Firefox - much easier than they previously would have.

This API is already in use on the modern browsers when using CSS transitions and keyframe animations, but also has its own JavaScript implementation allowing for much finer control over animations, especially when chaining them or triggering them upon interaction.

	Left	Margin	Transform	Transform (Hardware Accelerated)
Calculation Time	1.7 ms	1.9 ms	0.8 ms	0.7 ms
Calculation Time (throttled)	8.4 ms	12.9 ms	14.9 ms	5.6 ms

Left

The table shows the difference in calculation time for all of the properties we animated and the difference when throttled

20. Compare the results

By re-running the performance test with the CPU throttled we can create a table to compare the difference in calculation times. As we can see, the animation performance is best under both conditions – that is, when we’re using hardware acceleration combined with the ‘transform’ property.

21. Wrapping up

The statistics from our performance tests prove that the ‘transform’ element is more efficient for moving elements. While to the naked eye there may not be much difference, under the hood the browser is being forced to do a lot more work. This extra work on sites running a lot of JS will slow down the performance of the whole site.

Inside the new Firefox Quantum

For a more in-depth look at how the newest Firefox Quantum works under the hood be sure to read Lin Clark’s excellent post on the Mozilla blog. <https://mzl.la/2ABmhuh>

The screenshot shows a Mozilla Hacks article. The title is "Entering the Quantum Era—How Firefox got fast again and where it's going to get faster". The author is Lin Clark. The article discusses the transition to a new rendering engine called Quantum. A quote from Sara Soueidan (@SaraSoueidan) is shown: "@FirefoxNightly is now officially my dev browser. It's gotten so much better and faster since the last time I used it a couple yrs ago. 🎉". Below the quote, a note says: "Over the past seven months, we've been rapidly replacing major parts of the engine, introducing Rust and parts of Servo to Firefox. Plus, we've had a browser performance strike force scouring the codebase for performance issues, both obvious and non-obvious." At the bottom, it says: "We call this Project Quantum, and the first general release of the reborn Firefox Quantum comes out tomorrow."

Code Pens

Step 07

<http://srt.lt/s9KpM>

Step 08

<http://srt.lt/rE3X7q>

Step 09

<http://srt.lt/ZOJrX>

Step 10

<http://srt.lt/w4bSa9>

Step 11

<http://srt.lt/N2L8E>

Step 13

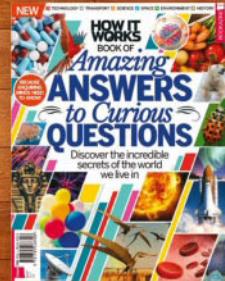
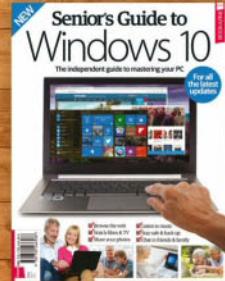
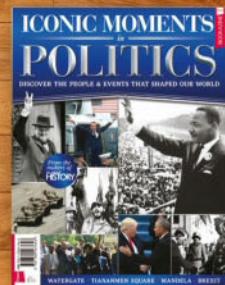
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Step 15

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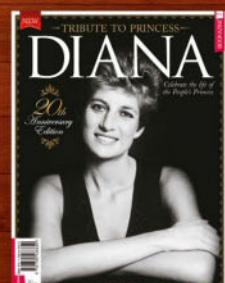
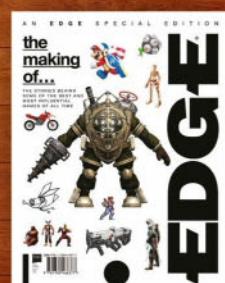
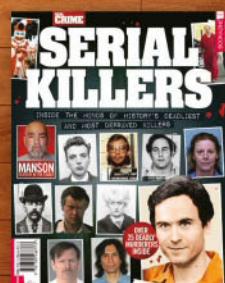
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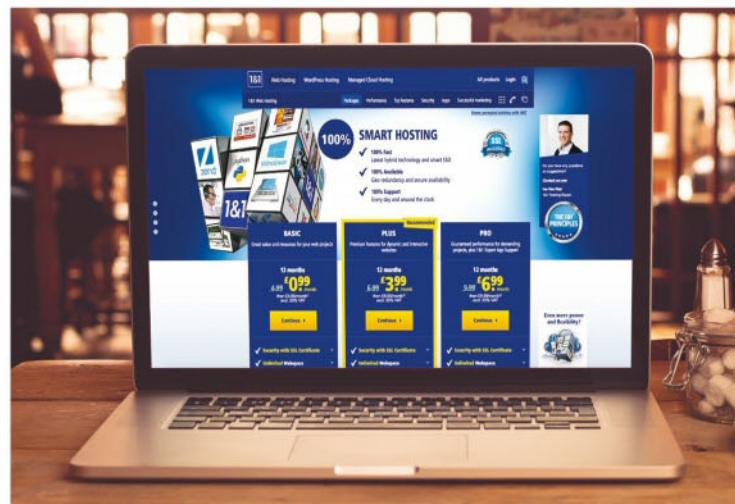


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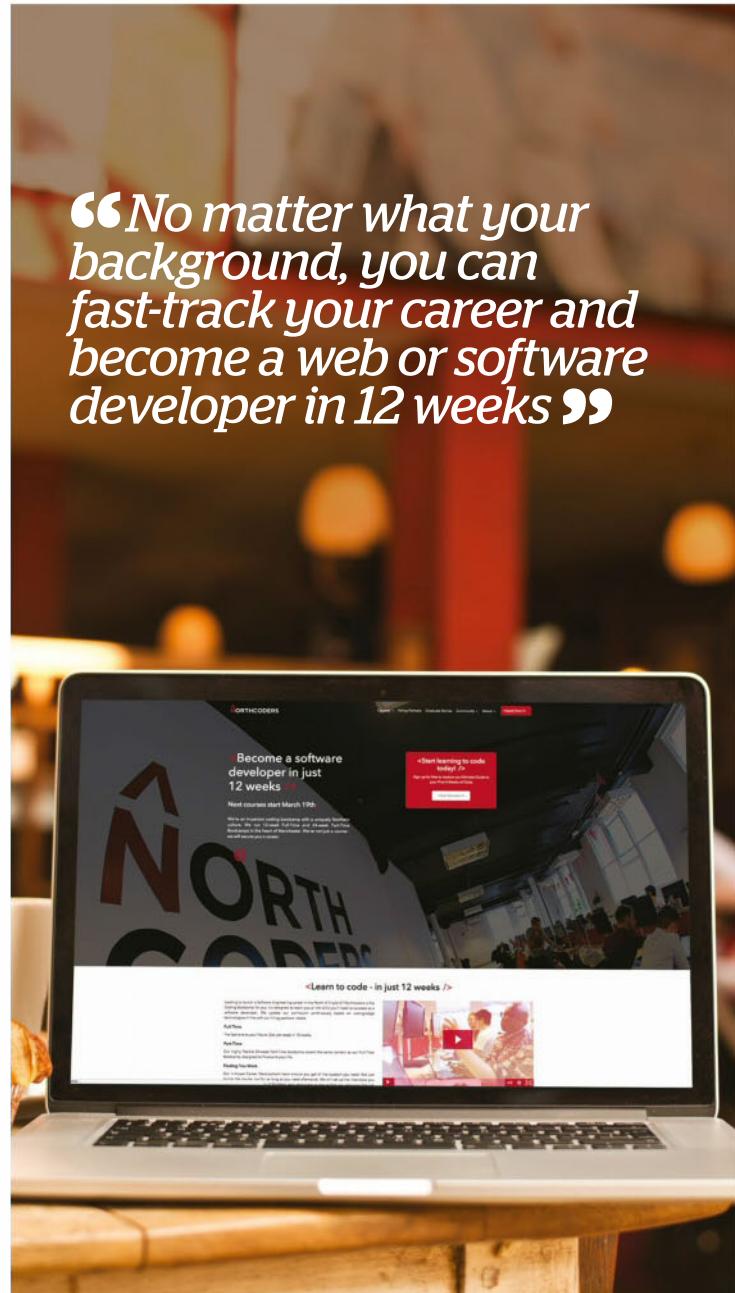
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Primary school teacher to software developer at Careicon



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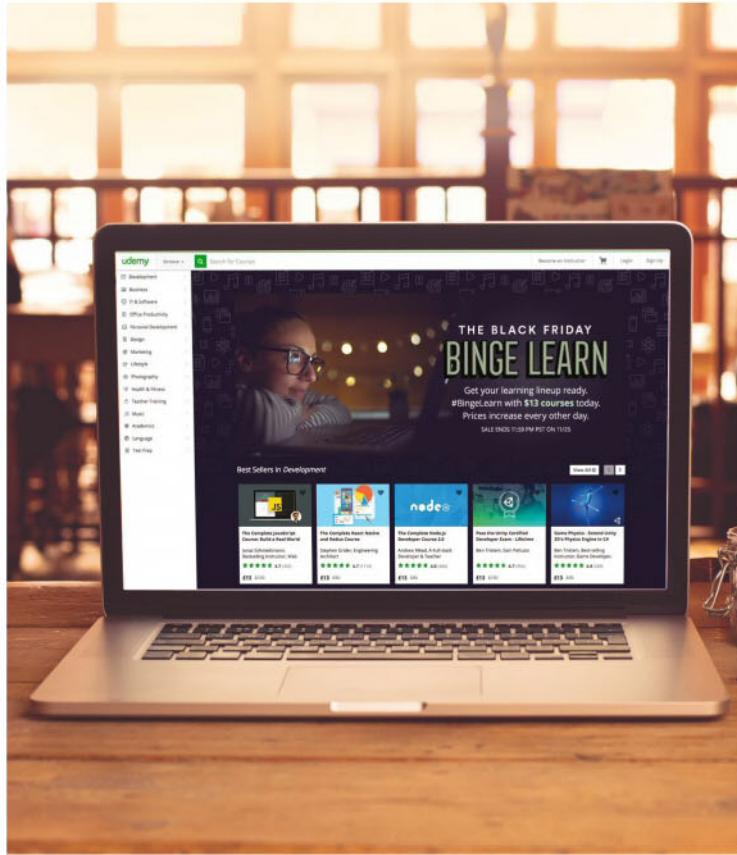
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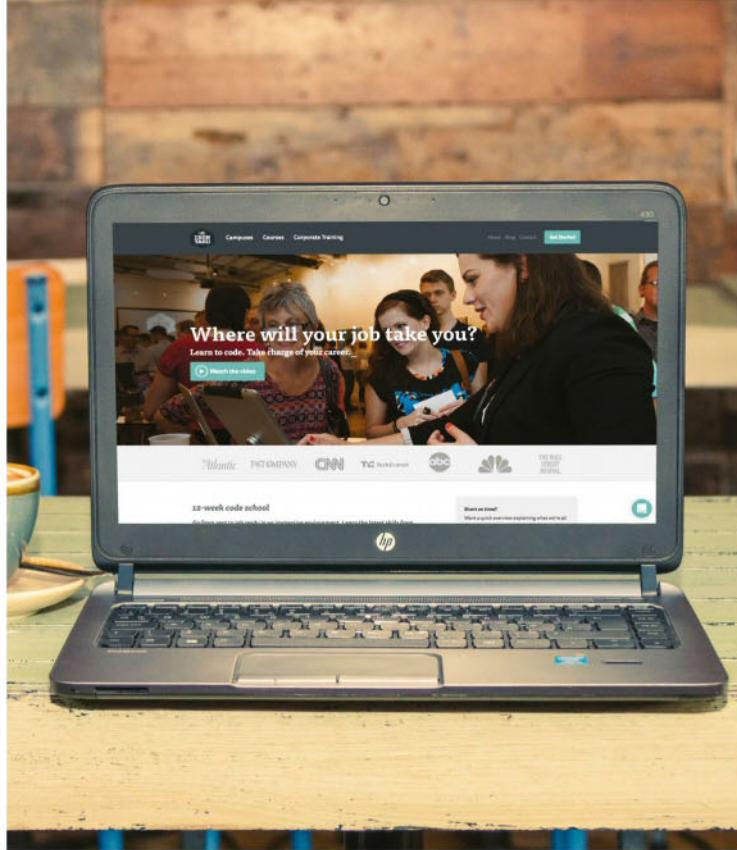
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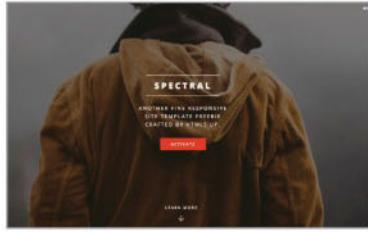
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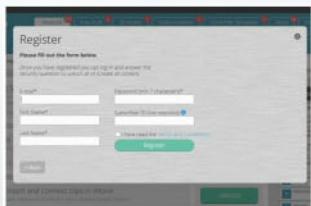


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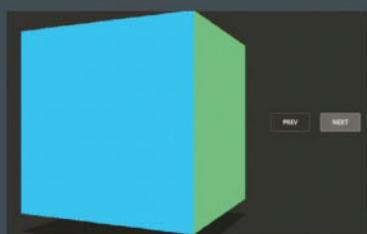
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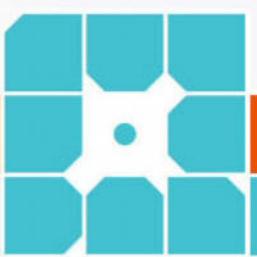


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