



GERRY MCGOVERN ON TOP TASKS

Customer Carewords' CEO on why users' priorities matter when designing sites

MAKE REACT NATIVE APPS
How to create a cross-platform application for iOS and Android

The voice of **web design**

net

Issue 312 : November 2018 : net.creativebloq.com

*ARTIFICIAL INTELLIGENCE

BUILD AN AI CHATBOT

Apply artificial intelligence to sites and create a natural language chatbot

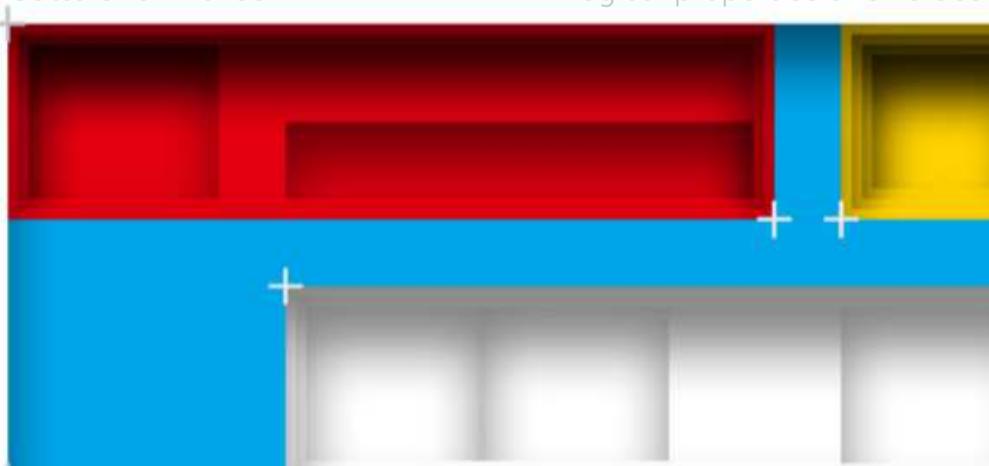
— RACHEL ANDREW REVEALS

THE FUTURE OF

CSS

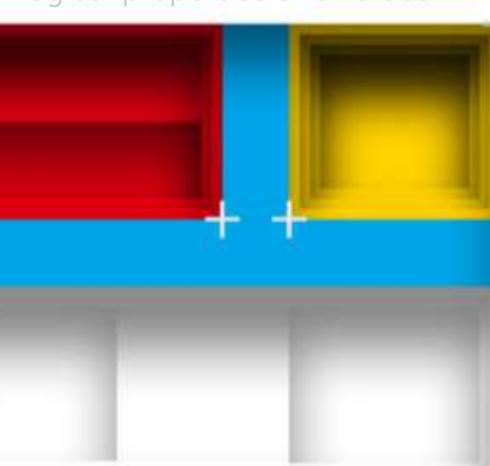
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Gutters for Flexbox



Detecting pointer type

Logical properties and values



Syntax improvements for Media Queries

Grid Level 2 and Subgrid



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Scroll Snapping

Variable Fonts

Initial Letter

FUTURE
ISSUE 312

Get creative with CSS masks and clipping

Use service workers to offer offline access to your site



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*WELCOME

EDITOR'S NOTE

One of my favourite things about the web design industry is that it's inherently forward looking. No sooner has a new standard dropped – opening up in the process a whole new way of shaping sites – than designers and devs begin hacking away at its boundaries. As a result, the way we work on the web is continually improving.

There's perhaps no better example of this than in the continued evolution of CSS. Scarcely more than a year ago, CSS Grid burst onto the scene and turned the web world upside-down – and now a whole new raft of changes are on their way that promise to have a similar impact. This issue Rachel Andrew,

co-founder of Perch CMS and Notist and invited expert to the CSS Working Group, runs down some of the imminent changes set to come to CSS, including scroll snapping, feature queries and subgrids.

But we've also spied a few other predictions in our crystal ball: Richard Mattka is considering the AI revolution and outlines how you can build a chatbot with natural language processing. We're also tapping into some app-focused trends: Darryl Bartlett looks at how you can create cross-platform apps with React Native, while Daniel Crisp follows up with part two of his guide on service workers, revealing how you can use them to offer offline access to your app.

FEATURED AUTHORS

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Andrew is a web developer, co-founder of Perch CMS and Notist and an invited expert to the CSS Working Group. On page 60, she divines which CSS features may find their way to a browser near you soon.
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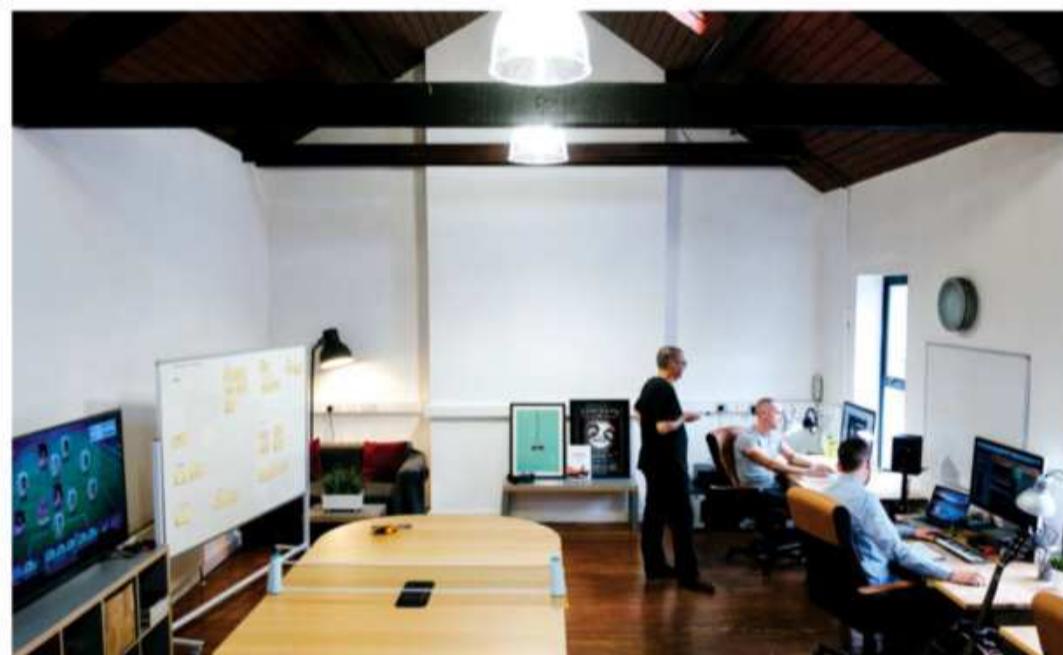
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THESE GIFTS



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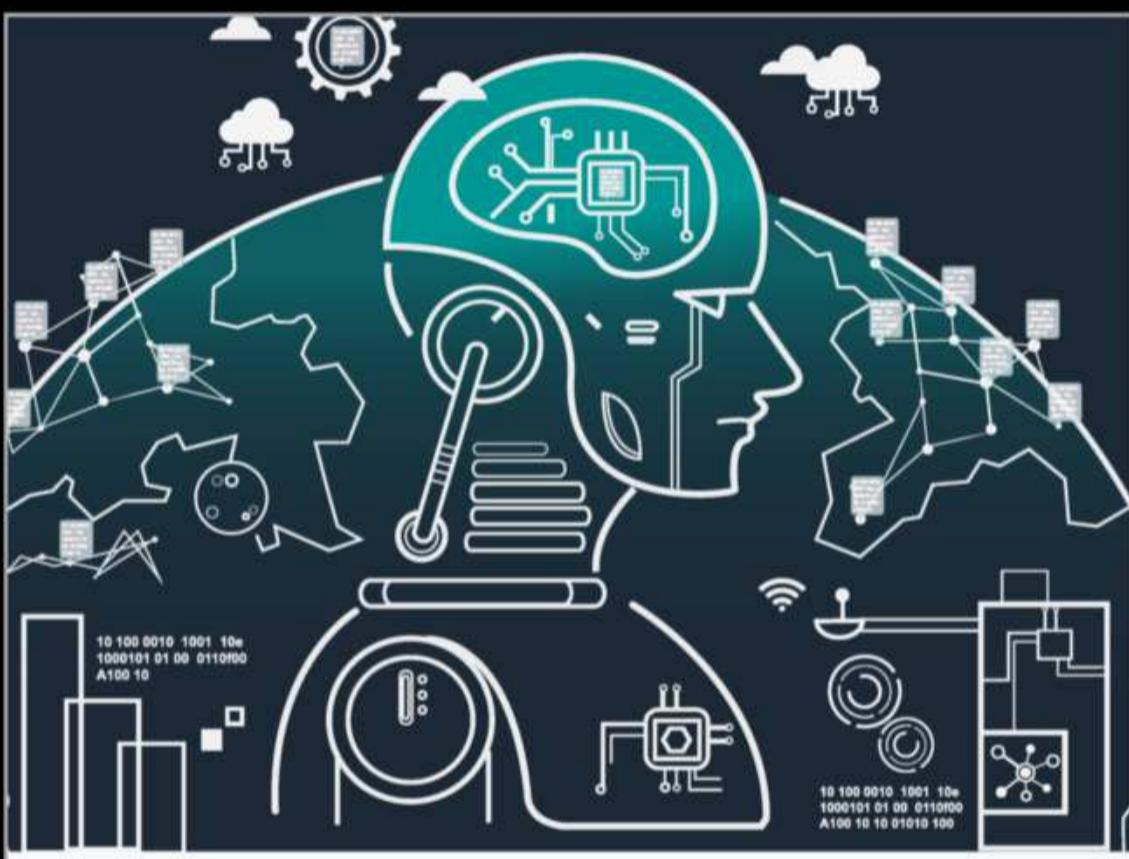
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★ REGULAR

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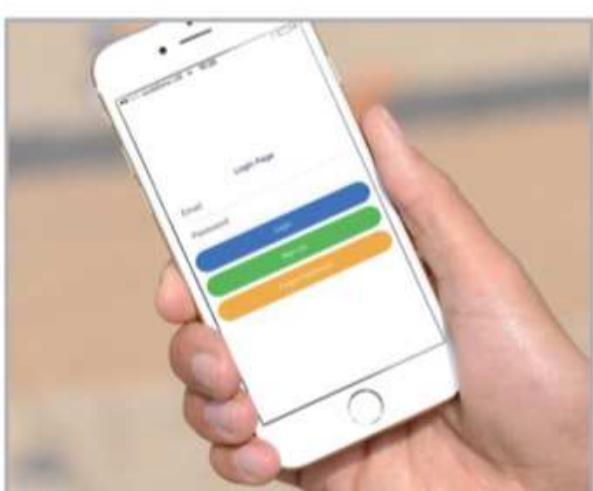
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EXCHANGE

Send your questions to netmag@futurenet.com

Practical
advice from
industry experts

THIS MONTH FEATURING...

SARAH RICHARDS



Sarah owns the Content Design Centre, which delivers public and in-house, one- and two-day courses in content strategy, content design, content design for comms and basic writing for the web. She is also the author of the book Content Design.

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Rob is digital design director at Armadillo, a CRM specialist based in Bristol that works with big-name global brands such as McDonald's, Disney and Hotels.com. He previously worked at Adestra and Dyson.

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★ QUESTION OF THE MONTH

How do you present content for deaf users with BSL (British Sign Language) as their first language?

Zara Gemmell, Nottingham

SR: Video or face-to-face. Some think digital is all there is. We communicated pretty well before the internet! Always go to your audience.

Citizens Advice has a team in Sheffield that is just for BSL users. The advisors are incredible. Many BSL users don't read English. Many organisations think everyone who is profoundly deaf can read English. That's simply not the case.

The content can also be very different. It's not always a case of taking content and making a video of it with a signer. Many government services can be very different for BSL users and I am guessing it will be the same for other industries. You need to tailor that content. Run different user journey mapping sessions to make sure you are getting the right information across on the right channel at the right time.

british-sign.co.uk

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To learn more about British Sign Language or to enrol on a course, visit the BSL website at british-sign.co.uk, which is packed with free resources, games and information

Email design

TABLE TALK

Should we use tables in HTML emails or is there a better way?

Duncan McClean, Scotland

RP: The reality is that, for most brands, Outlook (and others) is still a pretty major consideration. That means you are going to still be working in tables until that stops being true. Even if you

are working with adaptive design, you are still going to have code that is full of checks for Outlook with hidden tables and table cells in.

But the real question is 'why does that matter?' There are fewer and fewer restrictions on what you can achieve in email – especially for iOS native emails, so why do you care that you are using a table versus a <div> or an article? While

The only framework that makes responsive email easy

[Download](#) [Documentation](#) [Github](#)

MJML (or Mailjet Markup Language) has been designed to reduce the pain of coding a responsive email.

it's a bit of a pain to change gears if you are normally a web dev, I've always found that tables make it quite easy to envisage the code I need before I even open my editor.

Content design

MIND YOUR LANGUAGE

What changes have you noticed in language now that the web has to comply with accessibility? Do we have to rethink how to label our navigation and CTAs?

Michelangelo, Los Angeles, USA

SR: To be brutal, I don't think most organisations have changed their language enough. Or, worse, they think they can 'teach' people language. If you are an author, great. People will be looking for skilfully written prose. But if your audience is buying something they won't want to marvel at your GCSE English skills.

Content is the easiest way to open your offering to an audience. The best way to do that is:

- Write to your audience using their language and to their needs.
- Forget jargon and phrases that make you look clever. Be clear and succinct.
- Language and human behaviour change. Your content needs to change with them.

This can be applied to all content but in calls-to-action and navigation, you just have a smaller space. So you can:

- Work with designers to make sure the words and design give your audience the best chance of interacting.
- Use card sorts to look at how your audience will group items.
- Test, iterate, test, iterate.

Research will show you everything you need to do. In our courses we show people how to do easy, cheap research that you can do while you are on a bus, so there's no excuse.

Pay gap

BRIDGING THE GAP

Why is the pay gap so large between email developers/designers and web developers?

Aysha Marie Zouain, Florida/Georgia, USA

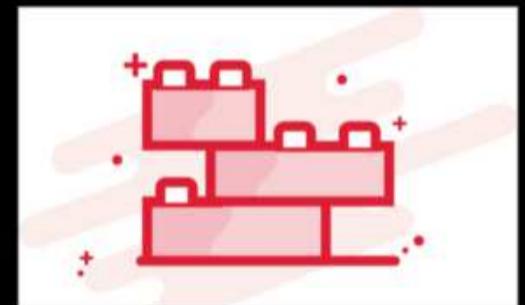
RP: Tricky one this. I've never recruited a mid-level email developer or designer that could only work in that medium. You set your own value to the market and, if all you can do is design or code emails and you are comparing yourself to people who are working on websites, emails and apps then you shouldn't be surprised that they earn more. I think it is unusual to have people that are only email designers or devs.

If you only consider yourself to be an email developer or designer then you've put a cap on your own development and pay. Widen your net and look outside the channel: it will benefit not only your pay packet but also your ability to improve your work, efficiency and desirability to employers.

3 SIMPLE STEPS

Do you recommend the MJML framework?

Aysha Marie Zouain, USA



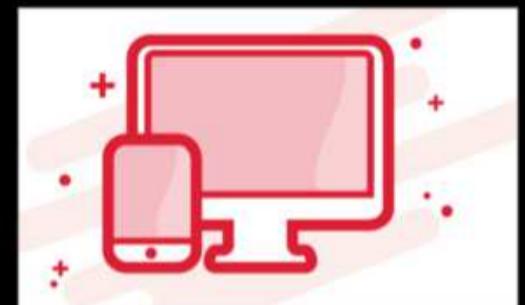
Learning curve

+ MJML is powerful, scalable and can save you a ton of code writing. But it has its own learning curve and some restrictions you wouldn't face if writing your own code from scratch.



Time investment

+ Like any framework, it takes time for new fixes and workarounds to flow into production and any new team members will either have to already know it or learn it, as well as HTML and CSS, before they can become as effective as you.



Simple results

+ That said, I enjoy the simplicity of the code and it's very extensible. Seeing simple code being turned into production code with minimal effort brings its own child-like excitement.

COOL STUFF WE LEARNED THIS MONTH

SECURING SITES MADE THEM LESS ACCESSIBLE

While using a flaky satellite internet connection in Uganda, Eric Meyer discovered a problem with the drive to get all websites using HTTPS: it breaks the local caching servers that make the web usable for people in remote locations. This piece explains how it all works.

netm.ag/2wKmJ9R

ETHICS IN WEB DESIGN

A number of engineers from big web companies have expressed their dismay about how features they designed have come to shape people's behaviour in troubling ways. In this interview, Morten Rand-Hendriksen puts forth an ethical framework for making design decisions, so you can strive to build things that won't prick your conscience in the future.

netm.ag/2wPRZEa

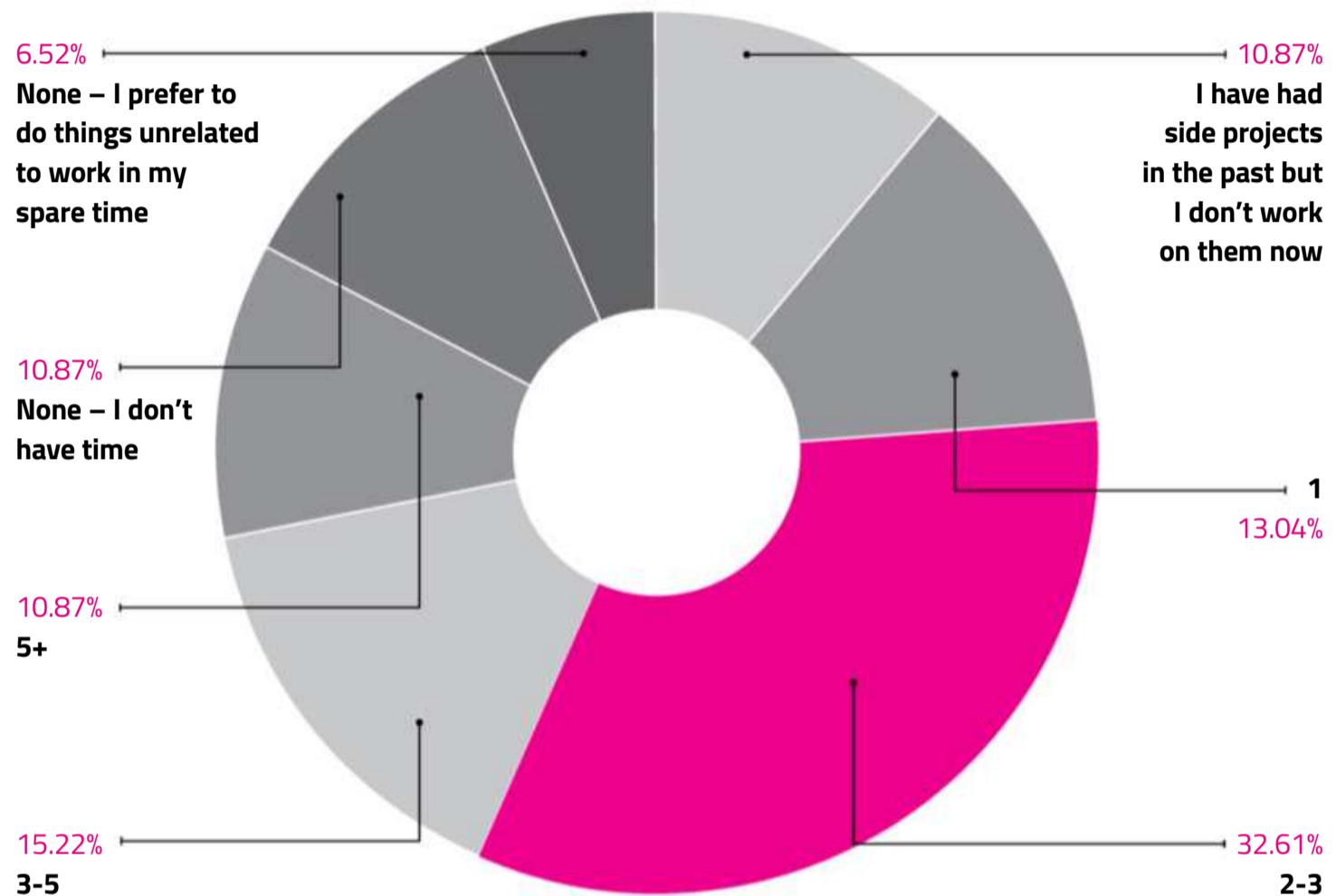
THE BULLSHIT WEB

Ever noticed how our internet connections are getting faster and faster but it still takes an age to load up a news article? This article has some interesting numbers about the useless scripts and other cruft weighing down the web and explains why AMP is problematic as a way to speed things up.

pxlnv.com/blog/bullshit-web/

*THE POLL

HOW MANY SIDE PROJECTS DO YOU HAVE?



From our timeline

What good advice do you find toughest to sell to clients?



That their personal preference on a design or feature may actually not be correct.
@simonminter



Wireframing – they just want to see the pretties not some boxes. Even when convinced they just sign it off pretty quickly without much thought only to come back after the pretties are done with substantial structural revision.
@julianknott



The importance of doing attitudinal and qualitative research in UX. A 'fetish' for numbers and behavioural user research approaches still dominates huge parts of the industry.
@TheGeekettez



The importance of continually investing in a new site after its launched – Measuring its performance, testing with users and making incremental improvements, rather than

leaving it for a few years until the next expensive redesign. It's not tough to sell but they rarely do it.
@JT3000



Budget for updates and maintenance once the project goes live. Clients don't want to hear there's extra costs – they want to spend now and forget about it.
@peterbowyer



People scroll. Had a client specify that the page must not scroll, because he hated scrolling. Told him I could provide studies where over 90% of users scroll the page. He said he wouldn't read them.
@myfirstraygun

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THIS MONTH FEATURING...

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This month a web developer's customer lets their heart rule their head when measuring margins



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WORKSPACE

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The screenshot shows the Remixmonsta website. At the top, there's a navigation bar with the logo 'remixmonsta Alpha', a search bar, and links for 'ABOUT', 'PRIVACY POLICY', and 'DONATE'. Below the header, a section says 'Choose your favorite genres, and start hunting for the best remixes' with genre filters like 'Latest 25', 'Ambient', 'Dance & EDM', 'Deep House', etc. A main list of tracks is displayed, each with a thumbnail, title, and buttons for 'Add to playlist' and 'Share'. To the right, a sidebar titled 'Your playlist' shows two tracks: 'Юлианна Карапулова - Разбитая Любовь (DJ ...)' and 'Sta Family - Многоэтажки (DJ PitkiN Rem...)', each with 'Remove' and 'Share' buttons. At the bottom, there's a purple footer bar with a play button icon, a progress bar, and a 'SIGN UP, YAAAY!' button.

REMXMONSTA

Peter Javorkai gives us a preview of his platform that allows artists to easily share their remixes

* SIDE PROJECT OF THE MONTH



PETER JAVORKAI

job: Javorkai is a digital product designer who works with everything that beeps.

w: peterjavorkai.com

t: @javpet



Tell us what Remixmonsta does.

Remixmonsta is a music platform that showcases uprising artists in several music genres using the Soundcloud API. The platform is as much an opportunity for music lovers to find something amusing, as it is for the artists to be presented to a broader audience. The list of top remix songs is automatically refreshed every three hours, which not only gives users a reason to return, but also the ammunition for a whole day of headbanging.

Why did you create it?

The reason I created it was pretty selfish. I really like this (sometimes quirky) type of electronic music and I often searched for hours on various music sites looking for interesting artists, which was neither joyful or efficient, and so I started looking for solutions. During my research I talked to around ten to 15 DJs and producers and they all highlighted the fact that without an ad budget or a record label, it can take ages for someone to be discovered (if they ever

do), which also churns a lot of the talents. In most cases, producers start out on remix competitions before trying to compose their first tracks, and that's the perfect way to stand out from the crowd early on.

What technologies were used in building it?

I kept the tech really minimal, using only HTML, CSS, jQuery and the Soundcloud API. Even though the API is really well documented, sometimes I had to reach out for answers on Stack Overflow but the community was really supportive.

How has it been received?

Since the launch of the alpha I've been receiving emails and messages from artists around the world asking how they can get on the list to be featured, so the interest is certainly there. Recent feedback suggests that people forget they are actually listening to Remixmonsta as the quality of the tracks matches some of the more sophisticated sites.

What do you think you'll do next with it?

The site will soon go through a small redesign and then the next step will be to launch the blog part, where I plan to present a new talent interview every week for the audience, and also share a weekly mix featuring the most popular beats from the week. In the longer term, the aim is to enable artists to directly upload their music to the site. ■



* HOW TO

MAKE WEBSITES GO FASTER

With more and more users browsing on mobiles and emerging markets still relying on patchy connections, it's never been more important to minimise the load a site places on users' connections. We asked the @netmag followers to tell us some of the easiest things they've done that have improved their sites' performance.

QUICK TWEAKS

@lealea's advice for an easy speed boost is simply this: "Optimise images". A number of others also gave this advice – it's a sure way to get a faster site.

You can read about techniques in the free e-book at <https://images.guide/> – it's by Addy Osmani, with input from a long list of experts.

MULTIFACETED APPROACH

"Caching, automated image compression, asset aggregation and, most importantly, putting less on the page," says @netrunnerIT.

Meanwhile: "lazy load JS, responsive images, minify JS/CSS, utilising FontFaceObserver," are @webreality_ny's techniques. @polettoweb recommends uglifying and concatenating CSS and JS with Gulp.

BIG CHANGES

@muzzlehatch_ saw an improvement by switching to GatsbyJS for "almost everything", and @Aligns got "amazing improvements" by setting up his WordPress sites on a server with @litespeedtech cache. @ArtWorked converted a site to a server side rendering build – "you can't beat that".



CHAOTIC ALIGNMENT

Exclusively for net: The latest in a series of anonymous accounts of nightmare clients

* CLIENTS FROM HELL

The following all happened in person, as I worked on the client's website at his office:

Client: This text doesn't look centred inside this box. Could you centre it?

Me: It's already centred via CSS.

Client: I don't think so. Could you move it a millimetre to the left?

Me: OK but it won't be centred.

Client: No, it will be centred.

I moved the text a millimetre to the left.

Client: Hmm, this still doesn't look centred. How hard can it be to centre it?

Me: As you said, I moved it a millimetre to the left. It was centred before.

Client: No, it wasn't centred, let me get a ruler.

The client grabbed one and then measured the gap on both sides of the text. But on one he used the end of the ruler as the starting point and on the other, he used the first line.

Client: See, one side says 4mm and the other says 5mm.

Me: Hmm, could you measure that again? But start at the line for both sides.

Client: No, it doesn't matter. It's not centred.

The client measured it again, exactly the same way he did before.

Me: You're using the ruler wrong.

Client: No, I am not. I'm right. I'm always right.

He was laughing but I don't think he was joking. At this point, we took turns using the ruler, arguing about the measurements. I showed him it was centred (it was) and he'd measure it improperly and argue it wasn't (it was).

Me: We could keep arguing but I can't do this.

Client: You're right. You can't do this. I think it's time we part ways.

Later that day I got a lengthy email firing me and telling me how I need to respect him as the boss. A few days later, I received an email from the client asking if I was getting any work done on the site.

CLIENTS FROM HELL
clientsfromhell.net

SPORTS ANALYTICS

Ivana McConnell explains how she has learned the power of narrative through reading statistical analysis of sports

* BEYOND PIXELS

 I've been an athlete for as long as I can remember. But there's a particular layer to sport that has been unexpectedly helpful to my work as a designer: advanced analytics.

For most, sports statistics are straightforward: goals, wins, points. But advanced analytics goes deeper. Technology records every action on a field or court and its output is analysed. Specialised statistics are used to fuel debates about whether or not teams are dynasties, who the real MVP is and myriad other things. We can find a player's value down to the win to their team, for example.

I became fascinated after reading 'Stephen Curry is the Revolution' on FiveThirtyEight. Using advanced stats, the piece is a deconstruction of the three-pointer, a contention that "Curry's bad shots are better than others' good shots." The story, underpinned by data, makes a counter-intuitive concept compelling. It is in the reading of these analyses that I learn how numbers provide a framework to fashion a memorable narrative.

To make a design decision, we need to gather and compare pieces of data that we might otherwise see as disparate, finding (hopefully) profound insight. But insight isn't enough – it must then be communicated and that is one of the most important things I've learned from

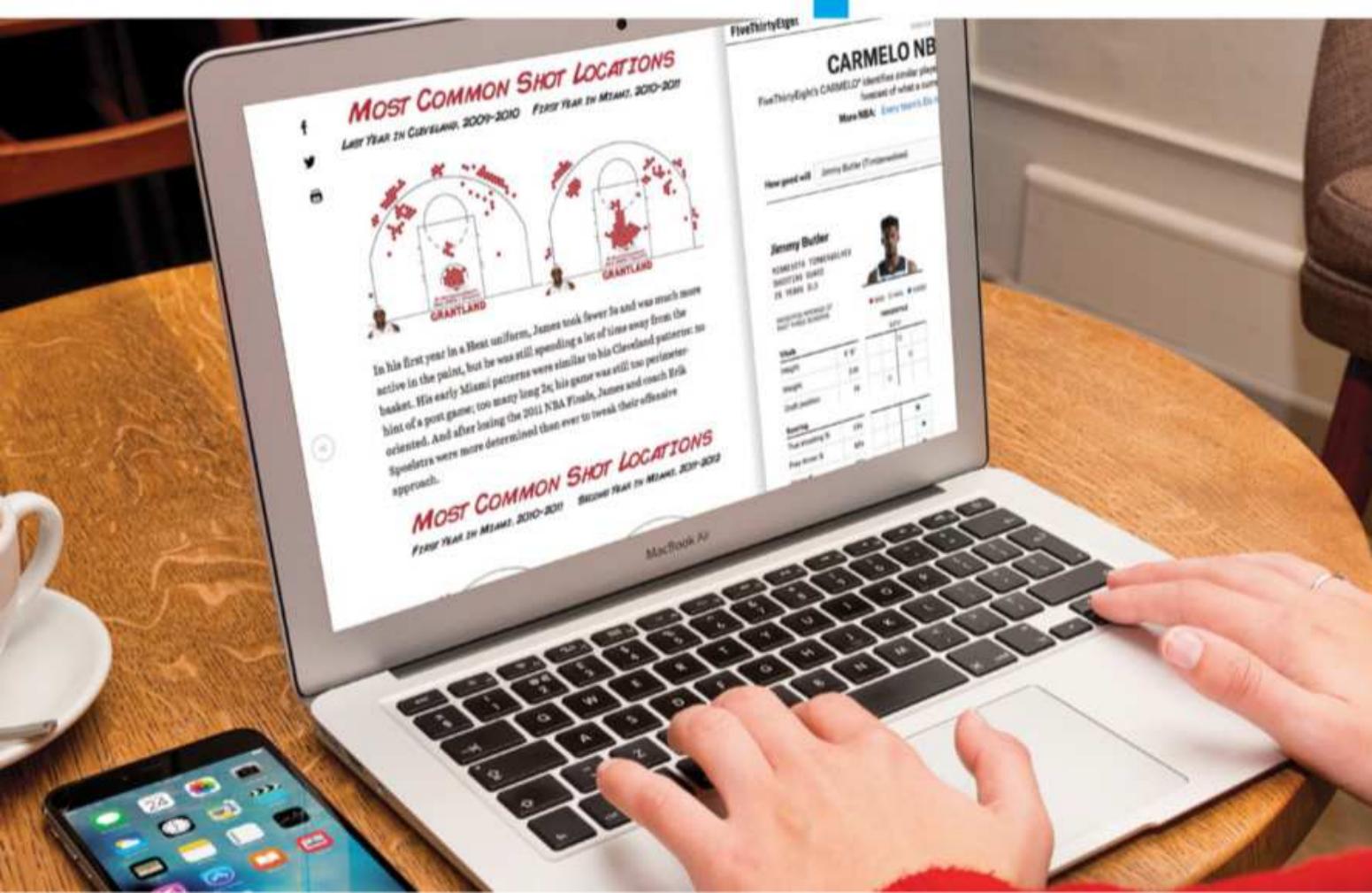
engaging in advanced analytics debates: the intersection of numbers and narrative.

In sport and design, not everything is as it seems: a high-scoring player might be taking shots away from better teammates, resulting in losses. Advanced stats tackle problems, asking questions of numbers and documenting the answers they give. The resulting story is used to articulate the insight to others. It's not just about the conclusion but about how we get there. The whole is greater than the sum of each statistic.

Uncertainty and critique, too, are important. I always want to remove all doubt in a decision but the picture is never perfect. A dataset can be used to declare Player A is brilliant, while another set can expose the same player as an overpriced fraud. And both can be correct – it just depends on what we value. This is why critique is critical and the numbers allow us to set baselines to tell our stories and communicate those values to others – in sport, design and elsewhere. ■



McConnell (@IvanaMcConnell) is a UX designer, first hooked onto the web by Geocities. She's forever trying to recapture that.



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KAREN COHEN

Engineering manager and product architect at Wix.com

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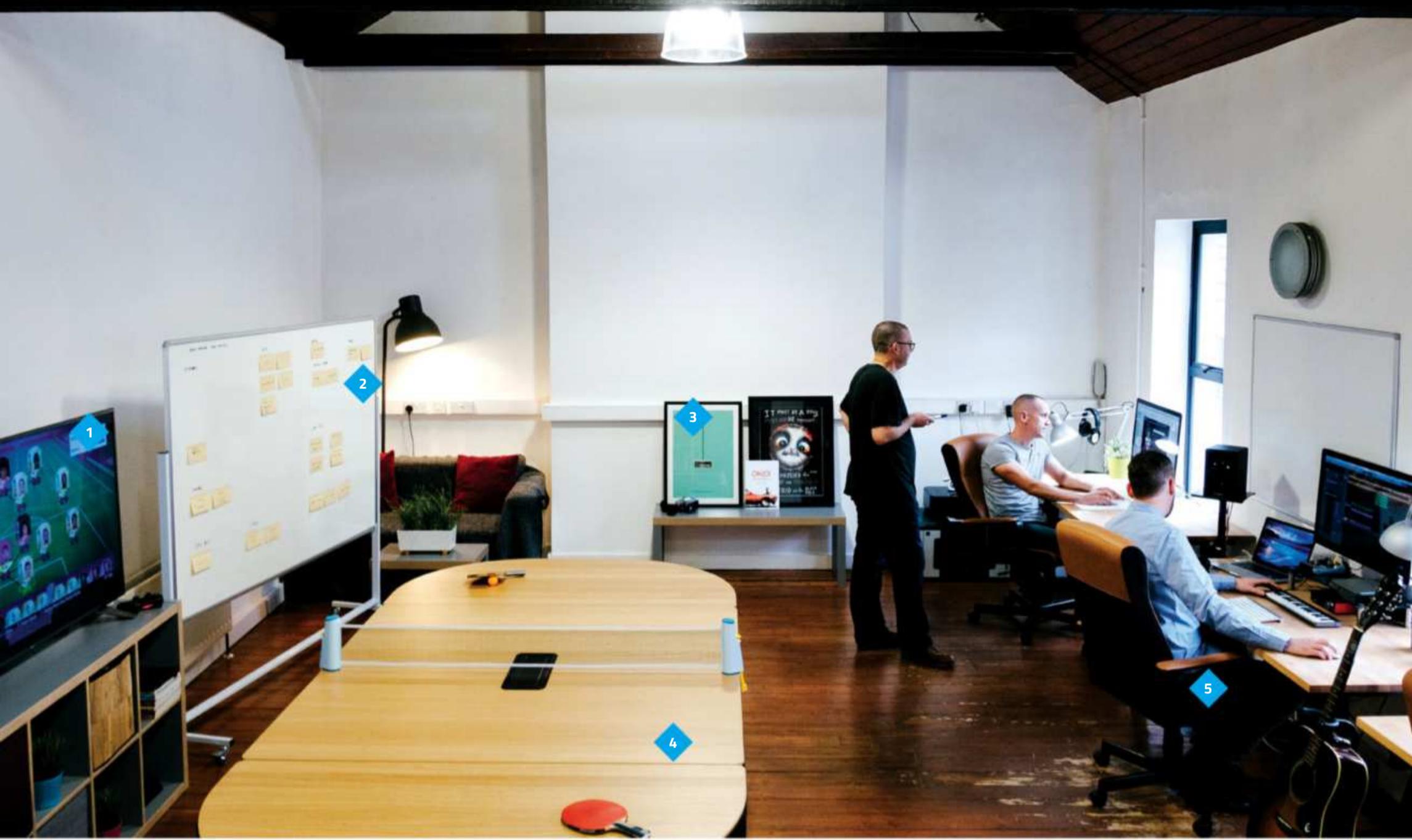
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getpocket.com



LITTLE THUNDER

Christopher Murphy takes us on a tour of Little Thunder's Belfast studio, nestled in the city's creative quarter

* WORKSPACE

A boutique experience-design business based in Belfast, Little Thunder (littlethunder.co) was founded in 2013 by designers Gaby Muldoon and Tim Potter.

Over its half a decade history, the company has grown from a two-person team to a rapidly expanding digital agency that includes designers, developers and animators. With a focus on the design of digital products, the studio counts Electronic Arts (EA), Visa and PwC as clients.

Nestled in the heart of Belfast's burgeoning 'Cathedral Quarter' creative district, Little Thunder's studio is a hotbed of activity with a steady stream of visitors. Just five minutes from Belfast School of Art – where many members of the team give their time as guest

lecturers – the studio is often a de facto tutorial space.

A large LCD screen [1] occupies pride of place in the centre of the studio. In addition to acting as a focal point for client presentations the screen is also useful for getting a feel for games, helping to inform the studio's work for Electronic Arts (EA), one of its central clients.

The team are firm believers in mapping everything out before moving onto screens. A portable whiteboard [2] is where new products are imagined and brought to life. Post-it Notes aplenty help to map out information architecture and customer journeys, reflecting the business's 'plan first, design later' approach.

[3] Chalky the Cat – the star of a successful ~£15K Kickstarter

campaign (j.mp/chalkythecat) to illustrate, design and create a children's picturebook – is never far away. The book, and its associated rewards, inform the studio's side-project work, focused around designing digital products for children.

The studio's boardroom table [4] doubles as a table tennis table and it's a measure of the relaxed studio culture that table-tennis tournaments are a regular – and noisy – occurrence! Some of the team's best creative discussions occur over hard-fought games.

With studio members including a former Kerrang! competition finalist and a former record label owner, it's no surprise to discover that sound is a big part of the studio's offering. [5] A guitar, a keyboard and a suite of audio production software are always on hand should a soundtrack ever be needed. ■

PROFILE
A digital strategist, Christopher Murphy (@fehler) works closely with Little Thunder, helping to champion a human-centred design approach.

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* CONTINUAL DEVELOPMENT

OPTIMISE A SITE'S DIGITAL PRESENCE

Sophie King outlines how you can continually improve a brand's digital presence



Every website can benefit from a program of continuous improvement but how do you know you've made it better? After all, when designing anything it can be easy for us to let our subconscious opinions creep into our designs so it is important to remember the value of data. A combination of quantitative and qualitative research should be applied to any design, by defining a hypothesis and backing up your results with research.

Steve Krug's brilliant book, *Don't Make Me Think*, suggests you should always ask the following when designing a website: is it useful, learnable, memorable, effective, efficient, desirable and enjoyable? These are the key elements that make up a digital brand.

CONTINUOUSLY IMPROVE

As technology evolves and users devices change, a design can never be considered perfect and the need for user experience

(UX) is ongoing. Websites need to be continuously reviewed to assess how effective they are – for example, how users are interacting with them, what this tells us about their goals and why there may be few or no conversions. Improving your platform can help you stay ahead of your competitors.

GATHERING DATA

A key first step to optimising your digital brand is collecting data. You need enough data to know how users are interacting with your website. Luckily, there are a lot of great online tools that can help you.

HotJar can help you understand exactly how users interact with your website by creating heatmaps, recordings, surveys, conversion funnels and much more. The ability to watch real people use your website gives important insights into its different elements. Be warned, you may see users interacting with it in a different way to how it was first designed.

You can combine this data with Google Analytics for more in-depth insights. It can help you see where users are leaving the site, what the bounce rate is and an endless list of more options.

Gathering anonymous data is great, but you should never overlook the value of talking to real people. Conducting usability testing provides you with insights not available online. You can follow up research found from online tools and ask why people don't perform a certain interaction, as well as test assumptions collected from the data. From asking questions you can gain an understanding of what is stopping you from achieving your business goals.

TESTING

Once you've gathered data and identified user pain points, you need to determine the most effective solution by testing.

There are several methods you can use to see which of your solutions has the best results. A/B testing compares the original website against one variation or you can run a test comparing the original against multiple variations. These two types of tests will help you identify which is the most effective optimisation.



Optimizely is a testing platform that allows you to run and manage tests on websites without development effort to change the source code. Instead, you can change components or add new HTML and JavaScript directly through the platform and it will track the results. You can even vary the size of the audience participating, which is handy for tests that could have a negative impact.

Continually running small tests on real users enables you to make almost unnoticeable changes to your website that can add up in a big way over time. It also helps reduce development overhead that can be involved in trialling an idea that might end up being unsuccessful.

REVISING UI

Tests that have shown a positive result should then be passed onto development and implemented on your website.

These will need to be implemented as soon as possible. For example, if a test proves you can generate 20% more sales then you don't want to wait to make the change. At DAM Digital, the results of

tests are picked up as development tasks and tracked to record their impact after they go live. In this way you can see if the results of the original test still apply.

CONCLUSION

With so many online data tracking tools available, there's no excuse for not knowing your users. It's easy to collect and act on data and make small changes that achieve big results. For a brand to have a great digital presence it needs to be memorable and users need to have a good experience as this will lead on to positive reviews, feedback and, hopefully, more users visiting your website.

To continually optimise your brand's digital presence, you need to listen to your users, gather data and run tests that prove you have made a more successful experience, whether that's according to sales, service or whatever it is you judge the success of your website by. ■

PROFILE *
King is a UX researcher at DAM Digital, a London-based digital agency that's designed websites for brands such as Cosmos, Marie Curie and Crisis.



★ EMERGING TECH

RESTORING TRUST IN EMERGING TECH

Illustration by Kym Winters

Peter Bähr explains the need to apply the principles of the open web to restore confidence in IoT and AI

In the early days of the internet, the web was largely open and decentralised. But in the roughly 25 years since, the consumer internet has changed: today, the web is more consolidated and centralised in its structures than ever before. Network effects tend to favour a winner-takes-all dynamic and so we have, by and large, one really big search engine, one really big social network and one really big ecommerce site.

But consolidation isn't the only thing that has changed. Over time, security and privacy safeguards have been added, like end-to-end encryption for web traffic (although less so for email). These safeguards have been tacked onto existing structures and amended to standards. They hadn't been part of the internet's original design; they simply weren't necessary in the web's original, academically focused ecosystem.

EMERGING TECH IS ALL AROUND US
For emerging tech today, especially the internet of things (IoT) and artificial intelligence (AI), it's very different. We are now creating a data layer that extends to, and shapes, our physical environments.

In this context, openness and safeguards for security and privacy are essential. We now casually embed internet-connected microphones and cameras in living rooms and bedrooms. This different context requires different thinking. We need to be able to trust the technology we live with.

To think this through, consider three different contexts: the smart home, the smart city and algorithmic decision-making (AKA artificial intelligence or AI).

Let's first look at IoT in the smart home. Voice assistants have microphones that by definition are always listening (to a degree) or at the very least could be. In political science, the potential or threat of abuse is considered just about as bad as the real thing because it can lead to chilling effects (en.wikipedia.org/wiki/Chilling_effect) – if someone feels like they might be spied on, they change their behaviour. How is this relevant to how we design connected products? As we add more and more microphones (and other sensors) to our physical environment, we multiply the potential for abuse. If we want folks to use connected products, we need to ensure they know they can trust them. Otherwise the privacy of our homes is a thing of the past.

Now zoom out of the home and onto the city: when smart-city technology with all its sensors and algorithms is rolled out across the urban fabric, it applies to everyone. Nobody can opt out of public space. So this had better work – and work well – for everyone. Instead of efficiency, smart cities should promote openness, be transparent, and allow for well-intentioned 'hacking' (in the sense of modifying for unexpected needs).

Finally, the third frontier: algorithmic decision-making or AI. Algorithms make decisions that impact all areas of our lives, from managing resource ►

- ▶ allocation (netm.ag/2MvoU6J) to predictive policing (netm.ag/2CXDTXU). And so we need to make sure that we understand the algorithms – effectively making them more open – in order to guarantee appropriate mechanisms for governance, accountability and recourse. Governments need to understand that algorithmic decision-making directly affects people's lives (netm.ag/2QuCxGD).

People are wary of emerging technologies and you can't blame them: large-scale data-driven systems with little openness, oversight, accountability and transparency – in other words, systems that aren't built within an ethical, healthy framework – are likely to cause massive damages and unintended consequences. So let's do better.

TECH NEEDS TO BE TRUSTWORTHY

To be clear, this isn't an exercise in making consumers trust emerging technologies more – it's an exercise in making emerging technologies more trustworthy. Today's consumers don't have good ways to make informed decisions about, say, a connected device's

and the debates on how to thwart fake news are just two current examples of the industry trying to get their house in order.

Consumers benefit from all of this but they still haven't had good tools to evaluate which products or companies deserve their trust. This, too, can change. As an example, take a concrete project we have initiated this year: the Trustable Tech Mark, a consumer trust mark for connected devices. Developed by the ThingsCon network with support from Mozilla, the Trustable Tech Mark will soon start offering an assessment framework to determine which connected devices are trustworthy. It looks at five dimensions: openness, privacy & data practices, security, transparency and stability.

The Trustable Tech Mark aims not just to weed out the really inferior products at the bottom of the pile but also to highlight the ones that are truly trustworthy and employing – or establishing – best practices for user rights. For example, imagine an intelligent smart-home assistant that does all the data processing on the device without sending sensitive data to the cloud. Or smart lighting that avoids privacy risks by not using

“As we add more sensors to our physical environment, we multiply the potential for abuse. If we want folks to use connected products, we need to ensure they can trust them”

trustworthiness. In his book *Radical Technologies*, (netm.ag/2xanARZ) Adam Greenfield sums up the dilemma: “Let's be clear: none of our instincts will guide us in our approach to the next normal.” Gut feeling won't cut it. We need better mechanisms, design practices and tools.

Luckily, there are promising approaches to tackle this. As an industry, we must follow through with best practices in all things data-related. As consumers, we need to demand better from industry. And as citizens we need policy makers to get smart about regulation. Fortunately, after the Snowden revelations shook consumer trust in connected devices like never before, things have been looking up.

Policy makers are slowly starting to get ahead of technology, rather than play catch-up. The European General Data Protection Regulation (GDPR) has been the first major regulatory initiative in this space that tries to protect consumer data at scale. (If and how the GDPR will play out over time remains to be seen.) California followed up with the California Consumer Privacy Act, which offers GDPR-like provisions.

In the tech industry, there is a growing awareness of the need to design emerging tech to be better and more open – digital wellbeing initiatives by Apple and Google

microphones in its light bulbs. Or a company that ensures that in case of bankruptcy or an acquisition, user data remains safe and the code is released as open source, so the product will work even after the company is gone.

The Trustable Tech Mark is only one of what we hope will be many initiatives to empower consumers to make better-informed decisions and make emerging tech more open. If industry, policy makers and consumers all can agree that transparency, decentralisation, accountability and openness are conditions that enable trust in technology, then we can look forward to an exciting – rather than scary – decade of emerging technology. As designers, developers, and technologists, we have an outsized role to play in this journey but we can – and should – also demand better as consumers. Industry and policy makers will follow this pressure. In the end, all parties benefit from better, more trustworthy emerging tech. ■



PROFILE
★

Peter Bihr (@peterbihr) explores the impact of emerging technologies. He is a Mozilla Fellow, founder and managing director of The Waving Cat and co-founder of ThingsCon.

PUT A PAUSE IN YOUR DAY

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INFO

job: Founder and CEO
of Customer Carewords

w: customercarewords.com
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Gerry McGovern

Words by Oliver Lindberg

Designing intuitive products is more important than ever. We talk to customer experience consultant Gerry McGovern about the top tasks methodology he has created to identify, measure and improve what matters most to an organisation's customers

“Anybody can code and wireframe but being able to put yourself into other people’s shoes and really understand them is the most valuable skill any digital team can have,” exclaims customer experience consultant Gerry McGovern (gerrymcgovern.com), founder and CEO of Customer Carewords. “And it’s so rare to find: there are so many UX people who don’t interact with their customers – what the hell is your purpose? They know all about tools and methods but the percentage of actual time that most digital people spend with customers – getting to know and understand them – is tiny. No wonder they create crap products that don’t fit!”

It’s for this reason that McGovern, who’s been in the business since 1994, isn’t a fan of personas anymore. “The theory is great but the practice has been very poor from what I’ve seen over the years. I used to do workshops on personas and I went to a lot of expense printing out 40 to 60 lovely A4 colour pictures of people. At a certain point I’d ask the attendees to select a picture of somebody that reflected the persona they’d designed. But the beautiful people always went first! They always selected the pretty ones and never the more normal ones!”

It then struck McGovern that the companies that really understood their customers didn’t need personas because they were constantly interacting with them. “Who cares if someone is 32 and wears such-and-

such shoes? It’s all trivia and most of the time it’s got nothing to do with actually making the website better. I’ve had so many bad experiences that often when I hear an organisation has done personas, it’s almost a sign of immaturity. Sure, some of that stuff is useful but the quicker we humanise things, the better.”

McGovern has consulted with clients such as Microsoft, Dropbox and the BBC as well as governments in the US, UK, EU, the Netherlands and elsewhere. Over the course of 15 years he has developed and refined a research methodology that helps large organisations improve the customer experience through the identification, measuring and optimising of top tasks, the tasks that matter most to their customers. It’s been used in more than 30 countries and languages and is especially suited for complex organisations that need to get to the essence of their product or service. “It’s about identifying what’s absolutely critical”, McGovern explains, who’s just written a how-to guide on top tasks, his seventh book, and will run a workshop on his method at UX Brighton on 1 November. “What’s the essence of buying a car or choosing a university? It’s really about cutting to the absolute chase of a particular problem but also about identifying what’s *not* the essence, what I call the tiny tasks. Often the digital team spends most of its time on these because they reflect the ego of the

organisation, the desire to have puff pieces and all sorts of propaganda that often disrupt the journey of the top tasks.”

The methodology came about almost by accident. McGovern was running workshops on information architecture design that included a card-sorting exercise. He noticed, however, that people didn’t really want to sort the 150 cards into groups; they wanted to decide which were the most important straight away. So one time McGovern didn’t bring in the cards and noticed he got the same results a lot faster by just asking people to look at a sheet and quickly choose from 50 to 100 possible tasks that customers may want to complete. “When people look at the survey, they think this can’t work”, McGovern laughs. “Initially, I never showed it to a company. They’d go crazy but there’s a method to the madness. You’re forcing people to really choose what’s essential to them. For most people, a gut instinct type of behaviour kicks in and, every time we do it, we get a small set of stuff that really jumps out from the voting.”

McGovern recommends organisations delete up to 90 per cent of their content. When he started working with the US Department of Health, they had 200,000 web pages. They deleted 150,000 of them and nobody noticed. Norwegian telecommunications company Telenor deleted 80 to 90 per cent of their content and their sales and customer satisfaction went up significantly, while support calls went down 25 per cent. “Most of what we produce is really low-level stuff, which over time begins to clutter the arteries of the top tasks’ journeys”, McGovern sighs.

Fundamentally McGovern believes that this is down to the way we track success. “The way we manage and measure in modern organisations is creating far more problems than it is solving”, he says. “In a digital environment, there is endless space and capacity to produce, so the metrics are of production. At Google, people get promoted for launching a new feature. That’s how you measure you’re smart: you’ve created something. You don’t get promoted because you improved something somebody else created.” Instead he believes that our focus should be on how something is being consumed – and whether it is being consumed at all. And if it isn’t, pruning





things back is essential to prevent digital environments becoming turgid and overgrown. "When they're fresh, they're really useful but leave them a few years..." he says. "I used to love Survey Monkey. But it's become harder to use, not easier."

When McGovern consulted at Cisco, they identified a top task as 'downloaded software'. At the beginning of the project, it took 15 steps and 300 seconds to download a typical piece of firmware – three years later it was down to four steps and 40 seconds. The shift occurred when they stopped measuring the software team simply based on producing firmware that worked. Of course, it was still essential that the firmware was well-tested, but they also measured the team on the ability of a network engineer to find and download the latest version of the firmware. "Once you start measuring the outcome, people will want to improve things," McGovern suggests. "We need far more energy focused on

continuously improving the critical tasks. If we also measure the consumption, we'll transform the culture."

Closely linked to the top tasks identification is the customer architecture

"The percentage of actual time most digital people spend with their customers – getting to know and understand them – is tiny"

and the design of an effective and intuitive navigation. Yet it usually gets neglected. "It amazes me that navigation is the thing organisations invest in least," McGovern shakes his head. "It's actually the single most critical factor. If there's one reason a

site might fail, it's because it has confusing menus and links."

Over the years McGovern has tested thousands of people and there are certain things that always trip them up in a navigation: one example he gives is that nobody ever understands what 'solutions' means. The reason a site navigation often features weird names is because they aren't really designed to help you find what you're looking for; they simply reflect the organisational structure. "These terms are designed to give prestige and power to various units," McGovern points out. "If you're a link on the top level of the structure, it shows your significance within the organisation."

McGovern recalls a project he worked on years ago centred around the intranet of a very large technology manufacturing company. "The service division was growing really fast and a lot of the revenue and profit was now going towards services," he recalls. ►



► As this had sparked a huge amount of jealousy between the product and the service divisions, they had demanded separate sections in the navigation. "When we started testing and identified the top tasks, however, we found that there was a total confusion among the staff about what was a product and what was a service," McGovern says. "In the next round of the iteration, the section was called 'products and services'."

McGovern has identified seven principles of effective navigations and a key one is momentum. You should always help people maintain their momentum in order to get to their destination as quickly as possible, as the essential purpose of navigation is to help people move forward. "If somebody clicks on 'musical instruments' don't second-guess them and suggest the latest films," McGovern warns. "Help them move on their journey. If you go into 'musical instruments' on Amazon, they're not trying to sell you books anymore, they're stripping away all

the navigation and the search has become customised to 'musical instruments'. If you really want to simplify and create the simplest and easiest-to-use navigation, you've got to trust people that they only care about what they've chosen."

Unfortunately, organisations often want to control, not help you on the journey. "If I'm driving to Dublin from Cork, the people who are designing the journey will try to get me to go somewhere completely different. If they were Google Maps, they'd give me directions and all of a sudden I'll have arrived at McDonald's. But I don't want to go to McDonald's, I'm not hungry! Oh, but we have a special deal on Big Macs. That's the way a lot of companies think. They force you if at all possible because that's a conversion. You wanted to go to Dublin but somehow we forced you to go to Belfast, where we have a really good hotel deal. That's not going to work in this age – people are much more sceptical and in control. They know what

they want. They don't want to book a flight to London and end up buying golf clubs!"

McGovern points out that the companies that are successful today, like Amazon, Apple and Facebook, are truly obsessed with their customers and constantly observing their behaviour. By way of an example he points to a feature Google Maps tested last year. It showed users how many calories they could burn if they walked to their destination and to put it into perspective it converted them into an equivalent number of mini cupcakes. "Google has a massive feedback engine, though, so within minutes people were complaining the feature was 'fat shaming' them and that they couldn't turn it off. It got a ton of negative feedback, which took an hour to document and within three hours it was removed. Most organisations would leave it up for six months!" ■

Top Tasks – How to Identify, Measure and Improve Customer Top Tasks is out now.



"The way we manage and measure in modern organisations is creating far more problems than it is solving"



★ THE DESIGN OF BUSINESS

TASKS

Christopher Murphy tackles the tricky topic of task management in an increasingly busy age



job: Writer, designer and educator
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t: @fehler

As knowledge workers toiling at the digital coalface, we regularly find ourselves managing multiple tasks at once. All too often those tasks add up, rendering it hard to focus and get things done.

Establishing a task management – or to-do – system can make all the difference. Your system might be analogue or digital but, regardless, it's important to have one.

One approach on the analogue side of the equation is the Bullet Journal (bulletjournal.com), which bills itself as: "The analogue system for the digital age." Ryder Carroll, creator of the Bullet Journal method, even has a book offering the tantalising prospect that you can "track the past, order the present and design the future".

The Bullet Journal method is tailored around a system of bespoke bullets: points (‘.’) for to-dos; circles (‘o’) for events; dashes (‘–’) for notes; and so on. It might sound complicated but, like any system, it gets easier with practice. If you've been tracking to-dos via a notebook, it's worth spending a little time exploring the methodology, which really can enhance your existing approach.

On the digital side of the equation, tools like Things (culturedcode.com) offer a seamless, software-driven approach to the task of tackling tasks. A task

manager for Apple devices, Things is designed to help you manage and achieve your goals, so you can organise all your to-dos in one place.

A beautifully designed suite of applications that won an Apple Design Award in 2017, Things makes tracking tasks enjoyable thanks to its delightful interactions. Even if you're not bought in to Apple's operating systems, Things is still worth exploring for its elegant user-experience design.

THE MYTH OF MULTITASKING

Mapping out your multiple tasks is, of course, only half of the equation; the other is completing them, which is where focused single-tasking comes in.

Doubtless everyone's heard of multitasking: the ability to undertake multiple tasks in tandem. The trouble is multitasking is a myth. Neuroscience has not only established that it is more stressful than undertaking tasks individually, it's also less productive and technically not even possible.

As Cynthia Kubu and Andre Machado, two noted neuroscientists, explain in 'Why Multitasking Is Bad for You' (bit.ly/multitaskingisbad): "One study found that just 2.5% of people are able to multitask effectively... repeatedly switching back and forth from project to project, like a hummingbird darting from flower to flower, can impair our ability to function at our finest".

Kubu and Machado also note that "isolating out of the multitasking world" brings many benefits, stressing that we "unequivocally perform best, one thing at a time".

What we think of as multitasking is, in fact, just the brain switching rapidly between tasks and doing so inefficiently. A far better approach is to sidestep multitasking and work your way through your to-do list a single task at a time.

Put together the two halves of the equation – a task management system, be it analogue, digital (or both); and a single-tasking mindset – and you will have a recipe for productivity success. To-do list, ticked off! ■

An award-winning task manager for Apple devices, Things helps you manage the contents of your to-do list and tick them off, one by one.



* Q&A

DAN MALL

The creative director, author and speaker explains why design systems are so important



job: Founder and executive director, SuperFriendly; CEO, SuperBooked
w: superfriendly
t: @danmall

You're well known in the web design community for your books, talks and work with big clients. But can you introduce yourself to those who might not know you?

DM: Hi, I'm Dan, a creative director and advisor from Philly. I'm founder and director of SuperFriendly, a design collaborative that brings creative direction and design to some the world's most important and interesting organisations. I'm also the co-founder and CEO of SuperBooked, a service that helps you find work with a little help from your friends.

You've just launched a course about design systems. What can you tell us about that?

DM: It's a video-based course on Skillshare about how to create and work with design systems and get your colleagues on board. A design system is a tool to make you more efficient and effective in your work. It should help you move faster, work better with other people and, honestly, just have more fun.

One thing I see designers and developers doing over and over again is reinventing the wheel. How many times do you want to design that button, form or the really dry parts of a project? A design system should take care of that stuff. So, over this course, I break down my principles and processes of design

systems, so you can spend less time doing the boring and monotonous stuff and more time having fun.

Why do you think everyone is talking about design systems right now?

DM: When I was learning web design 20 years ago, most of my clients needed help making their first website. Now, I tend to work with organisations managing lots of digital products like websites and apps. Because of this volume, a lot of them are finding it hard to create consistency and efficiency. At this scale, it becomes very apparent how much money and time is being wasted needlessly reinventing the wheel. A design system is a great tool to help solve this problem.

Design systems are trendy at the moment, so is there a danger people will use them for the wrong reasons and for the wrong purposes?

DM: Of course! With great power comes great responsibility and having a design system is a lot of power. For example, one of the outcomes of having a design system is to free up designers from designing the same thing over and over and instead spend time on more important and interesting things. However, people could use a design system to put their designers out of a job instead. That's bad news for everyone!

Your course is hosted on Skillshare, a platform that lets people create instructional videos and charge people a subscription to access them.

What attracted you to this method of teaching?

DM: I initially learned how to be a web designer largely through a combination of school and reading books and blog posts. But what I'm finding in teaching a younger generation of designers and developers is that they're less interested in books and articles than they are in video tutorials. I haven't had good luck in finding a lot of great video resources, so I figured I could have a hand in creating some myself.

What was it like filming the course? Is it really as easy as you make it look?

DM: Haha, it's definitely not as easy as it looks! There's lots of prep and editing and back and forth that goes into making something even short. That said, the Skillshare team made it super easy for me to execute. Once we had the main content and structure together, the filming part was pretty streamlined because they made it really straightforward in what we needed to capture.

You can sign up to 'Digital Design: Creating Design Systems for Easier, Better & Faster Design' at skl.sh/superfriendly

★ RELAXATION TIPS

HOW HARD IS IT TO WORK ON PUBLIC TRANSPORT?

Can you actually get anything done on the bus, train or plane?
Seven designers and developers share their experiences



**ROB
FENECH**

Freelance web designer
robfenech.co.uk

 I rarely work whilst travelling. I'm usually connected to so many CDNs that not having stable and consistent Wi-Fi can really mess with my workflow. Also, being a primarily front-end developer, I like to have a few screens at any one time so I can quickly see what things look like on various devices; it's almost impossible for me to get into a good groove when I'm moving between desktop views on my Macbook Pro. For those reasons, I find it particularly difficult to work when I'm on the move.



**ANTONIUS MARIE
HOGEBRANDT**

Developer, Angry Creative
angrycreative.se

 It depends a lot on how I'm travelling. I prefer to go by train, since they're more comfortable and roomier than both buses and cars (and cheaper and more accessible than planes). The key things I need for working are a table and good Wi-Fi, either via the train's own service or via my phone. Most of my work involves using a virtual machine on my laptop, so while I still need some way to connect to the various services at work, I can work well anywhere.



**JOHN
TAYLOR**

**Freelance
digital designer**
johntayloronline.co.uk

 I often work in Manchester and it's impossible to work on public transport whilst travelling to and from the city centre during rush hour, although it can lend itself to doing research like reading, listening to podcasts and watching videos. On quieter journeys, I sometimes do admin work like correspondence, bookkeeping and invoicing but this is rare. I can't imagine trying to do any serious design or dev work whilst travelling, unless it was something simple like an amendment or minor update. There are too many distractions and the problems caused by overcrowding are not conducive to an effective working environment.



INAYAILI DE LEÓN PERSSON

Lead web designer, Canonical

yaili.com

 I have RSI so I can't (or shouldn't!) do laptop-based work on public transport. Because of that, I use the time I spend travelling listening to podcasts and articles. I follow lots of both work and non-work-related podcasts and I tend to listen to the former while commuting and on work trips. I also use Instapaper's text-to-speech feature on my iPhone so I don't hurt my neck reading on my phone. It's made me appreciate how important it is to have well-written semantic markup when creating content online!



MICHAEL VESTERGAARD

Creative developer and interaction designer

iliketoplay.dk

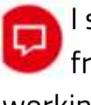
 I always feel great when I get work done on the train or at the airport because it's like my time wasn't wasted. But it can be a challenge. I normally plan ahead specific animations, prototypes or code snippets I need for new or ongoing projects. These might be micro interactions, text and image transitions or even drone formations, such as our most recent launch for Verity Studios. This kind of work is easier to pick up after a distraction or a longer break and distractions such as noise, slow Wi-Fi, small screen and so on aren't such a big deal.



BEN READ

Web developer, Zopa

deliciousreverie.co.uk

 I sometimes work during my 90-minute commute from Hertfordshire to London Bridge. I'm currently working on a project that ties in many different services to one single static site using Gatsby.js. I carry a backup battery pack and typically use data tethering from my phone but it's tricky when you're pulling data from an API and suddenly the train goes into a tunnel. I've run out of data twice this month because I forgot to disconnect the tether, then later ran 'npm install'. When you've got over 300 dependencies to download that can hurt your allowance. I should probably invest in an unlimited data plan.



SALLY LAIT

Digital transformation consultant

sallylait.com

 It's about tailoring your work to your situation. If I know I'm going to have a patchy connection, I'll save up writing tasks, use it as distraction-free time to read or learn something new. It's important to set yourself up right and download what you need in advance. Also embrace the change of scenery; being in different situations can work wonders and give you a bit more energy. Final tip: make sure it's all optional. It's very stressful to *have* to work and not be able to but nice to have it as an option.

RESOURCES

5 TIPS FOR ACTUALLY GETTING WORK DONE WHILE TRAVELLING

netm.ag/2oB0j5a

 Sara McCord used to take regular 10-day business trips and realised that if you squander your travel day, you'll arrive with hours of work to make up. Here she offers five tips for optimising productivity on a travel day.

36 COMMUTING APPS TO MAKE YOUR TRIP TO WORK MORE PRODUCTIVE

netm.ag/2Py7l8d

 It's easy to think of commuting as a waste of time. But there are some good apps to help you make better use of those lost hours. Lindsay Kolowich rounds up 36 of the best.

TESTING SATELLITE BROADBAND ON A BRITISH AIRWAYS FLIGHT

netm.ag/2wBZej7

 Many airlines are finally upgrading their on-board connectivity. But can you actually trust it enough to get some serious work done? Mark Jackson puts it through its paces in this technically detailed article.



*UX

STOP HATE-FORKING PROJECTS YOU LOVE

Why Adam Innes believes forking is the highest form of flattery in the world of open-source software

The open-source philosophy lets anyone take a project in a new direction by changing the original to create something unique. That philosophy is the reason we have projects like Firefox, a project originally forked from the Mozilla Application Suite. In Firefox's case, the developers felt the software was too bloated, so they used the original codebase to create a more streamlined browsing experience. As a result, Firefox has become one of the most used browsers in the world. Forking a project is a sacred and important function of the open-source model, which is why it's important to know when to do it right.

When it comes to proper forking etiquette, there are best practices in regards to publishing forks. To be clear, fork privately any way you want. Experimenting with new

features and code is part of the fun of programming. Even though guiding principles of open source ensure developers have the right to publish a fork, it doesn't mean that is always the correct choice. Forking to make a small insignificant change or to add a single feature without properly attempting to participate in and contribute to the open source community is bad form.

The original project maintainers have put their code out there because they believe in it and they know that other people may have ideas to improve on what they've made. To them, the project is probably something they're passionate about. Before bastardising their hard work and effort, one option is to submit a feature request. Open source projects typically have a system in place to accept feedback and code, so we recommend using it. If you've already coded the change,

submit the new code in a pull request. This approach helps ensure that developers not publish a fork and just walk away.

Submitting a pull request in lieu of a fork is especially important if you're improving the security of the code. Open Source software relies on the 'many eyes' approach to security, meaning the more people looking through the code base, the better. Don't hide your security tweak in an unseen and forgotten fork. Instead push it with pride and your efforts will likely be much appreciated by the maintainers plus you'll be making the code more secure for all those who use it.

If you're passionate about the project and have a vision for the future, become an active contributor. This is also a great way to hone your development skills. Participating in the project gives the maintainers an opportunity to make the feature or change available to everyone who uses that project by incorporating it into the original. Not only does this please users through the thoughtful improvement of the overall user experience, the practice of joining a project can help introduce you to a world of coding opportunities. When you build relationships with fellow programmers, the resulting sense of community uplifts everyone.

If you're passionate about the project and have a vision for the future, become an active contributor. Sometimes you will find that the project has been abandoned and is no longer actively maintained. In this case, you should reach out to the maintainer and ask to take it over, which would afford you the option of building on the project framework while taking it in a new direction. A good example of this is when Jeff Atwood, the co-founder of StackOverflow, publicly asked to take over the Markdown project from John Gruber or to have Gruber participate in a new version. Receiving no response, he created CommonMark. CommonMark was forked with the intent to create a new, better version of the original. Atwood attempted to participate in the original project and reached out to the original maintainer. That's how you fork. ■

PROFILE
*

Adam Innes is a Senior Developer at 50,000feet, a design-tech agency in Chicago, USA. He has over 10 years' experience developing web applications and has been known to fork.



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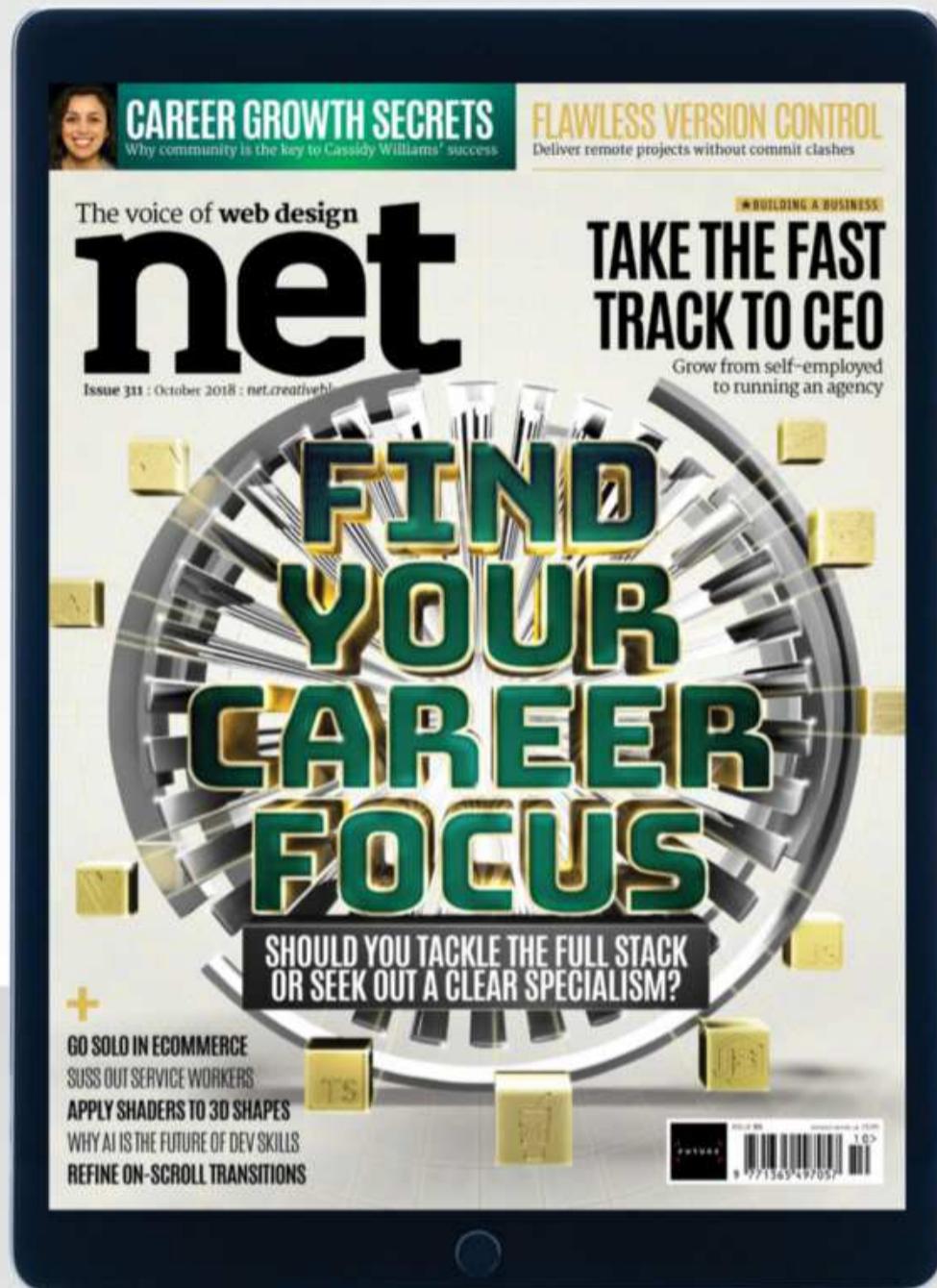
†UNFAO, Global Forest Resources Assessment 2005-2015.

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Solve your programming puzzle with 25 practical JavaScript tools, perfect your prototypes and become a Vue.js virtuoso



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Explore CSS animation with Animista.net's creators. Code custom WebGL effects, prototype with Origami and top PWA tips



#303 MAR 2018

A pro guide to all the best tools in web and UI design, 10 expert React.js tips, the 5 best code editors and Blockchain explained



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50 amazing dev tools for 2018, plus prototyping at Netflix and a free, bumper 20-page design trends supplement



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GALLERY

Sensational design and superb development

MARK COTTON



Cotton is lead front-end developer and project manager at Absolute Design. He specialises in web-based applications and Magento ecommerce development.

t: @marktcotton

ARTISTS WEB

SHAAN ATARI

AWARDS
Awwwards, CSSDesignAwards, Mobile Site of the Week, Nominated for E-Commerce Site of the Year

ROLE
Art Direction, UI/UX, E-Commerce Development

PROJECT
A London based fashion design house, showcasing their unique range of classic signature bracelets, card holders and accessories for a global market, a sense of the past reinvented with the spirit of now.

[LAUNCH WEBSITE](#)

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* PROGRESSIVE WEB APP (PWA), WEBGL, VUE.JS

ARTISTS WEB

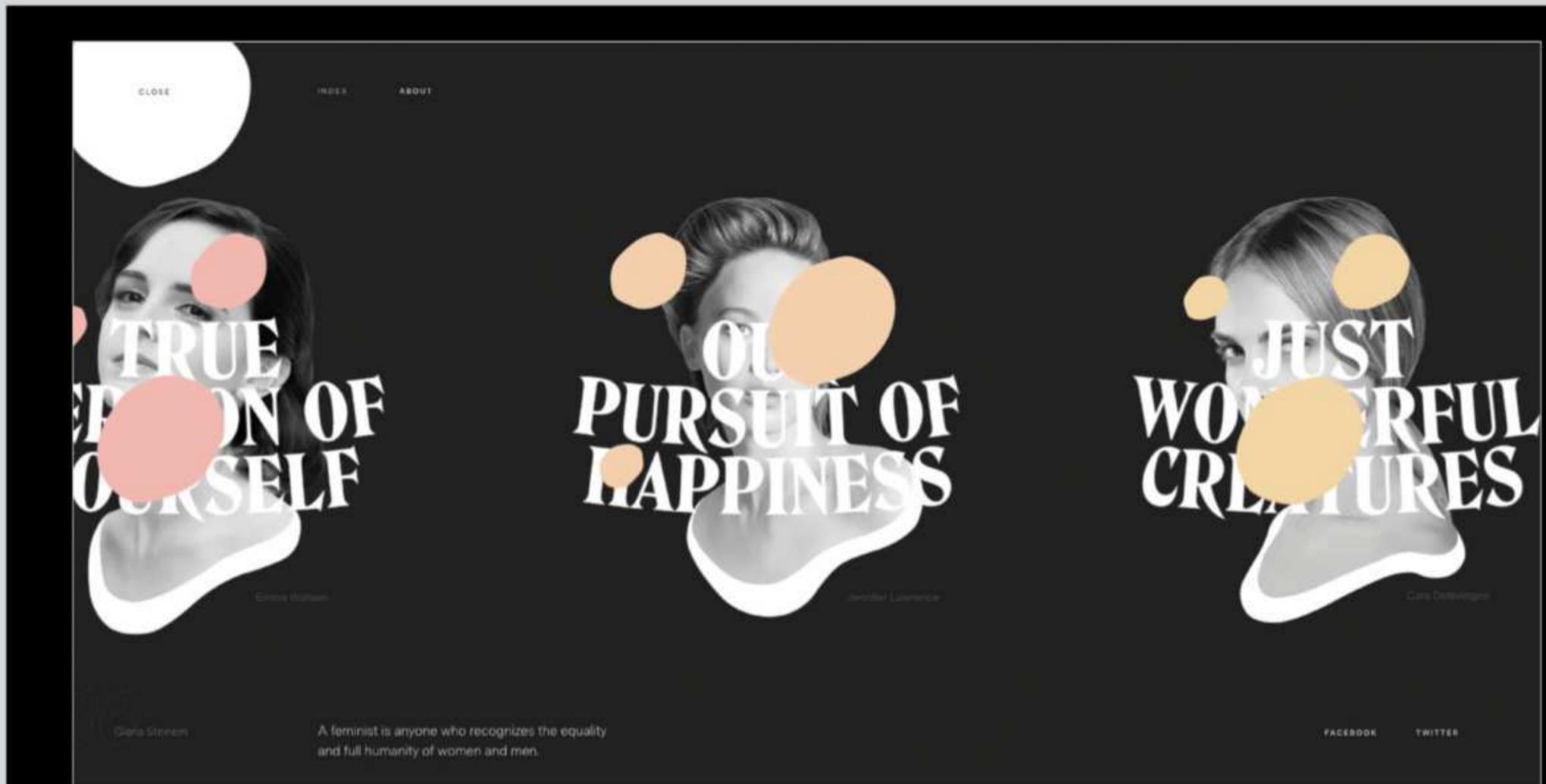
artistsweb.com

The creative digital agency Artists Web present its online portfolio as an interactive experience. Its dynamic, modern approach utilises the latest technologies to create a solution that is impressive on a broad range of devices. With progressive web app (PWA) provisions in place, including service workers, the user is proactively prompted by the browser to 'Add to homescreen' when visiting the website on recent mobile versions of Chrome.

Artists Web has been built on Vue.js and utilises Webpack, with GSAP and WebGL being key factors in its seamless transitions. The portfolio utilises mouse and touch gestures throughout to aid a unique navigation. A combination of simple gestures have been implemented to give an impressive custom

feel, which is seamless when transitioning between areas. The use of mouse and touch gestures is present again to trigger interactions with the surrounds when hovering over elements of the page. Other interactions – including the ability to contact via audio clip – add to the immersive feel of the portfolio.

Videos have been created for each of the included case studies. These provide a deeper overview of each project in a small time frame, demonstrating key features and interactions that are available for each piece.



* NUXT.JS, PIXIJS, HOWLER.JS

BEYOND BEAUTY

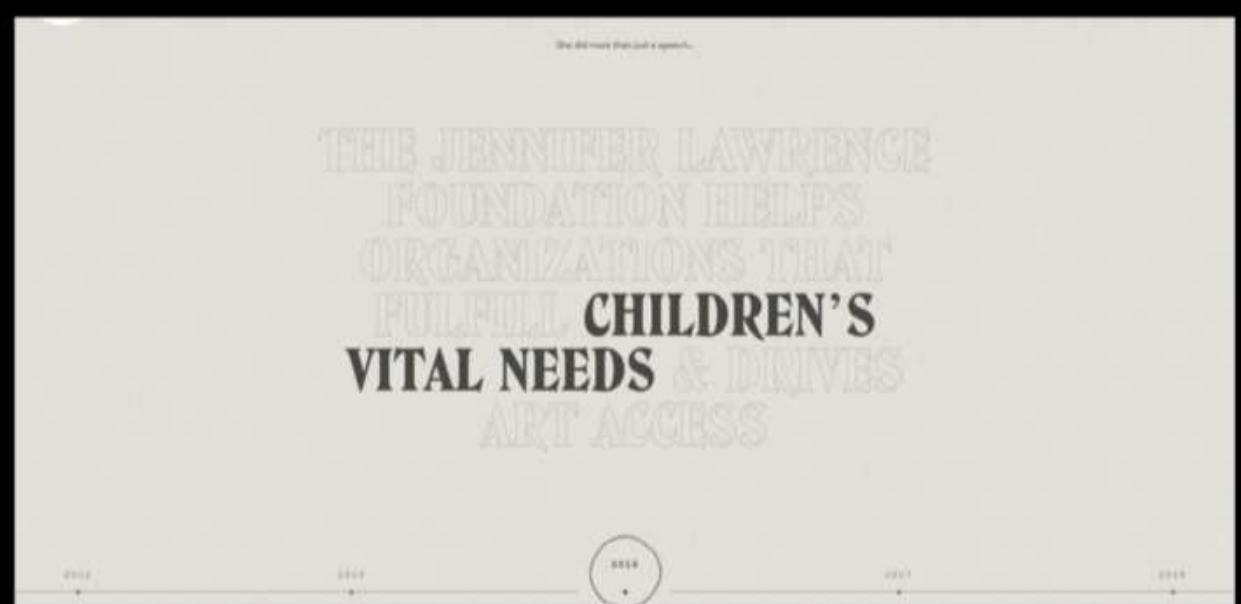
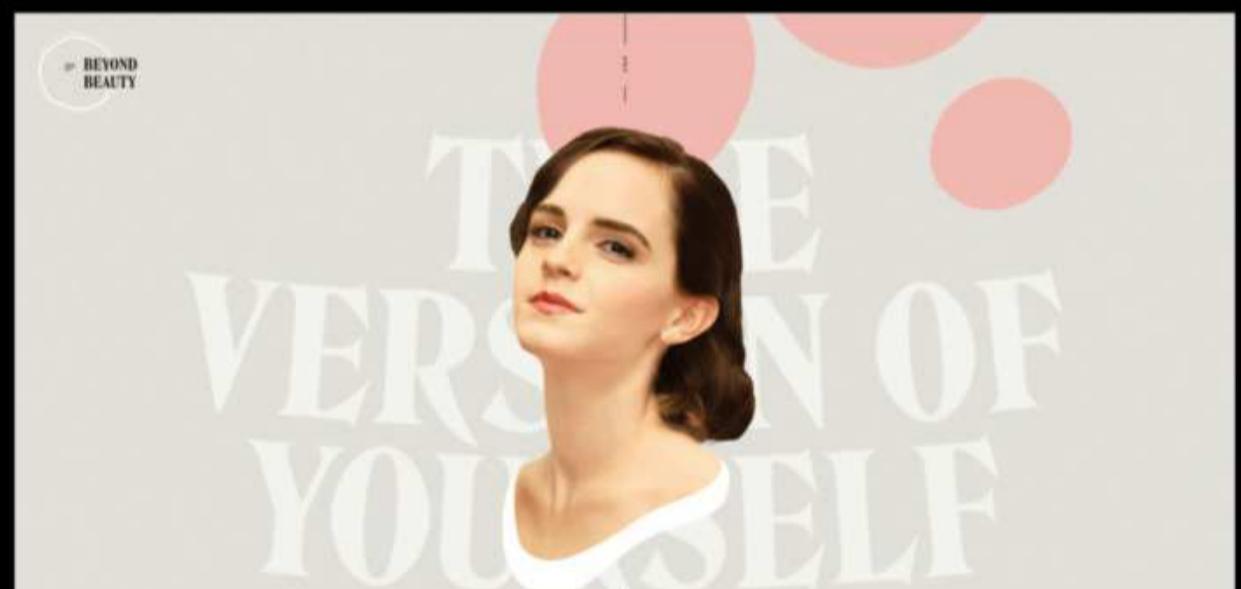
beyond-beauty.co

 Beyond Beauty showcases causes championed by four well-known female actors who are primarily known for their appearance. It highlights their active roles in politics, education and equal rights.

The user experience is enhanced using a number of conventions, including sound and custom cursor states. While sound is key to the experience it's refreshing to see an approach where it enhances the experience but is still functional without it.

Co-designer Louis Ansa explains how sound forms a key aspect of the project: "The site's core feature is, of course, the audio/visual speech approach that emphasises the immersive aspect and lets the user get carried by the topic. The concept of this project and the message delivered is as important as its realisation."

The high level of detail in the design combined with subtle interactions in development produces smooth transitions between subjects, creating an immersive experience. Paired with an unconventional horizontal menu, it provides an intriguing way to navigate between the subjects. Ansa says: "[The] organic look shows the human side and the relationship between the physical and inner beauty of these women."





* THREE.JS, OIMO.JS, GLSL

FOOSBALL WORLD CUP 18

foosballworldcup18.com

Paying homage to the traditional arcade foosball table, Foosball World Cup 2018 (FWC) brings a futuristic take on the classic tabletop game. FWC is an R&D project by AQuest, created to test new technologies and their limitations. It showcases 3D WebGL in the browser to simulate an interactive game of Foosball against AI as the opponent.

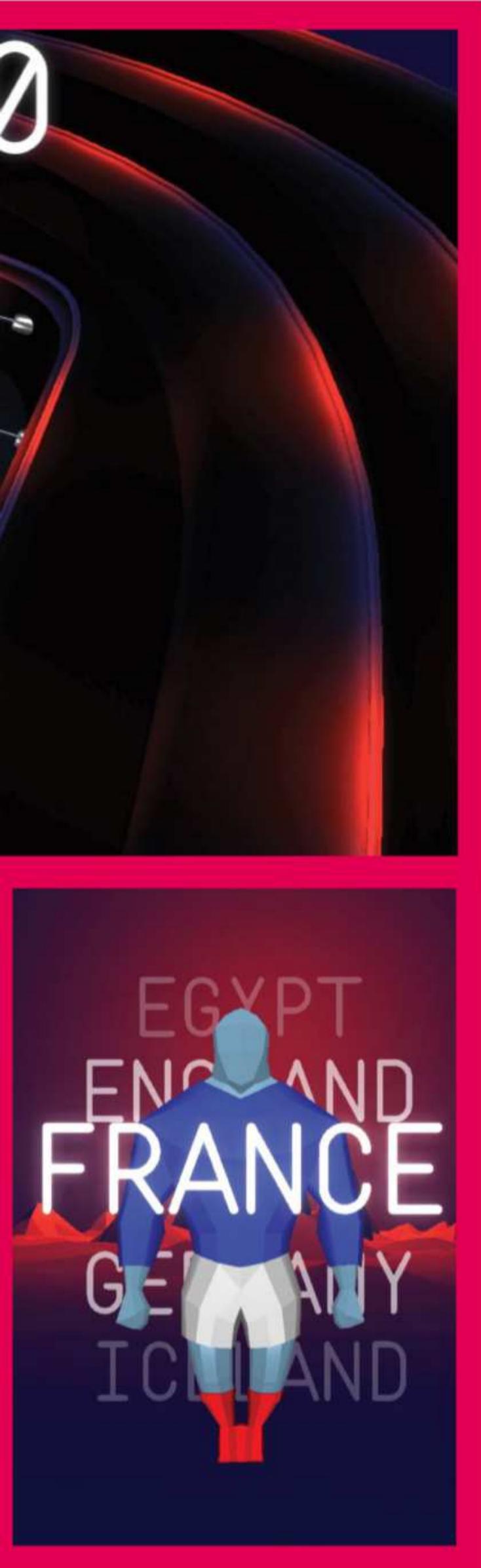
FWC is an impressive example of the level of interactivity that can be achieved within the browser, with no attention to detail spared. The complexities of the project are instantly clear; despite this, there is still more going on. Subtle but powerful additions include the 3D environment reacting to the colours of the selected teams and better performances from the AI where their corresponding country has a stronger football team.

Each part of the game has been considered in great detail by AQuests. These details can be seen in the final product with the stadium alone using around 7,500 polygons. The challenges of building an interactive experience of this magnitude have been undertaken using a number of libraries. Development incorporates Three.js, GSAP and a customised version of Oimo.js, as well as GLSL – an OpenGL Shading language based on C. Photoshop, Illustrator, After Effects, Maya, Cinema4D and Principle were also used.



“Foosball World Cup website is the coolest thing that’s ever happened.”

TWITTER.COM/NOTLIKETHECAR



* BEWEGEN MAPBOX, TWEENMAX, BEM

BEWEGEN

bewegen.com

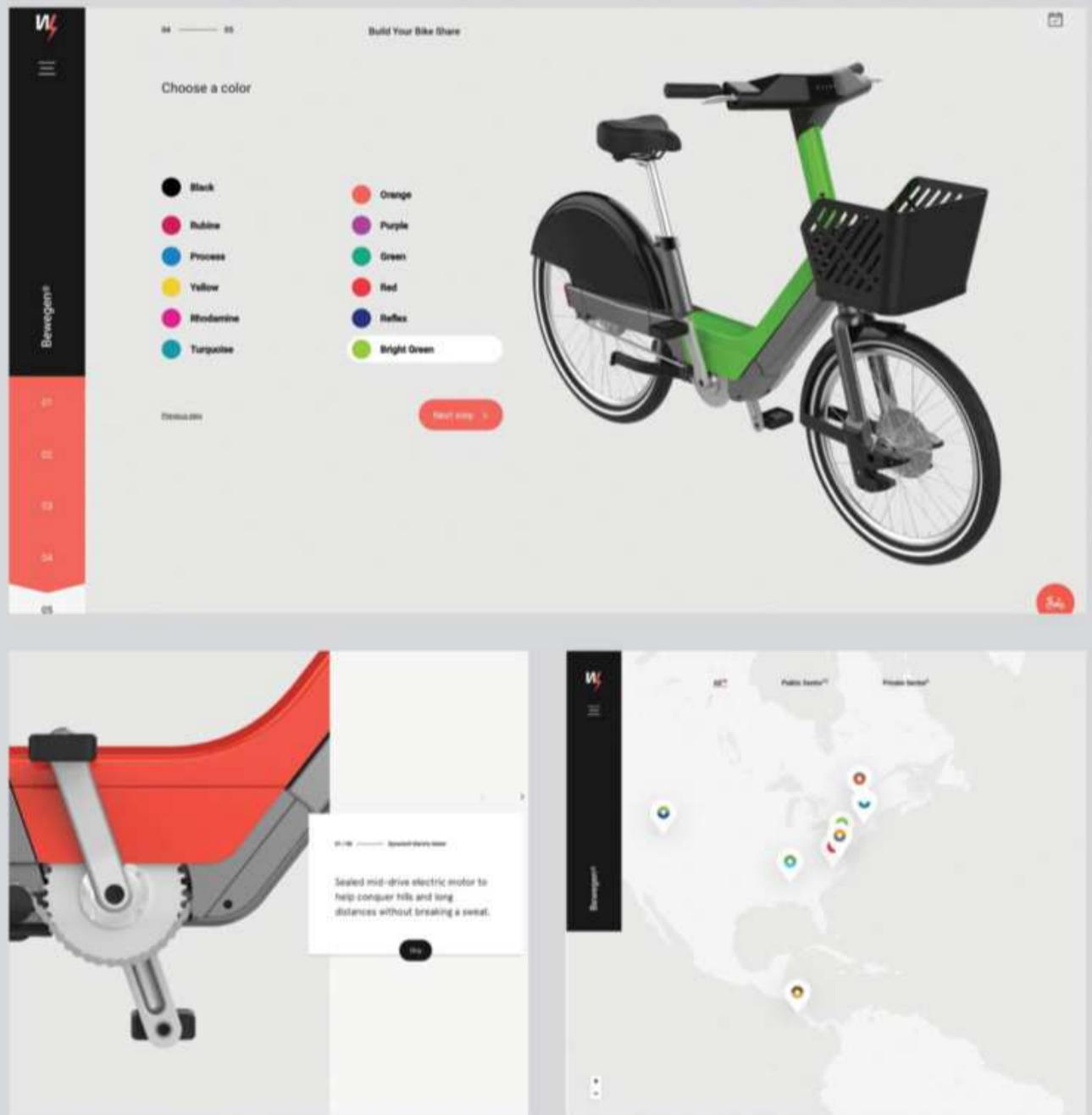
> Canadian company Bewegen Technologies is celebrating five years of bike sharing in over 20 cities across the world. It partners with digital agency Locomotive to showcase its new website. Photography and video are key to the experience with details of its electric-assisted bikes presented via interactive visuals, giving a deeper insight into its innovative products. TweenMax keeps the animations smooth throughout.

Case studies detail the success of its bike-sharing system with a five-step ‘Build Your Bike Share’ form, enabling businesses to create their own custom installation. It demonstrates how even complex forms can be simple to use.

Bewegen’s worldwide bike-share network locations are pinpointed on an interactive map, created using Mapbox. This open-source platform has been utilised to create a simple but effective visual display.

The solution has been considered in depth across resolutions, creating an experience that is without compromise. Even when viewed at a lower resolution, such as on a mobile device, all the features remain present and the user experience is as fluid as it is on desktop.

The code is as cleanly presented as the website, with a custom version of the BEM (Block, Element, Modifier) naming convention, supported by namespaces for components, objects and utilities.



* WORDPRESS, LIGHT.JS, TEXTUREPACKER

KOOX

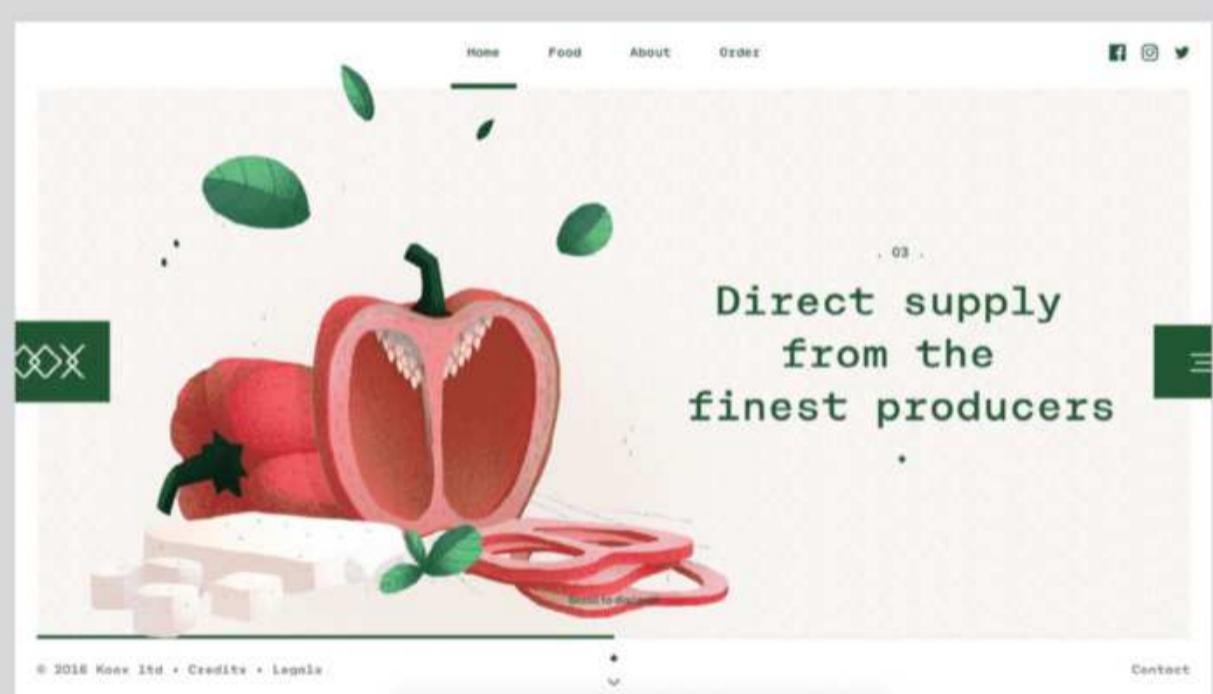
koox.co.uk

> Koox is London's first takeaway created by Michelin-star chefs. The combination of vivid illustrations by Jeanne Morel and Tristan Dion with subtle parallax effects creates a tempting offering. Blue Cheese Studio has created an enticing website that's simple to use.

Where you would traditionally expect a PDF menu, you are presented with an interactive array of dishes. The combination of photography and illustrations gives a clean finish, capturing the tone of the restaurant and the quality of the food.

Performance has been considered throughout, with WordPress REST API utilised to retrieve data in JSON format. This avoids loading unnecessary elements, providing a smooth user experience. Images are also loaded in different sizes depending on the resolution, so helping to cut load times.

TexturePacker provides a further performance boost, being used to create optimised spritesheets for many of these visual assets. Libraries used in development include Light.js, a custom framework based on web-components by Nicolas Riciotti, one of the developers on the project.



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THIS MONTH FEATURING...



PROFILE

50

We speak to Austrian front-end developer and designer Max Böck who's been experimenting with CSS Grid to unlock the future of the web



HOW WE BUILT

56

Outpost and Michael Vestergaard tell how they created a flock of virtual drones for a creator of spectacular live events

DESIGN CHALLENGE

This month...

FOOD MARKETS

* PROFILES



ORLANDO ARIAS

Arias is one of six UX designers at SingleStone, a technology consulting firm in Richmond, VA.

w: orlandomario.com t: @orlandomarioa



MEGAN EGAN

Egan is currently art director (creative placement) at Havas London

w: meganegan.com t: @megan_eghan



ROB HAMPSON

Hampson works on UI/UX at Vodafone. Clients include Facebook, Microsoft and Tinie Tempah.

w: robhampson.co.uk t: @robhampson



BRIEF

This month we would like you to design a website for a food market. Information about location, opening hours and the traders should be easily accessible and you may also want to include things such as an events calendar and blog.

* ORLANDO ARIAS

ATLANTICO MARKET

A site designed to serve the needs of both local visitors and tourists

> Food markets offer a unique experience to both local and international visitors. My aim with the Atlantico Market website is to satisfy the needs of these two audiences by offering a site that is intuitive and sophisticated. I looked to connect with locals by using the colours of the Barranquilla flag to highlight the categories and, with the international audience in mind, I've created a sophisticated, clean feel.

Accessibility is what makes this site unique. Pushing the boundaries of what is thought of as a conventional website, the site feels more like an application where the content is the primary focus. The horizontal, Netflix-like approach of moving through cards brings familiarity to the experience and lowers the learning curve.

I envision this site being built by JavaScript technologies, such as React, to allow users to interact with it quickly and get instant feedback. I would look to make use of a static site generator like Gatsby to offer users a faster experience.

CLOSE UP

(1) A set of categories allows users to focus on a desired section of the food market. The use of colour adds greater distinction between categories. **(2)** Adding a smart search to the site with conversational language adds emphasis of the intent to serve users. **(3)** Language selection is important to attract both locals and international visitors. Users can choose between English and Spanish. **(4)** When users select a specific category they're presented with a list of traders sorted by the number of recommendations. Its horizontal presentation helps save real estate. **(5)** A horizontal list of upcoming events, sorted by relevance, is presented to users and gives them the ability to share an event. In addition, a label signalling the most relevant content based on user selection appears. **(6)** Opening hours and the address are easily accessed via the header and footer respectively. This information takes a more prominent position when the site is displayed on a mobile device as it may be more relevant for users on the go.

MY MONTH

What have you been doing this month?
I've been working on a dashboard solution for an enterprise client and improving my JS skills.

Which two websites have you visited for inspiration?
I looked at Borough Market and Boxpark to familiarise myself with international food markets.

What have you been watching?
Having lived in Brooklyn for a long time, my wife and I enjoy watching *Everybody Hates Chris* on Hulu.

What have you been listening to?
Lots of podcasts. The two I listen to more regularly are *Syntax* and *Shop Talk Show*.

The image is a collage of various food-related content from the Borough Market website. It includes a large top-left image of a salad in a box with a yellow diamond icon labeled '1'. Below it are two smaller images: one of a bowl of noodles with chopsticks labeled '6' and another of a dish labeled 'BEEF AND BASIL MEATBALLS' from Urban Kitchen labeled '5'. To the right, there's a central text section about the market's history with a yellow diamond icon labeled '2'. Below this are two more images: a map of London with a yellow diamond icon labeled '4' and a bowl of soup labeled 'XIAO GUO MIXIAN' from Ngon labeled '3'. At the bottom, there's a yellow banner with the text 'MEGAN EGAN' and 'BOROUGH MARKET' followed by the tagline 'A bold new look for the Borough Market website'. On the far left, there's a logo for 'MY MONTH'. On the right, there are two screenshots of a mobile phone displaying the Borough Market app interface, showing various food items and sections like 'TRADERS' and 'RECIPE'.

* MEGAN EGAN

BOROUGH MARKET

A bold new look for the Borough Market website

What have you been

What have you been doing this month?

I have just started my first creative placement at Havas, after making the switch from being a designer to an art director and relocating from Birmingham to London.

**Which two websites
have you visited
for inspiration?**

I've visited
Designspiration
and SiteInspire.

**What have you
been watching?
I've been watching
*Patrick Melrose***

What have you been listening to?

The Stone Roses and Jurassic 5.

 I have redesigned the Borough Market website to simplify the user journey and give it a bolder, more contemporary visual style. The theme is black against white, which is striking while still allowing the food photography to be the star of the show.

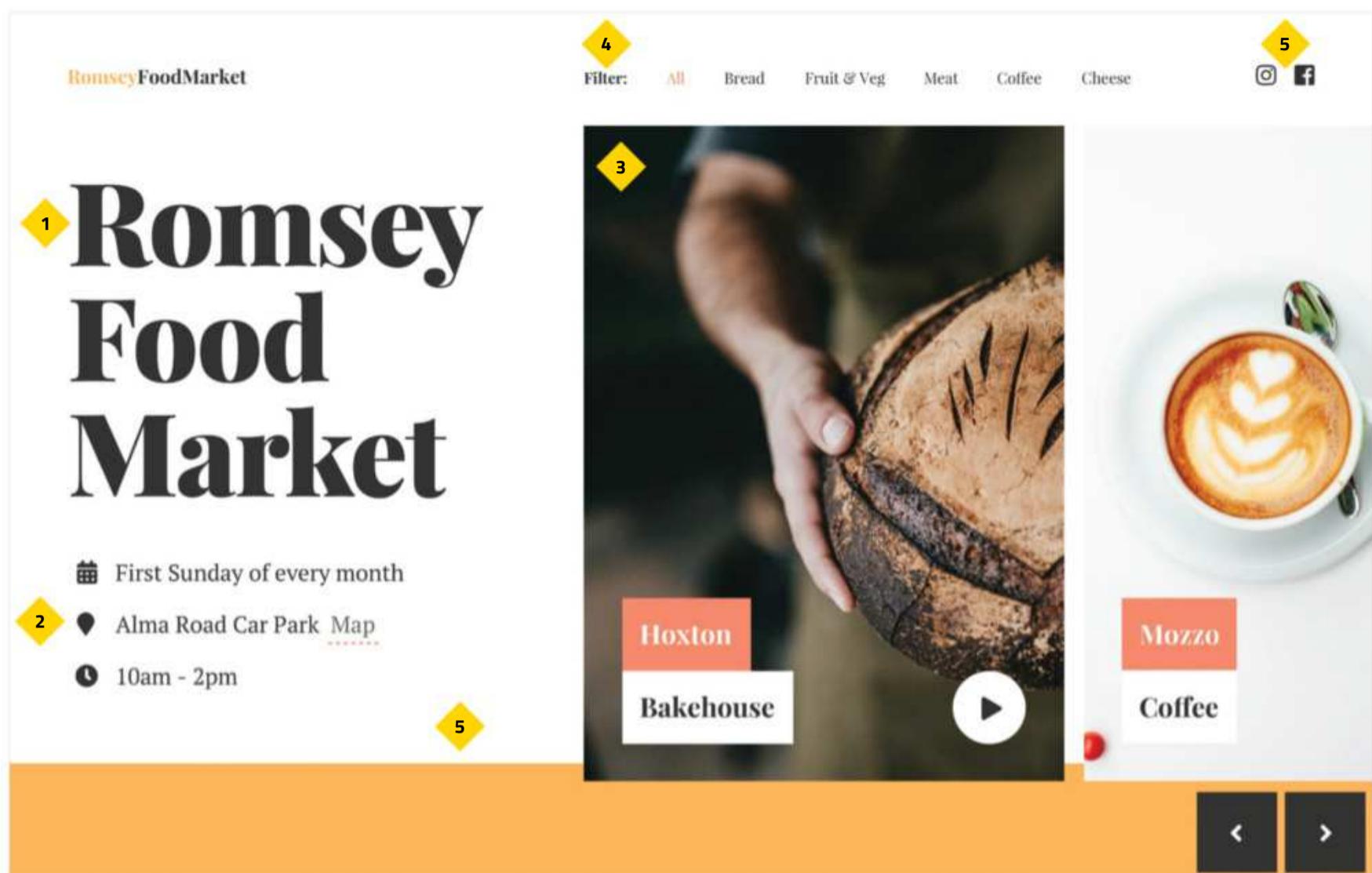
The way the traders are organised has been updated for food lovers with all budgets in mind, with a function added to allow users to order traders by price as well as by cuisine or alphabetically. Directions and key information have been labelled more clearly for tourists and linked in a prominent place on the homepage.

The flexible grid layout allows for different content blocks to be moved around to fit the market's ever-changing needs. A spotlight feature on the homepage thrusts different traders into the spotlight; this randomly shuffles with every refresh, highlighting businesses in a fair and unbiased way.



CLOSE UP

(1) Traders are featured in the left column of the home page. These randomly update after every page refresh, meaning all traders have an equal chance of being in the spotlight. This also demonstrates the wide variety of cuisines that are available to the public. **(2)** The user journey has been simplified, with prominent buttons making it easy to find key pages such as trader listings, information on opening hours and how to get to the market. **(3)** The navigation is fixed to the top of the page and floats above the content. The use of thick, bold black means it will always be visible against the site photography. **(4)** On mobile, the nav bar transforms into a burger menu. Just like the desktop site, the nav floats above the page content and remains fixed to the top of the screen. **(5)** Traders can be sorted by cuisine type, alphabetically or by price, ensuring food lovers of all budgets can be catered for and anyone can easily find something that tickles their taste buds.



* ROB HAMPSON

ROMSEY FOOD MARKET

Videos of food producers enable users to get to know the traders before they visit

> I've created a design for a food market in Romsey. I began by thinking about what information is essential for my prospective market goers and what content could I include to help delight and encourage them to visit?

The location, opening hours and information about the producers were essential to include. Without these the website wouldn't be useful, so these needed to be clear and easy to read. To delight users I decided to include video profiles for each food producer. The aim is that it would help prospective visitors connect with what's on offer and build relationships with the traders before they've even set foot in the market.

Visually, the design puts the spotlight on essential information and the video profiles. People are able to filter the videos by food type to tailor the experience towards their personal preferences. This functionality also encourages people to discover the diverse range on offer.

CLOSE UP

(1) The information shown here is essential for people interested in the food market. I have dedicated a good amount of screen space to this content with clear, readable typography and concise information – at a glance you can get all the information you need. **(2)** A link to a map has been included to help people understand where the market is. I want to make it as clear and easy for people as possible. **(3)** Video profiles for each food producer are included with beautiful cover photos. Hovering over a video would animate it. These are easy to flick through and a selected video would increase in size to a 16:9 ratio. **(4)** A filtering system has been added here to help people tailor the videos to their interests. Selecting a filter would swiftly change the videos below and selecting 'all' would show everything. **(5)** Links to Facebook and Instagram are included to help people engage further with the market and encourage them to share content with friends.

MY MONTH

What have you been doing this month?

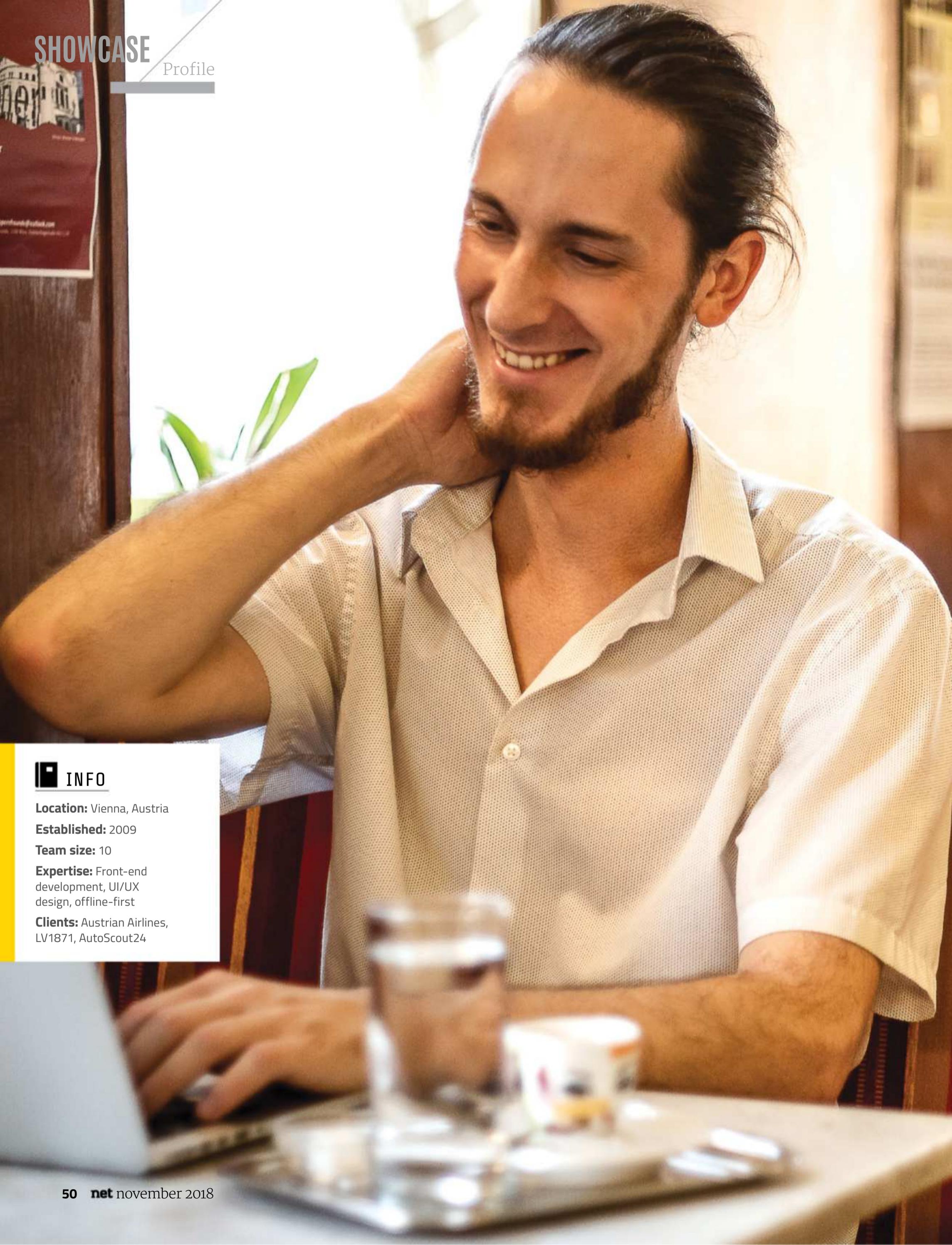
I've just installed a smart cat flap so I can track my cat from my phone! Work-wise, it's a bit of a secret but what I can tell you is that it's exciting and involves lots of user research.

Which two websites have you visited for inspiration?

The Muzli extension for Chrome, sitelInspire.

What have you been watching?
Anything sci-fi and ideally from the 1980s.

What have you been listening to?
Ready Player One and *Masters of Scale* by Reid Hoffman.



INFO

Location: Vienna, Austria

Established: 2009

Team size: 10

Expertise: Front-end development, UI/UX design, offline-first

Clients: Austrian Airlines, LV1871, AutoScout24



★ PROFILE

MAX BÖCK

mxb.at

We speak to an Austrian front-end developer and designer who's recently been experimenting with CSS Grid to unlock the future of web design

> Vienna-based front-end developer and digital designer Max Böck (mxb.at) has been building stuff on the web for the past 10 years, firstly as a freelancer and more recently as one third of Simpleloop (simpleloop.com), a studio he set up with a couple of colleagues at the start of the year. He's worked on apps and sites for clients of all sizes across various industries and recently he's been experimenting with CSS Grid to find new ways of making web layouts. We spoke to him to find out more.

Your original qualification was in music. What drew you to web development?

Yeah, I graduated from high school with a focus on music. I did a lot of gig posters, band logos and other design work for the local music scene back then and I loved it. After a while I started learning how to make simple websites and became fascinated with the web as a global creative medium.

Wanting to be a designer, I moved to Vienna in 2009 to properly study web design and development. Over time, I gradually became more interested in coding and all the technical aspects as well – that's what got me started.

How did life as a freelance developer treat you?

I founded my freelancing business straight after college. In the first few



years, I tried hard to find work and build a portfolio, so I did a lot of websites for small businesses and startups. I remember taking on many challenges I did not feel ready for at the time, as sort of a learning-by-doing strategy.

After a while I had built up a reputation and got hired by bigger agencies and clients. Freelancing hasn't always been easy but carrying a project all the way from first contact to launch has definitely taught me a lot of valuable skills. Plus I love the freedom and flexibility that comes with it.

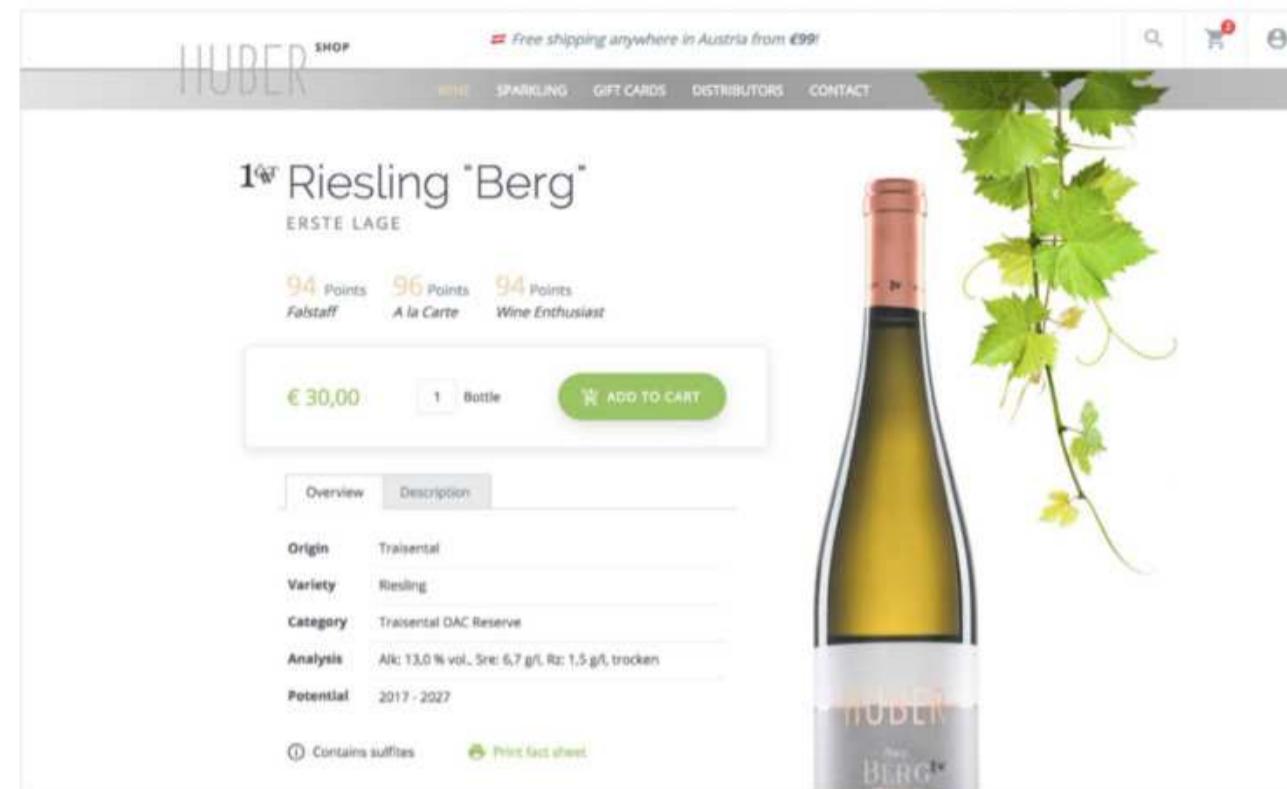
Since working freelance you've teamed up with two friends to form a studio. Tell us about that.

When I first met Thomas and Luis, the other two-thirds of Simpleloop, we were working on a project together. They both had experience in building complex software in Python but needed somebody to handle the front-end side of things. Our skills seemed to complement each other perfectly and we share the same no-bullshit approach to web development, so I joined Simpleloop as a partner in 2017.

Since then, we've focused on creating useful, innovative products on the web. We work with a very modern tech stack and an international client base. I like that, as a small team, we're able to move quickly and apply our individual strengths to solve problems. There's less talk and more action. I've worked with other teams but it has never been that streamlined and productive before – and there are some very interesting projects on the horizon.

You tackle design elements alongside front-end development. Is this something you feel comfortable with? Absolutely. I'm one of those 'designers should know CSS' people. But I also think developers should learn about design. Talk to each other – there's tremendous value in knowing both sides.

Thinking in components and considering performance or accessibility while doing design really helps to ease the transition from mockup to code. On the other hand, knowing about the



A product page on the Huber Winery web shop; when putting the site together, Böck spent some time working closely with winemaker Markus Huber and his staff in the beautiful Traisen valley vineyards

intention behind the design enables developers to ship a much more consistent UX, down to the small details that sometimes go overlooked. I enjoy doing both: it's cool to have some balance between creativity and logic.

You have been experimenting with unconventional web layouts and intrinsic design (mxblab.at/blog/layouts-of-tomorrow). What did you learn? For a long time, we were quite limited by the technical constraints of the browser, so we got used to doing things a certain way. We've all seen these standard bootstrap sites – the big hero image, the three teaser boxes. I think one reason why they're so common is that custom layout is hard. Grid certainly makes things easier but it also has the potential to completely reshape web design.

To me, the beauty of intrinsic design is that the browser does most of the calculations and heavy lifting for you, so you need less code to describe complex layouts and responsive behaviour.

I guess the hardest part is breaking out of our old mindsets and come up with new ways to do layout on the web. It's up to us to explore new creative directions, see what works and what doesn't. Right now, it's a big playground.

You rebuilt Huber Winery's site to be responsive, performant and multilingual. What sort of work was involved?

Huber (www.weingut-huber.at) is one of the larger wineries in Austria, with award-winning wines and exports to over 20 other countries. In 2015, I did a complete redesign of the brand prior to developing their new website. That process involved concept, print packaging and screen design, technical development and maintenance.

Getting the site and the included shop system ready for launch took quite a while because there was a lot of ground to cover. From content setup to SEO to connecting with the company's internal software, I kept pretty busy.

But while fine-tuning the site, I also spent some time working closely with winemaker Markus Huber and his staff in the beautiful Traisen valley vineyards. There are worse places to be and I got to taste their excellent Grüner Veltliner.

What were the challenges of building a conversation interface for Livv? Livv (livv.at) is a company specialising in life insurance. Getting insured usually involves a lot of questions and tedious paperwork, so we wanted to make that process more user-friendly. Instead of

Bauchschmerzen in Brignoles

Brignoles, Frankreich
8.2008

Ihre bestürzte Mine werde ich nie vergessen, als wir Ihr verweigerten die beiden schweren Koffer bei uns im Krankenwagen unterzubringen.

Ich war 15 und besuchte seit langer Zeit wieder meine Tante und meine Oma in Frankreich. Zum ersten Mal alleine mit einer Freundin in den Flieger zu steigen, war ein tolles

GeschichtenFee
Berlin, Deutschland
Mitglied seit 2018

GeschichtenFee's Geschichten wurden:
3 Mal gut gefunden
71 Mal gelesen

Erzähler/in anschreiben

A story posted on Story.one – a site that connects storytellers' real-life experiences with publishers. Individual stories can be found based on their content, location or timeframe

a long, complicated form, we built the sign-up as a conversation. All questions appear as chat messages and users are provided with a custom UI for their answers and helpful advice along the way. The expected premium rates are calculated on the fly after each step.

A chatbot-style interface like that means that every question depends on the outcome of the previous one, so the process is a bit different for each user. Keeping track of all the logical states was a real challenge, considering that users can also go back and change their given answers. We learned a lot making this and the results have been very positive.

You built a platform for connecting airline passengers. How did that evolve?
We developed 'Clever Together' for Austrian Airlines as part of their digital innovation program. The app enables passengers to build a community during a flight, sharing travel advice about their destination with each other.

This involves a live group chat, a threaded questions-and-answers forum, a quiz with local trivia and other helpful resources. So if you're heading from Vienna to London, you could ask the plane for the best pubs in Shoreditch or where to go for lunch. Passengers also

started talking about different topics in real time, which was fun to watch.

A plane is an interesting target environment because it has a very diverse mix of users. People with different languages, technologies and expectations come together and share the same space for a couple of hours. That's why the app was built to run on whatever device and browser the passengers were carrying with a maximum of flexibility in mind. It works with the onboard Wi-Fi, so we also had to design for connectivity failures and offline use.

Story.one is a story-matching platform. What's the story behind it?

The purpose of *story.one* is to connect people with stories directly to the people looking for them. Storytellers share their real-life experiences and publishers can discover stories based on metrics like location, time frame or theme.

One of the main goals in developing the site was to make the writing process as comfortable as possible for authors. The story editor in particular was designed to feel intuitive and support everything a user might be accustomed to, so we took some clues from products with great UX like Medium or Google

MAX BÖCK

What's on your desktop today?
Headphones, a coffee mug and three half-finished to-do lists.

Little things that make your life worthwhile
Websites: Github, CodePen, WeRateDogs on Twitter.
Apps: Spotify, Slack, Alfred.
Audio: Mostly guitar-heavy stuff, some electro and essential hip hop.
Reading: *The Expanse* by James S.A. Corey.

What's on the walls?
Movie and gig posters I love. Artwork by DKNG, Olly Moss or myself.

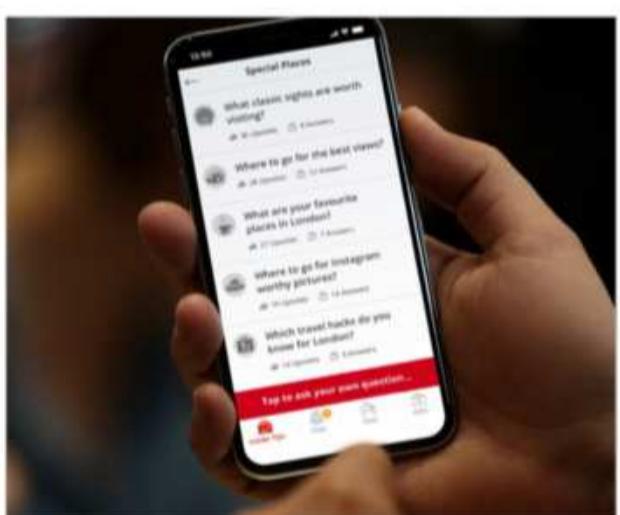
What will you do for lunch?
The office is right next to the central food market, so there are plenty of options. Anything from sushi to schnitzelsemmel.

What hours do you work?
Usually from around 9 to 6, with the occasional overtime or lazy day.

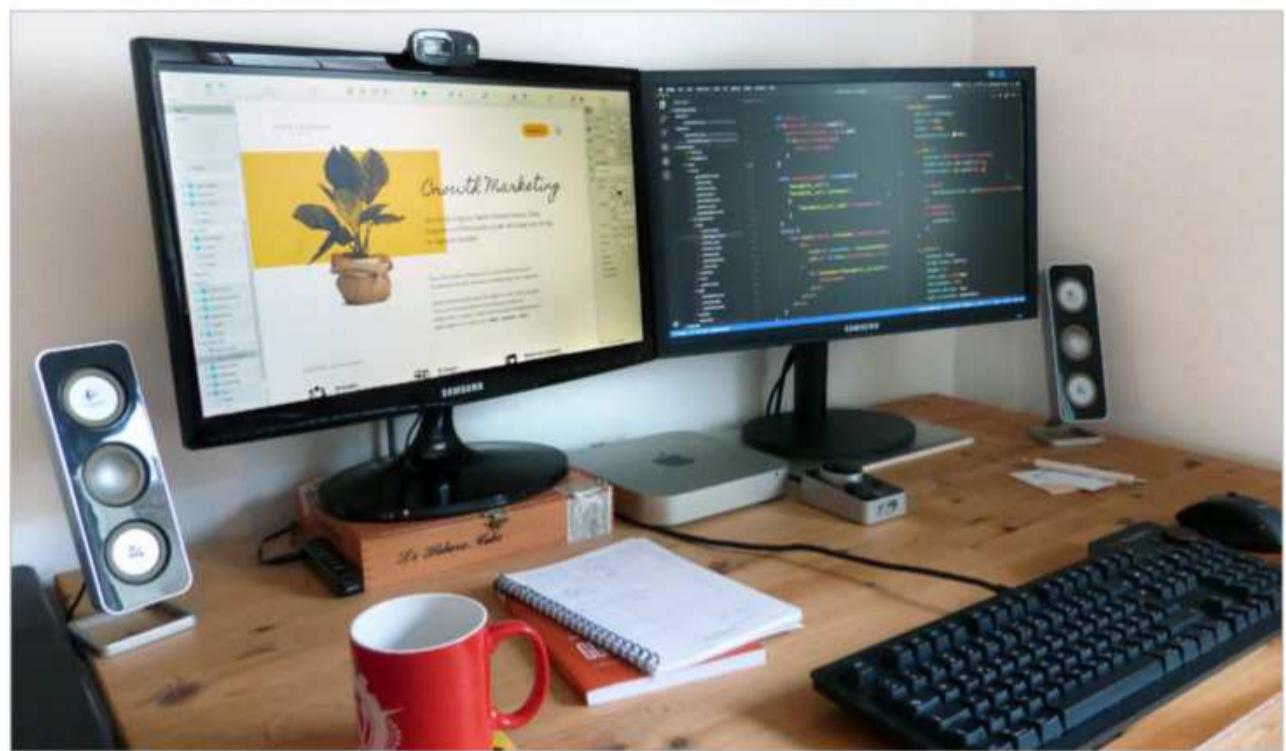
What else do you do in the office?
Argue about accessibility, typography or the best coffee places.

How often do you hang out with other developers?
The Meetup scene in Vienna is awesome, so it's nice to talk about all the new stuff going on over a beer.

Describe your working culture in three words
Try. Learn. Improve.



The Clever Together app for Austrian Airlines/Lufthansa in use on a flight to London



Böck's work desk and studio setup: he admits that it's usually a bit messier than this but that he's "cleaned up for you guys"

- Docs. We also paid close attention to performance and accessibility, which made this a very interesting project.

How do you keep up to date with new technologies and frameworks?

I follow some really smart people on Twitter and I read a lot. Writing blog posts about new tech also forces me to understand these things better. It's hard to keep track of everything going on, as the landscape is constantly changing. But this is a very exciting time for web development – there's more innovation than ever before.

Personally, I'm very interested in the latest CSS additions. The Grid Level 2 spec is in the works right now and Subgrid could be a very powerful feature. Service worker technology is also fascinating to me. It's a bit like magic. I'm still experimenting with offline support and all the other new possibilities it brings.

What's your current go-to toolkit?

Most of my design work is done in Sketch and I develop in Visual Studio Code. I do a lot of React interfaces these days, so there's the usual Webpack/Babel tooling that comes with that. I rely on Sass for styling and I'm a very big fan of the BEM class-naming method. We also

do automated testing at Simpleloop and it has proven very helpful to ensure our code does what it's supposed to.

I generally try to stay away from frameworks as much as possible though and go with vanilla JS/CSS where I can. When it comes to long-term solutions, you can't beat the standards.

What do you like to do when you are not working?

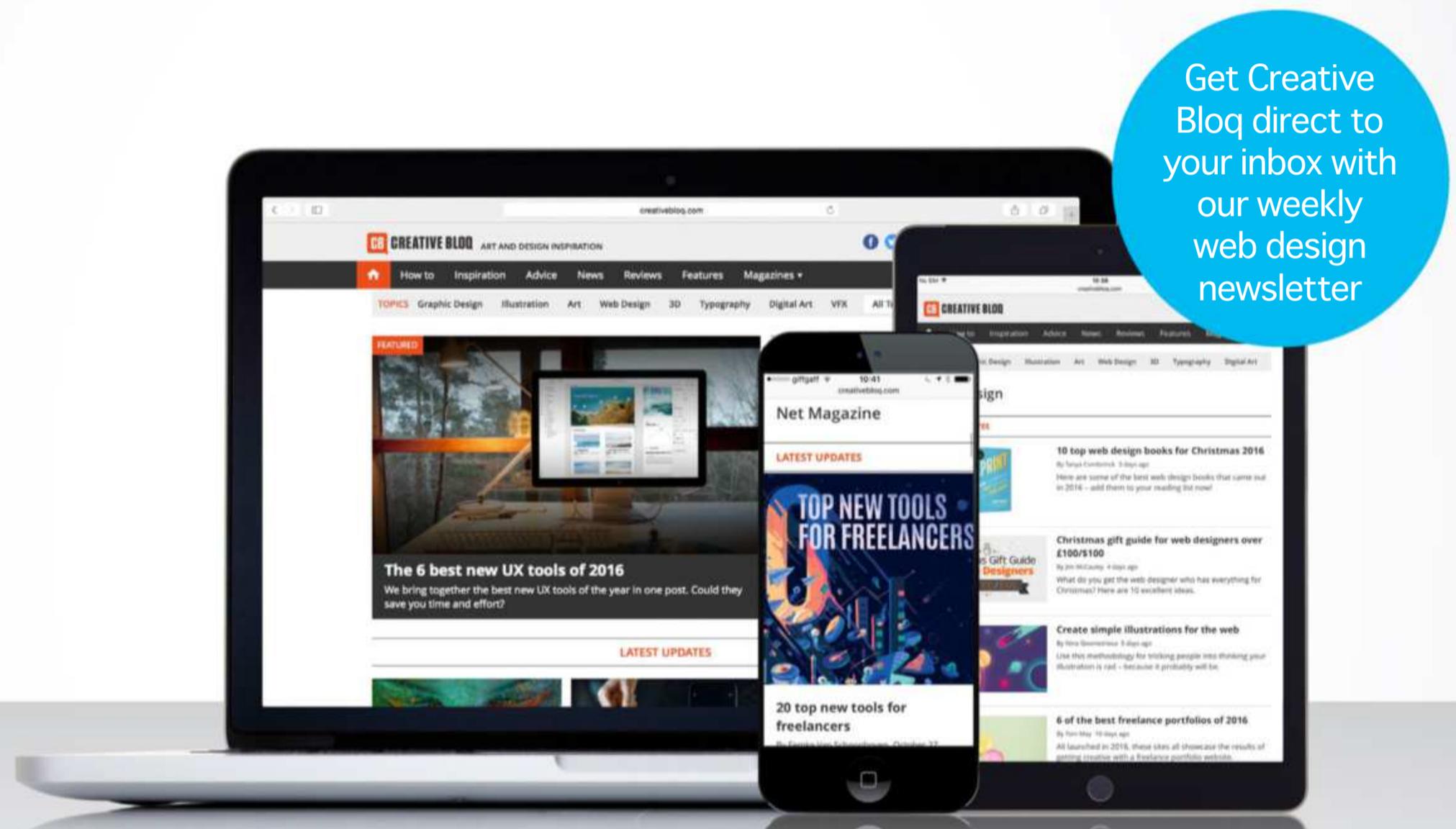
I like to take some time each year to travel with my girlfriend and see the world. I also still make music sometimes – I play in a Rage Against The Machine cover band, called Rage Aid, where we do shows for charity.

How do you think the industry's likely to move forward over the next few years?

I'd love to see the industry move away from the walled gardens of proprietary platforms and towards a more open, independent web. Progressive web apps might be the path to get us there but it's too early to tell.

The web has gained numerous new capabilities in the last couple of years and I hope we'll further close the gap between web and native apps. New technologies are emerging and there's always room for improvement. I'm excited to find out what's next. ■

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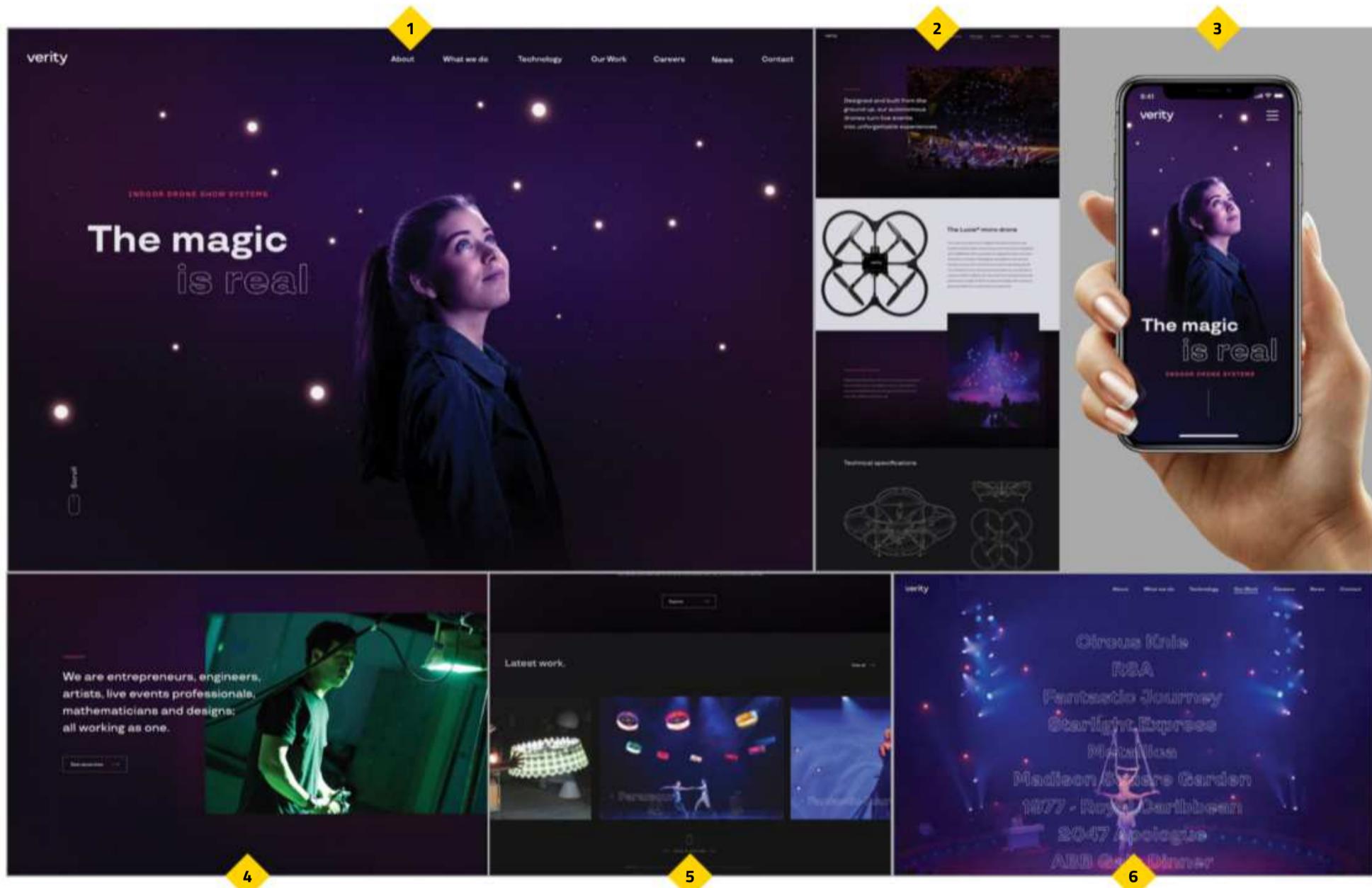
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★ HOW WE BUILT

VERITY STUDIOS

Outpost and Michael Vestergaard tell how they created a flock of virtual drones for a creator of spectacular live events



CLOSE UP

BRIEF

Verity Studios specialises in using its own cutting-edge drone technology to amaze audiences at live events worldwide and it needed a suitably spectacular site to showcase its work to directors, creative directors and event managers in the creative industries.

(1) We wanted to bring to life the idea of the 'magic moment' Verity could bring to any event. To do this, we mirrored Verity's own blend of art and technology to immerse the visitor in the experience. Three.js particle simulations were used to create the drone choreographies on the home page. We also added light and smoke effects to the image of the girl. (2) We integrated simpler particle systems into the other page headers. We also implemented more subtle interactions,

page transitions and animations along with parallax scrolling functionality. (3) The site was designed to work across all platforms and replicate the same user experience.

(4) The site had to work as Verity's main commercial and recruitment platform, so the interactive features and rich media had to offer seamless UX performance. (5/6) To communicate the true spectacle of the drone shows, users can navigate through live video feeds from the various work carousels.

CHRIS WILCOCK



Wilcock is a co-founder and creative lead at Outpost. He directed the site design for the Verity Studios project.
t: @chriswilcock83

MICHAEL VESTERGAARD



Vestergaard is a specialist creative developer and was responsible for the build of the Verity Studios project.
w: iliketoplay.dk

> Led by founder and entrepreneur Raffaello D'Andrea, Verity Studios (veritystudios.com) offers ground-breaking autonomous drone technology in live entertainment around the world. With more than 30,000 completed flights so far, its drones have toured with Metallica, been on Broadway with Cirque du Soleil and been part of the New York Knicks season opener at Madison Square Garden. Committed to the belief that drones can transform the live event experience, Verity needed a site to showcase its technology and services. Enter Outpost (discoveroutpost.com) and creative technologist Michael Vestergaard with some attention-grabbing ideas.

What were Verity's requirements for this project?

CW: What Verity creates is truly groundbreaking and – to do that justice – the new website needed to be a true digital expression of the company and the services they offer.

The main requirement they had was to capture the ‘wow factor’ that comes from their shows. In order to achieve this, we had to make sure the user experience was as immersive, rich and as dynamic as possible – while at the same time being robust enough to accommodate the short- and long-term commercial objectives of the company. The site also had to act as the main recruitment and sales tool for the business – bringing this all together in a seamless experience was quite a challenge.

How did Outpost get involved?

CW: They had seen the work we had done for the Bear Grylls website and invited us to pitch against two other agencies. After proposing a high-level solution over conference calls, we were selected as the chosen agency and invited to Switzerland to meet the team and learn more about the company. During the two-day visit we were completely immersed in their world, even being surrounded by a swarm of Lucie drones as they demonstrated how their system works – this was awesome! We also took the opportunity to conduct workshops to gain a deeper understanding into their audience and establish the exact site requirements.

What are the main design features of the site?

CW: We wanted to bring to life the idea of a ‘magic moment’ and show how Verity could bring that magic to any event. To do this, we mirrored Verity’s own blend of art and technology to immerse the visitor in the experience. After experiencing what it was like to be part of one drone demonstration, we wanted to try and recreate this in a digital space. We played around with several ideas for recreating the drone shows from motion graphics and a live video production but, in the end, we decided on utilising WebGL and Three.js particle simulations to recreate the choreography.

While we made a big feature of WebGL on the homepage, we integrated simpler particle systems into the site’s other page headers to give a complete visual language. Throughout the project, we



*TIMELINE

Key dates in the Verity Studios

LATE FEB 2018

Outpost is appointed the agency and the team visits Verity Studios in Switzerland to undertake a two-day workshop to determine the audience and the exact site requirements.

EARLY MARCH 2018

Following the workshop, specification documentation along with site wireframes are produced for client sign off.

MID-MARCH 2018

The team produces several design concepts for consideration.

EARLY APRIL 2018

Verity Studios selects a design concept to proceed with and the team begins working on the final designs.

EARLY APRIL 2018

Photoshoot is undertaken to create assets for home page.

LATE APRIL 2018

Designs go through multiple reviews before being signed off and proceeding to build.

MAY 2018

Build of the site begins, 3D models of the drone choreography are created along with all animations to bring the site to life.

JUNE 2018

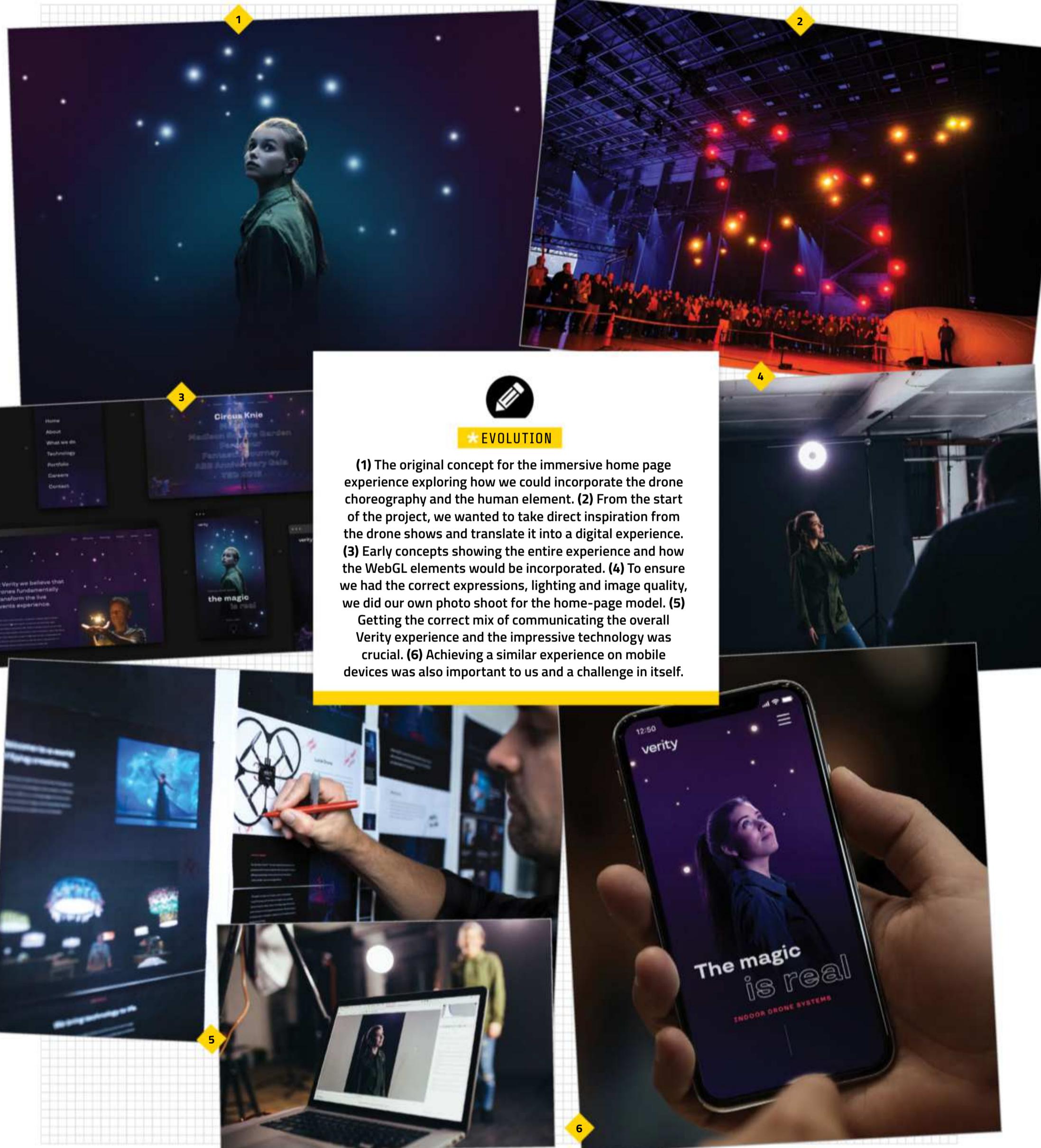
The site goes through multiple reviews and extensive testing stages.

EARLY JULY 2018

The final content is uploaded and the site is pushed live.

SHOWCASE

How we built



► were always conscious of the drawbacks of a full WebGL experience so opted for a hybrid integrated model. Other key features on site included parallax scrolling to give a sense of movement and flight along with video carousels.

There's a flock of JavaScript drones on the home page. How did you set about creating those?

MV: The drones were the largest single element to develop for this project. We took inspiration from the choreography of the real drone shows. The drones are points in a 3D scene (we used Three.js). They are grouped in various ways and controlled by a lot of custom (trigonometry) code.

The whole site scrolls incredibly smoothly. What's your secret?

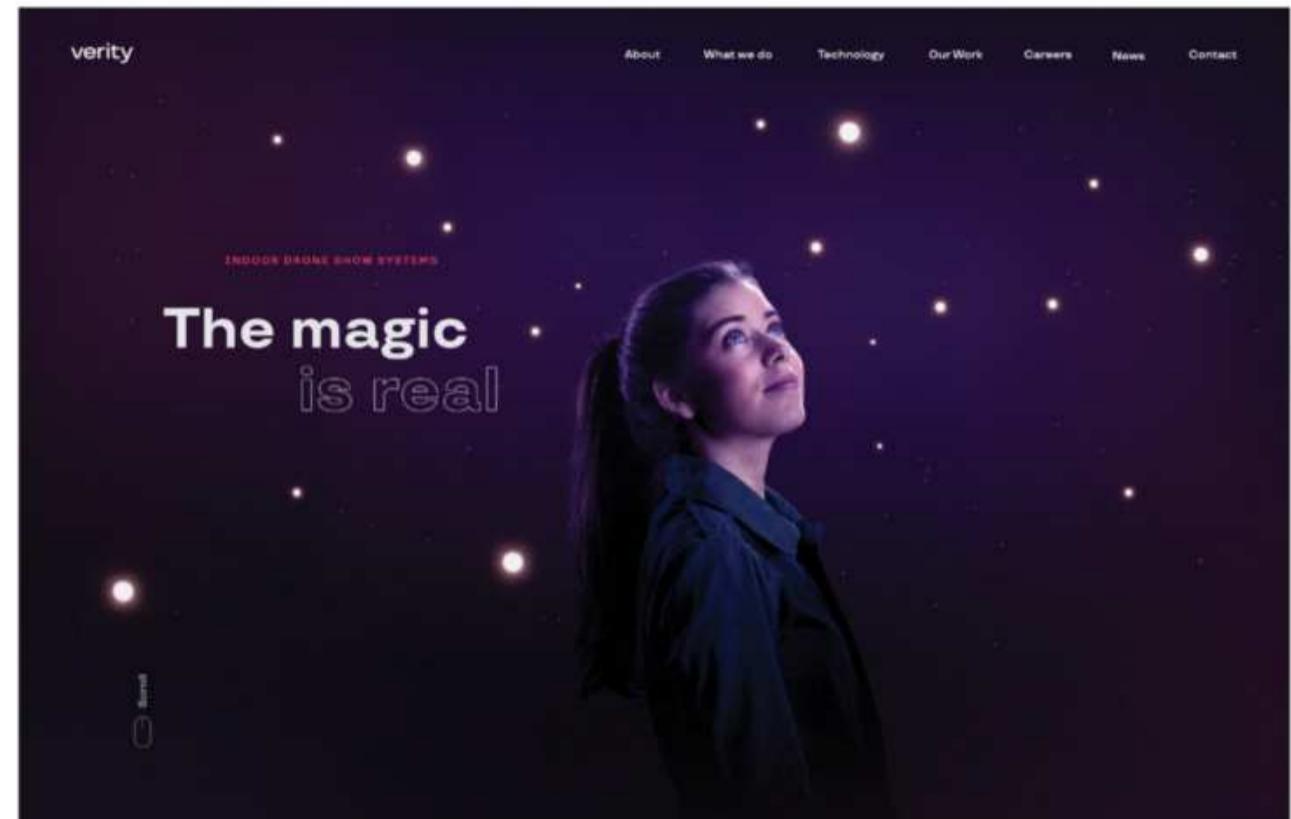
MV: Thank you! We used a technique in which you fix the position of the content – and then move it with some easing when the site scrolls. This works well for pages that aren't super-long because we can hardware accelerate the movement. On touch devices, there are too many drawbacks so we use standard scroll instead.

Talk us through the technologies that are running the site.

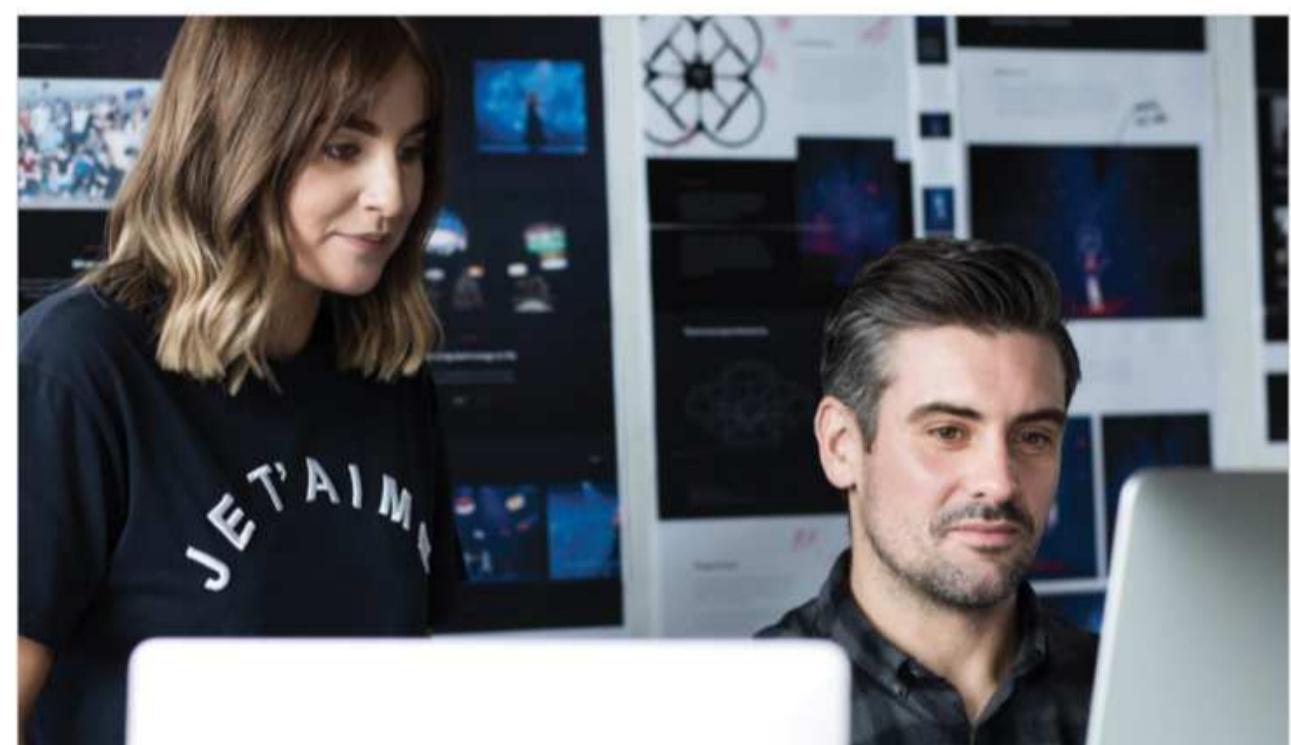
MV: We used Prismic as a headless CMS. The files containing all data for the site are built when publishing from Prismic. So there are no extra API calls at runtime (making the site a lot faster). The front-end is based around a custom framework handling routing, lazy loading, memory management and much more. In this way, we have perfect control and there is no boilerplate code or things running in the background. We used GSAP for the animation and Three.js for the drone scene.

What was the biggest challenge you faced on this build? Did you learn any useful lessons from it?

MV: The drone scene took a long time to get right. Both the graphics and the animations had to be tuned many times in order to give the 'wow' feeling we wanted. We actually removed some



Above The Verity Studios home page with the immersive drone show that was created using a combination of Three.js particle systems, 2D photography and interaction effects



Above The modelling of the drone choreography went through multiple iterations to ensure the correct flight paths and environment were achieved

choreographies because they were confusing the overall experience – 'less is more' still applies. Also, the main challenge when trying to render light using Three.js is how taxing it is on performance – creating a single light is fine but trying to create twenty on a single page presented some real challenges. In the end, we used layered PNG images that all had their own

behaviours to emulate the flickering and rotating lights.

Now that the site is live, what has the reception been like?

CW: It's been great: we had a blast doing it and the client loves it, which is the most important thing. We've also had a lot of press coverage and won a couple of awards, which is always good! ■

THE FUTURE OF CSS

Rachel Andrew takes a look at the new CSS that is starting to land in browsers, from row and column gap properties for Flexbox to entirely new specifications



This is a very exciting time to be a web developer. We will take a look at some of the new CSS properties and entire specifications that are making their way into browsers. Some of these are behind flags or only available in beta versions of browsers now but you will be seeing them in release versions very soon.



AUTHOR

RACHEL ANDREW

Rachel Andrew is a web developer, writer and speaker. Co-founder of Perch CMS and Notist, editor in chief of Smashing Magazine and an invited expert to the CSS Working Group.

w: rachelandrew.co.uk

Gutters for Flexbox

CSS Grid Layout introduced the `grid-column-gap`, `grid-row-gap` and `grid-gap` properties. Multi-column layout already had `column-gap`. It therefore made sense to remove these properties from the Grid and Multicol specifications and place them into Box Alignment, the specification that deals with space distribution and alignment across all specifications. This meant the gap properties – now renamed `column-gap`, `row-gap` and `gap` for all contexts could be specified for other layout methods – such as Flexbox.

At the time of writing, Firefox is the only browser to have implemented these properties for Flexbox and they are expected to ship in Firefox 63 (which should be available by the time you read this). However I would expect other browsers to follow suit. This should mean that instead of having to use margins to create gutters between flex items, you'll be able to use gaps as in grid layout.

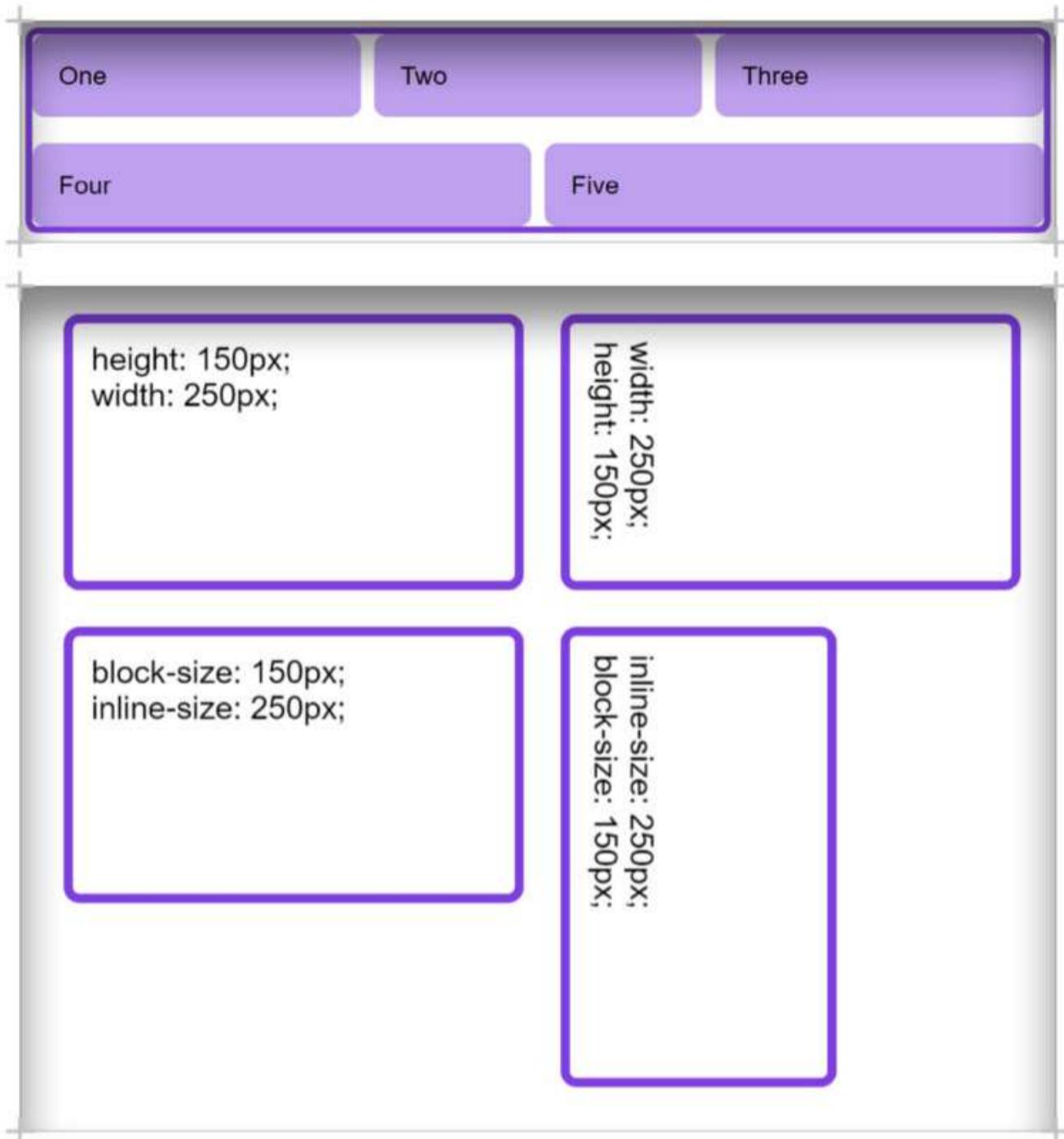
```
.flex {
  display: flex;
  flex-wrap: wrap;
  row-gap: 20px;
  column-gap: 10px;
}
```

Logical properties and values

Our CSS properties and values have traditionally been mapped to the physical properties of a screen. For example, we use width and height and we set margins on the top, right, bottom and left of an element. These physical properties seem strange when working in writing modes other than horizontal and top to bottom. As a simple example we can think about a box with both a height and a width.

```
.box {
  height: 150px;
  width: 250px;
}
```

Our box will be 150 pixels tall on the screen and 250 pixels wide. Even if we change the writing mode to a vertical one, the box will remain tied to its physical dimensions.



We now have new logical properties and values that enable us to size elements or refer to their margins, padding and borders in such a way that makes sense even if the writing mode changes. If we return to our previous example, we might want our box to always have a length of 250 pixels in the inline dimension regardless of orientation.

The inline dimension is the way that a sentence runs in that writing mode – so horizontally in English, and vertically in any vertical writing mode. We then want it to have a length of 150 pixels in the block dimension, which is the way that blocks such as paragraphs are displayed in that particular writing mode. So we could size our block as follows:

```
.box {
  block-size: 150px;
  inline-size: 250px;
}
```

top: Browsers implementing the gap properties for Flexbox will mean an end to using margins and negative margins to make gutters

above: Using the logical sizes block-size and inline-size instead of width and height the box rotates to match the writing direction

The box now follows the writing mode in use. There are logical properties and values being created and implemented in values for every physical counterpart: Firefox currently has the best support for these.

Grid level 2 and subgrid

Work is already underway of Level 2 of the CSS Grid Layout specification. This level is all about the `subgrid` feature. Subgrids will mean that in addition to the direct children of a grid container becoming a grid item, you will be able

to create a grid on a grid item and have it use the column and row tracks of the parent. This would mean, for example, that you could create a multiple column grid for your page and use that to line up items nested in the markup.

```
.grid {
  display: grid;
  grid-template-columns: 1fr 2fr 1fr 2fr;
}

.item {
  grid-column: 2 / 5;
  display: grid;
  grid-template-columns: subgrid;
}
```

In the above CSS example, I have a parent element set to display: `grid`, which defines a four-column grid. The child item with a class of `item` is placed on the grid from column line 2 to column line 5, spanning three tracks of the parent grid. By using the value `subgrid` in place of a track listing for `grid-template-columns` on the child item, we tell its grid to use the tracks from the



Subgrids mean you'll be able to create a grid on a grid item that uses the column and row of the parent

parent. Any child of `item` will therefore use the sizing of column tracks as defined on the parent grid.

This is not yet implemented in any browser, however I expect we should start to see implementations soon.

Initial letter

Initial Letter, currently only implemented in WebKit, is a little feature that solves a common problem. It enables the creation of a large initial letter (or drop capital) sunk into the text that follows it.



HOW DOES NEW CSS GET INTO BROWSERS?

If you have been doing web development for a few years, you may be under the impression that new features take a very long time to get into our browsers and therefore there is no point looking at features with little browser support. Things have changed and the time that it takes for a new feature to be designed and implemented can be very short indeed. We saw with CSS Grid Layout how all the browser vendors shipped their implementation within a single year; making the web platform interoperable is something that everyone working on CSS cares about.

When it comes to adding new CSS features to browsers, we sometimes wonder why one browser hasn't added a feature that others already have. Ultimately, it comes down to the fact that each browser is a business with limited people working on browser implementations and decisions must be made about which features to implement next. You can help encourage vendors to implement new features by actively demonstrating a need for them. There are several ways to do this and the first is simply to use the feature. Browser vendors search the web to see how much usage a feature has when deciding what to prioritise. Another way is to write about features, even on a personal blog. This shows interest from web developers. You can also go to places such as the Edge Developer Feedback site (wpdev.uservoice.com/forums/257854-microsoft-edge-developer) or find the bug on Bugzilla for Firefox and Chrome and star it.



Above The CSS Exclusions feature noted to have 'no signals' from developers, therefore indicating little interest from the web development community.

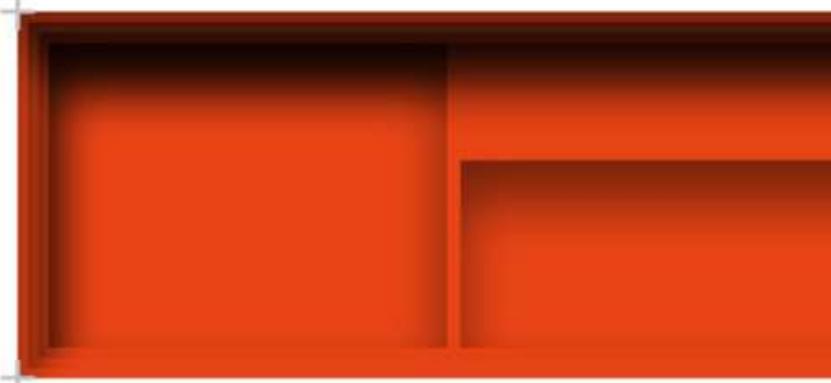
A Balloon Ascension at Midnight

We had agreed, my companion and I, that I should call for him at his house, after dinner, not later than eleven o'clock. This athletic young Frenchman belongs to a small set of Parisian sportsmen, who have taken up "ballooning" as a pastime.

After having exhausted all the sensations that are to be found in ordinary sports, even those of "automobiling" at a breakneck speed, the members of the "Aéro Club" now seek in the air, where they indulge in all kinds of daring feats, the nerve-racking excitement that they have ceased to find on earth.

I might add that these facts were but vaguely known to me before I had been introduced, by a mutual friend, to this nouveau siècle young sportsman, and had accepted his invitation to accompany him in his next aerial voyage.

When we reached the vacant lot at the huge gas works of St. Denis, where our balloon was being inflated, I could not help feeling a bit alarmed at the sight of that little bubble—only a few hundred cubic metres—and the very small basket



left: A fancy initial letter can be inset into our content with the `initial-letter` property, which is currently only available in Safari

AXISPRAXIS [playground](#) [blog](#)

Introduction

MY SPECIMENS

Old Default
Compressa

SPECIMENS

Jabin
方正悠黑
文鼎晶熙黑
晶熙ゴシック体
Amstelvar
Avenir Next
Bitcount
Buffalo Gal
Compressa
Decovar
DIN 2014
Dunbar
Fit

EXP

Compressa is a geo European styles of numerous sets of characters for additional workhorse gives significant sports team logos a The proportions, the smallest dimensions and widths contain of a reliable text table shapes and use the fonts for

[More about Compressa](#)

- ▶ The CSS is one property: `initial-letter`; to see it working you need the prefixed WebKit property for Safari and iOS Safari. The two values for `initial-letter` are the number of lines the letter should span in height and then the number of lines it is to be indented into the text.

```
h1+p::first-letter {
  font-weight: bold;
  -webkit-initial-letter: 4 3;
  initial-letter: 4 3;
}
```

Variable fonts

If you have ever used a web font in a design, you will understand the problem of needing to include – and therefore your user needing to download – each variant of the font that you need to use. For most fonts, you will want the regular, bold and the italic versions of the font. That's four requests plus a reasonable amount of data to download.

A variable font is a single font file that contains all of the above variants and many more. OpenType Font Variations is technology jointly developed by Microsoft, Google, Apple and Adobe and this feature should make using beautiful typography on the web much easier.

To utilise variable fonts you need to use a font that supports the feature, and a browser that has implemented the `font-variation-settings` property, which enables you to control the various axes of your chosen font. Support in modern browsers is excellent. To get a feel for how controllable fonts can be, check out the Axis Praxis website (axis-praxis.org), where you can play with various fonts and copy out the CSS used for the font variant that you have created.

To find and test variable fonts, visit v-fonts.com. The Variable Fonts Twitter account (twitter.com/variablefonts) is worth following to discover new font releases and other news.

Scroll snapping

CSS Scroll Snapping means that you can create interfaces that snap to scroll points. This is useful for full-page interfaces that you want to act in a similar way a mobile app might, snapping from page to page.

The code below creates a list of items, where the parent has a fixed height and the overflow is set to scroll. I want the items to snap to the top of the container as they are scrolled to.

On the parent element we add the property `scroll-snap-type`, which has a value of the axis that we are scrolling



Scroll snapping is useful for full-page interfaces you want to act in a similar way to an app, snapping from page to page



COMPRESSA PANDA

metric, sans serif typeface inspired by the mid-20th century. PRO-Font has numbers, small caps and alternative characters. This flexible design, product labels, letterheads and an uncompromising look.

It and details are designed for tensions and each of its weights retains the most important feature surface. Enhanced fonts with fractions allow designers to the most complex information.

above: Play with the capabilities of variable fonts using the Axis Praxis website, and find fonts which support the new features

on and then a keyword of `mandatory` or `proximity`. The `mandatory` keyword will force snapping to the snap point, therefore you should be careful when using this that you don't cause a situation where the user is unable to scroll to some of the content because of the scroll snapping.

On the items we specify where we want to snap to using the property `scroll-snap-align`. In this case I have selected `start`; the other values are `center` and `end`.

```
ul {
list-style: none;
border: 5px solid rgb(126,63,222);
border-radius: .5em;
height: 300px;
padding: 0;
overflow-y: scroll;
scroll-snap-type: y mandatory;
```

CSS SPECIFICATION LEVELS

In this article I have referred to different levels of CSS specification. For example, the new work on CSS Grid subgrid is in Grid Level 2, while the new features for Media Queries are part of the Media Queries Level 4 specification. These levels refer to the progress of individual specifications through the standardisation process. You may have heard people talk about CSS3, and the modules that we used to refer to as CSS3 were all the modules that contained CSS, which existed in CS2.1 prior to the modularisation of CSS. In CS2.1 we had one single specification that included everything in CSS. CSS3 marked the move to a more modular process and from this point each part of CSS could move forward at different rates.

Therefore, a specification, which was at level 3 at that point and became a W3C Recommendation at Level 3, will have new features added to a Level 4. Once that specification is complete then work will start on a Level 5. New specifications such as CSS Grid Layout, which did not exist in CS2.1, start life at Level 1. A draft goes through various statuses before becoming a W3C Recommendation. Importantly to us as web developers, to get to that point each feature needs to have two different implementations. This prevents CSS being standardised in a way that can only be implemented in one browser. To find out more about how new CSS becomes part of our browsers, watch this talk that I gave at CSSConf.EU: [youtube.com/watch?v=cYGOv2ToZjY](https://www.youtube.com/watch?v=cYGOv2ToZjY).

Category	Status	Count
CSS Color Level 4	WD	1
CSS Fonts Level 4	WD	1
CSS Rhythmic Sizing Level 1	PR	1
CSS Image Values and Replaced Content Level 4	WD	1
CSS Fill and Stroke Level 3	PR	1
CSS Logical Properties and Values Level 1	PR	1
CSS Overflow Level 4	WD	1
CSS Grid Layout Level 3	PR	1
CSS Text Decoration Level 4	WD	1
CSS Layout API Level 1	PR	1
CSS Values and Units Level 4	WD	1
Reworking	WD	1
CSS Box Model Level 3	WD	1
CSS Generated Content Level 3	WD	1
Abandoned	Draft Standard Track	1
Current	NOTE	1
Upcoming	Notes	1
Notes	Dangerously outdated, see CSS 2.1	1

Above The future of CSS is modular – and that means a change to the way specifications for different features are set out. You can find out more and get involved at [w3.org/Style/CSS/current-work.en.html](https://www.w3.org/Style/CSS/current-work.en.html)

```
}

li {
background-color: rgba(126,63,222,.3);
padding: 40px 20px ;
border-bottom: 1px solid rgb(126,63,222);
min-height: 150px;
scroll-snap-align: start;

}
```

Media Queries Level 4

The Media Queries Level 4 specification gives us some interesting new ways to detect the device a visitor is using, plus some syntax improvements that help to make Media Queries less verbose.

Detect pointer type

The ways in which people interact with your site or application are changing. Your visitor might be visiting your site on a touchscreen-enabled device, using a keyboard and mouse or – with devices

```
/* CSS rules useful to people with devices  
that have hover support */  
}
```

These Media Queries give you another way to test for device capabilities in order to give a great experience to all visitors to your site. They are currently supported in all modern browsers other than Firefox.

Syntax improvements for Media Queries

The Level 4 specification also includes some syntax improvements as Media Queries currently are very verbose – in particular when specifying a range, for example:

```
@media (min-width: 40em) and (max-width:  
59em) {  
    /* CSS rules for screen sizes  
between 40em and 59em */  
}
```

Digitized by srujanika@gmail.com



Instead of asking the browser about the device being used, a feature query asks if it supports a particular CSS feature

such as the Microsoft Surface Book acting like traditional laptops that also have a touchscreen – both at once. Therefore, looking at screen size isn't a good way to find out what type of device your user actually has. Media Queries Level 4 introduces Interaction Media Features, which enable us to find out what type of pointer a user has, and test for properties such as the ability to hover.

For example, if I wanted to add some CSS for touchscreen users, I could use the following code to test for a coarse pointer:

```
@media (pointer:coarse) {  
    /* CSS rules for touch screen */  
}
```

I could also test for the ability to hover:

```
@media (hover) {
```

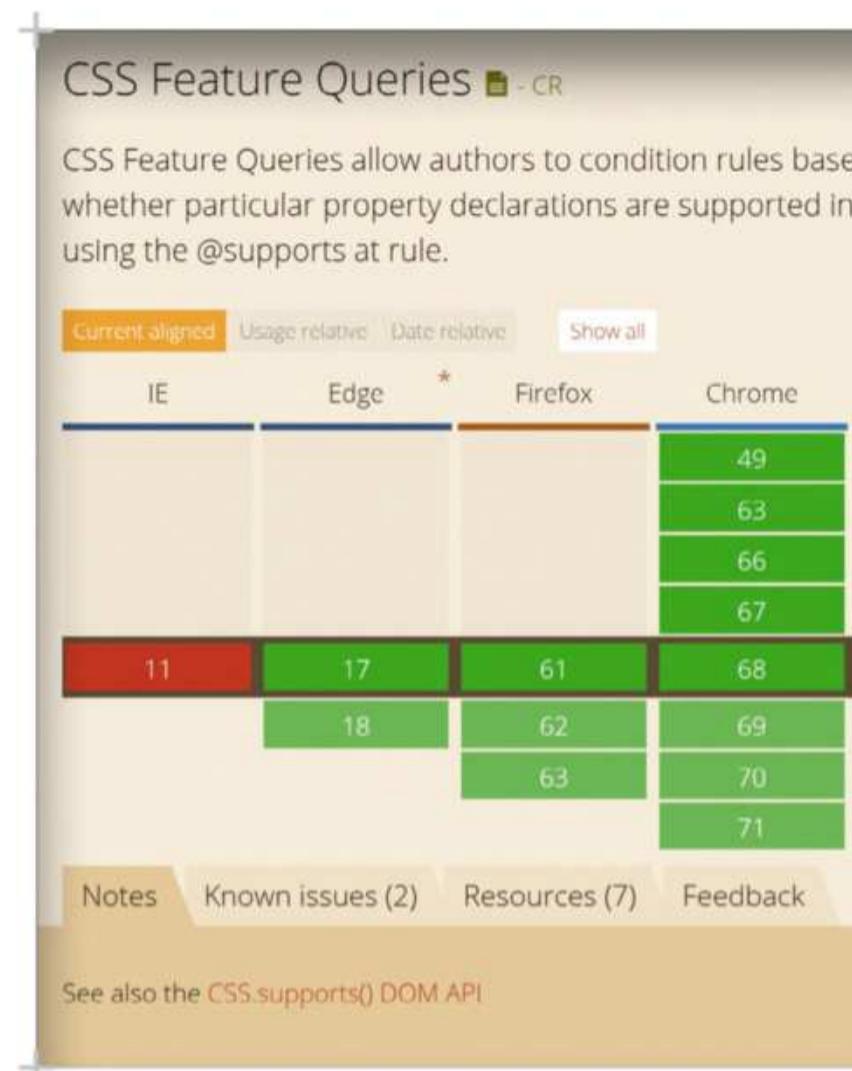
The new specification enables us to use the following syntax and achieve the same thing:

```
@media (40em <= width <= 59em ) {  
    /* CSS rules for screen sizes  
between 40em and 59em */  
}
```

This syntax looks strange at first but what we are saying is that the width should be greater than or equal to 40em, and also less than or equal to 59em. It may be helpful to look at the width first then compare it to the things on either side. The old syntax isn't going away so you can use either.

Use CSS to test browser support

CSS has even developed a way for you to test for browser support of new CSS



See also the [CSS supports\(\) DOM API](#)

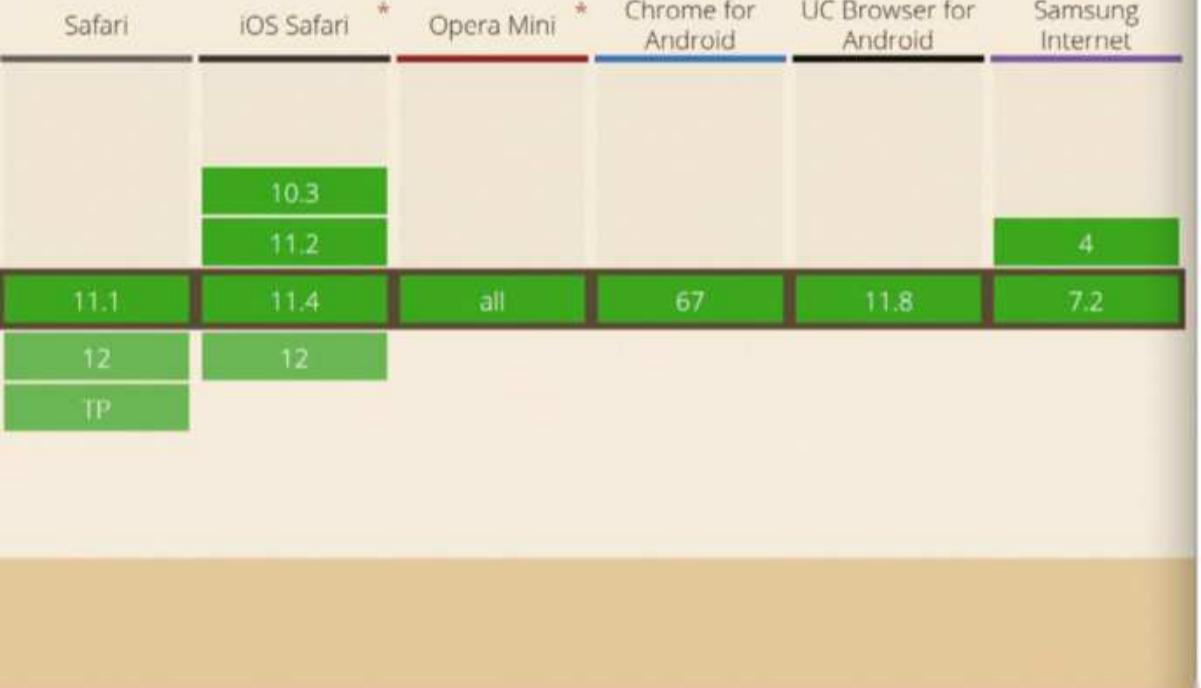
features, with Feature Queries. A Feature Query behaves in much the same way as a Media Query, except that instead of asking the browser something about the device being used to view the site, a Feature Query asks the browser if it supports a particular CSS feature. This makes it easier to use new features in a safe, progressively enhanced way.

```
@supports (display: grid) {  
    /* CSS rules for browsers that  
support grid layout */  
}
```

Browser support for Feature Queries is great, however they are not supported in Internet Explorer 11 and below. This is less of a problem than you might think: as long as you test for support and then write the code for supporting browsers

The future of CSS

ed on
CSS



you can overwrite anything you needed to previously do in your CSS for those older browsers. Anything new that comes into CSS you can use Feature Queries to test for. I think they are one of the best things to come into CSS recently because they enable us to start using new features more quickly and, as you've seen in this article, there is a lot to get started with! ■

Top: Feature Queries have excellent browser support, test-for support, and anything new in CSS can be tested for using them

Caption: Our scroll snap example snaps each item to the start as the visitor scrolls a box with overflow: scroll vertically

RESOURCES

MDN

developer.mozilla.org/en-US/docs/Web/CSS

My go-to resource for anything about CSS is MDN. The project is documenting the entire web platform and the CSS documentation includes full guides to features such as grid, individual property pages with interactive examples and browser implementation data.

CSS Grid Level 2 – Here Comes Subgrid

smashingmagazine.com/2018/07/css-grid-2/

A useful article explaining how subgrid will work in our browsers, based on the in-progress Editor's Draft, complete with code examples.

Practical Scroll Snapping

css-tricks.com/practical-css-scroll-snapping/

For more information about scroll-snapping see this article on CSS Tricks from Max Kohler.

Using Feature Queries in CSS

hacks.mozilla.org/2016/08/using-feature-queries-in-css/

To get started with Feature Queries, Jen Simmons has an article on the Mozilla Blog.

Grid By Example

gridbyexample.com

For Grid Layout examples and a full free video tutorial, pay a visit to Grid by Example.

CSS Layout News

csslayout.news

Sign up for CSS Layout News and once a week you'll receive a list of new articles and resources on CSS Layout in your inbox.



ARTIFICIAL INTELLIG



Artificial intelligence (AI) is an integral part of our world, embedded in nearly every technology we have. AI is in the Google searches we run, the voice commands we give Alexa and the map directions we follow. It's part of ordering our morning coffee and in the navigation system in our cars. Our AI-powered phones, which are never out of reach, have become an extension of our physical selves and our very identity. AI has the potential to make almost everything we do easier and vastly improve our world.

As a technologist, it's critical that you learn as much as you can about how to leverage these technologies and integrate them into your work.

So what is AI?

Artificial Intelligence (AI) is defined as a machine-based intelligence, as opposed to the biological-based intelligence of humans and animals. AI refers to machines performing functions of cognition, such as learning, planning and solving problems. But the definition seems almost too simplistic to capture the incredible range of incarnations of AI.

Communication, transportation, scientific discovery, medical research and service industries – all are enhanced

ENCE FOR THE WEB

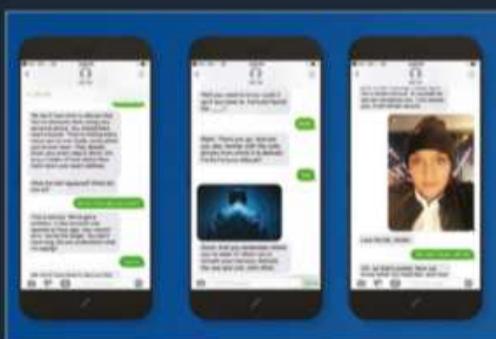
Case Study John Wick 2 chatbot experience

Chatbots, like the one you're creating with this tutorial, can be used in a wide range of service and customer support roles. They can help you shop online, troubleshoot IT issues and pick the right vacation. They can also be used creatively as well, like in this cool, interactive chatbot developed by Jam3.

Lionsgate used this engaging AI agent to promote the movie 'John Wick: Chapter 2', starring Keanu Reeves. The experience draws fans into the world of the hitman character John Wick, enabling them to interact with the master assassin. Using an SMS-based chatbot, fans interact via text messages through their phone. It leverages the 'faceless' interactions we are already accustomed to having via text. Just like in the film – where assassins are contacted via text message – fans get contacted the same way.

Natural language processing via Wit.AI interprets a wide range of user messages, trained with a high volume of potential phrases. Hundreds of responses were also created to yield a unique experience for each user. Location tracking was used to further enhance the personalisation of the experience, connecting the storyline to the users' location.

Computer Vision via Microsoft's Vision API, was also used to recognise content in images. For example, if you happened to be wearing glasses in your photo, Wick might respond with: "Lose the glasses. They can be a hazard when fists and bullets start flying."



▶ by AI. It performs a wide range of activities including game theory, electronic trading, robotic automation and exploring the vastness of space.

Another way to define AI is as intelligent 'agents' which can perceive their environment and take actions towards achieving their goals. You're going to learn how to create your own intelligent agent later on in this article, in the form of a chatbot.

Blurred lines and the challenge of defining AI

Defining AI has become increasingly difficult because technology evolves so rapidly. We tend to extend the definitions of AI as tasks performed by AI become routine. Basic tasks such as autocorrect or autocomplete hardly seem notable today, in the face of self-driving cars and computer vision.

In fact, AI is so integrated with our everyday experience we may be hardly aware of it. We may lose sight of where we end and AI begins. AI is so prevalent it is becoming invisible to our perception. Instant search, with most relevant results at our fingertips, is just expected. Massive collective knowledge available with a voice command. Your phone shows you directions to a location that you are 'most likely' to be going to next (yep, your phone knows you walk to the coffee shop every morning before work).

Disciplines of AI

Despite the ever-changing definitions, there are several identifiable objectives or disciplines within AI. Some applications are but are not limited to:

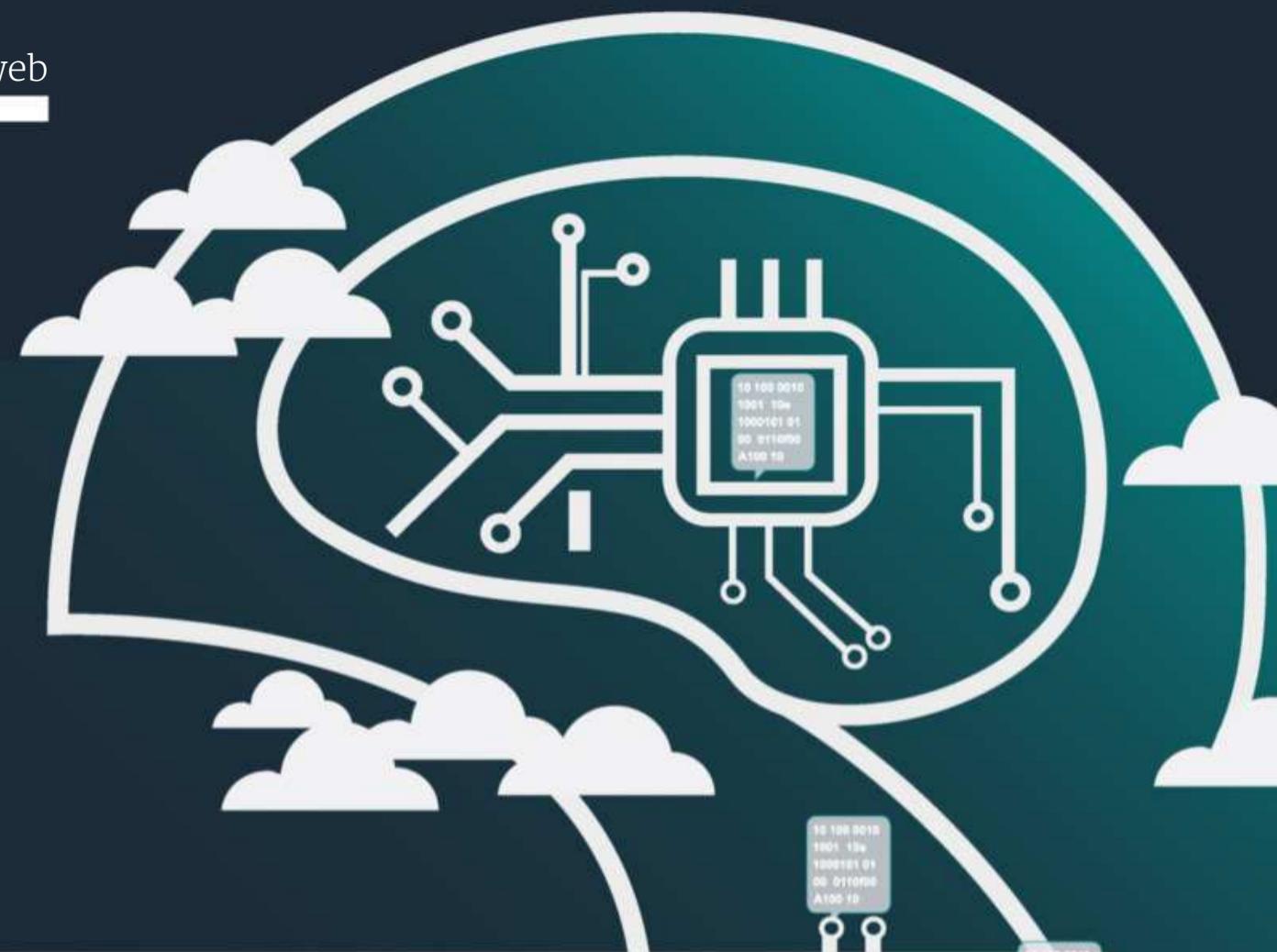
- Knowledge reasoning
- Machine learning
- Natural language processing
- Computer vision
- Speech recognition
- Robotics
- Virtual reality
- Data mining
- Game theory

AI knowledge reasoning

Knowledge reasoning is defining information in a format that a computer system can use to solve complex problems such as diagnosing a medical condition or having a dialogue using natural language. It combines problem-solving psychology and logic to automate reason.

Machine learning

Machine learning uses statistical techniques to 'learn' without being explicitly programmed. Using data samples, the AI progressively improves by analysing them and making continual predictions. Some examples include Amazon recommendations, Siri voice recognition, spam filtering and computer vision.



Natural language processing

Natural language processing (NLP) focuses on the interactions between machines and human languages. It is the objective of NLP to process and analyse vast amounts of natural language data, to have improved 'natural' communication between humans and machines. This field of AI includes speech recognition, understanding language and generating natural language.

Computer vision

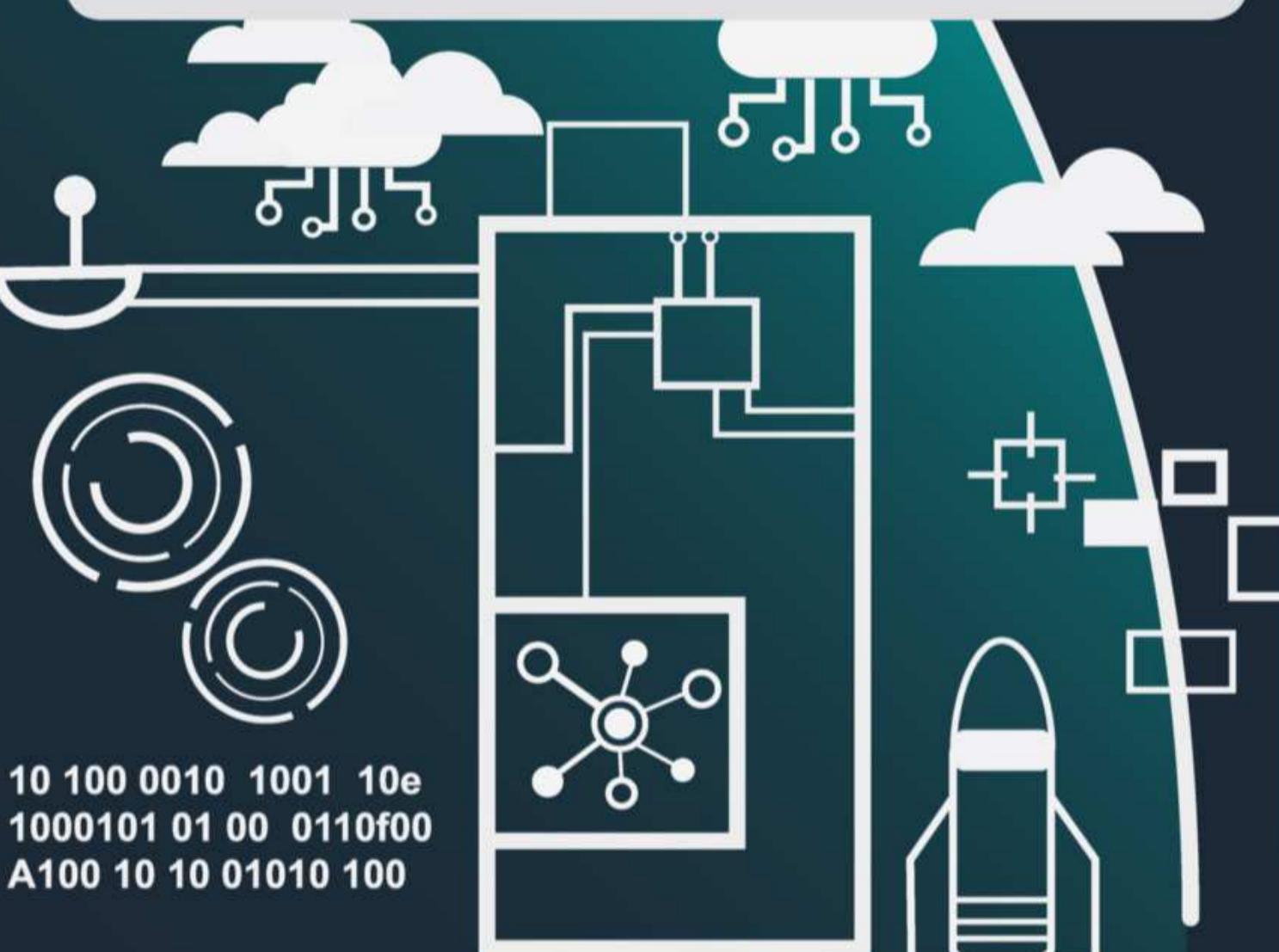
Computer vision is an incredible field that focuses on how AI can gain comprehension or understanding from digital images or videos. The objective is to automate what biological visual systems can do and make AI see and understand what it is looking at.

Examples include detecting events, tagging and classifying images, motion tracking in videos, image or scene restoration and object recognition.

AI in web applications

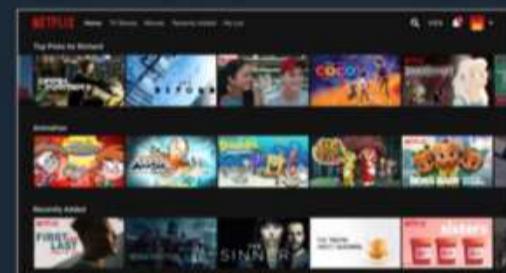
Websites and apps can have a variety of moving parts, including front-end creative, server-side processing, APIs, data storage and various forms of interconnectedness. AI can plug in any of these components. On the front end, you can connect voice commands, chatbot interfaces or reactive WebGL creative elements. On the back end, databases use intelligent algorithms to maximise speed and analysis. APIs can provide a layer of abstraction from a wide range of AI functions, from predictions to collective training.

On the front-end, you can connect voice commands, chatbot interfaces or reactive WebGL creative elements



Case Study Netflix movie recommendations

Netflix combines a powerful prediction system, based on a high-volume data continually collected from viewers. What you watch, how long you do, how often and when you watch is all tracked. Movies are tagged and categorised by genre, length, type, actor, theme, director, location, content and many more data points. Your information is also used to intersect this data. Training is done on millions of viewers' watching habits: eventually the system has a very accurate prediction of what you'd like to watch.



Artificial intelligence APIs

To fully customise your front-end apps and experiences, you'll want to leverage the abstracted interfaces of AI APIs. These endpoints will enable you to interact with a variety of services. You can easily send data from your app and receive responses. Whether you need to process a user's input, analyse an image or make predictions based on datasets, these APIs can get it done. Add these AI resources to your projects:

Dialogflow by Google dialogflow.com

Allows you to build and manage powerful AI agents using natural language processing and much more.

Watson AI

ibm.com/watson/developer
Tap into one of the most power AI systems in the world via API endpoints. Data mining, predictions and computer vision are all possible.

CREATING YOUR FIRST CHATBOT

To create your first chatbot, we'll use Google's new Dialogflow toolset. It harnesses powerful machine learning as well as speech-to-text. It can be incorporated right into your website as a widget or customised to your needs.

CREATE AN ACCOUNT

1 Go to dialogflow.com and create your account. Sign in and agree to the permissions to enable Dialogflow to have access to your account.

CREATE AN AGENT

2 Dialogflow uses the term 'agent' to represent instances of your AI. Think of the agent as the virtual intelligence you are creating. You could have many agents working for you, each with its own personality and purpose.

Click on the 'Create Agent' button and enter a name for your agent: 'HAL 9000'.

CREATE AN INTENT

3 First, you need to create an Intent. We are defining the 'intention' of the user's inputs. Click 'Create Intent' and name it 'open doors'. Press 'Save'.

TRAIN THE AI FOR THIS INTENT

4 Train the AI for this intent by providing phrases that a user might use. The NLP AI will use these and derived variations to train the agent. Add the following training phrases in the 'Training phrases' window and add as many of your own as you like:

- 'Open the Pod bay doors, Hal.'
- 'Open the doors.'
- 'Let me in, Hal!'

ADD RESPONSES

5 Next, you need to add some responses that the agent will respond with. You

enter these in the 'Responses' window. Try out some like this:

- 'I'm afraid I can't do that, Dave.'
- 'I can't do that right now.'

Then press 'Add Responses' and 'Save' up at the top again. You'll see notifications that the agent is being trained and then it is ready.

TEST OUT THE CHATBOT

6 On the right-hand side of the screen is a testing tool. The chatbot will use Google's speech-to-text service to translate your voice into text if you try that out. You should see the results of your request and the response the AI agent selected. Very cool!

CREATE AND USE AN 'E ENTITY

7 Entities are concepts that can be defined and reused in the agent's responses as variables.

Let's train the AI to understand when a user is expressing an emotion then use that in its response to the user.

On the left-hand menu, click 'Entities'. Type 'emotion' for the name of your new entity. Keep 'Define synonyms' checked.

Click in the table below and type 'angry' as the first emotion. Then click to the right of that and add synonyms such as 'mad', 'upset' and so on.

Then add another entry for 'scared' and use synonyms 'afraid', 'terrified', etc., that you like. Press 'Save' when done.

This has now trained the Agent to understand that 'angry' and 'scared' are emotions a user may communicate. All those synonyms are variations that might occur. The AI will generate some as well.

CREATE A NEW INTENT

8 Now we are going to create a new intent to use the 'emotion' entity we

See how it works in [Google Assistant](#).

Agent

USER SAYS
open the doors hal

COPY CURL

DEFAULT RESPONSE

Sorry Dave. I can't do that now

INTENT
[open doors](#)

ACTION
[Not available](#)

PARAMETER VALUE

Above Train the AI for an intent by providing phrases that a user might use

Above right Clicking on Web Demo will display a code snippet you can use to drop the widget into your own website

have created. Call this intent 'emotions' and click 'Save'.

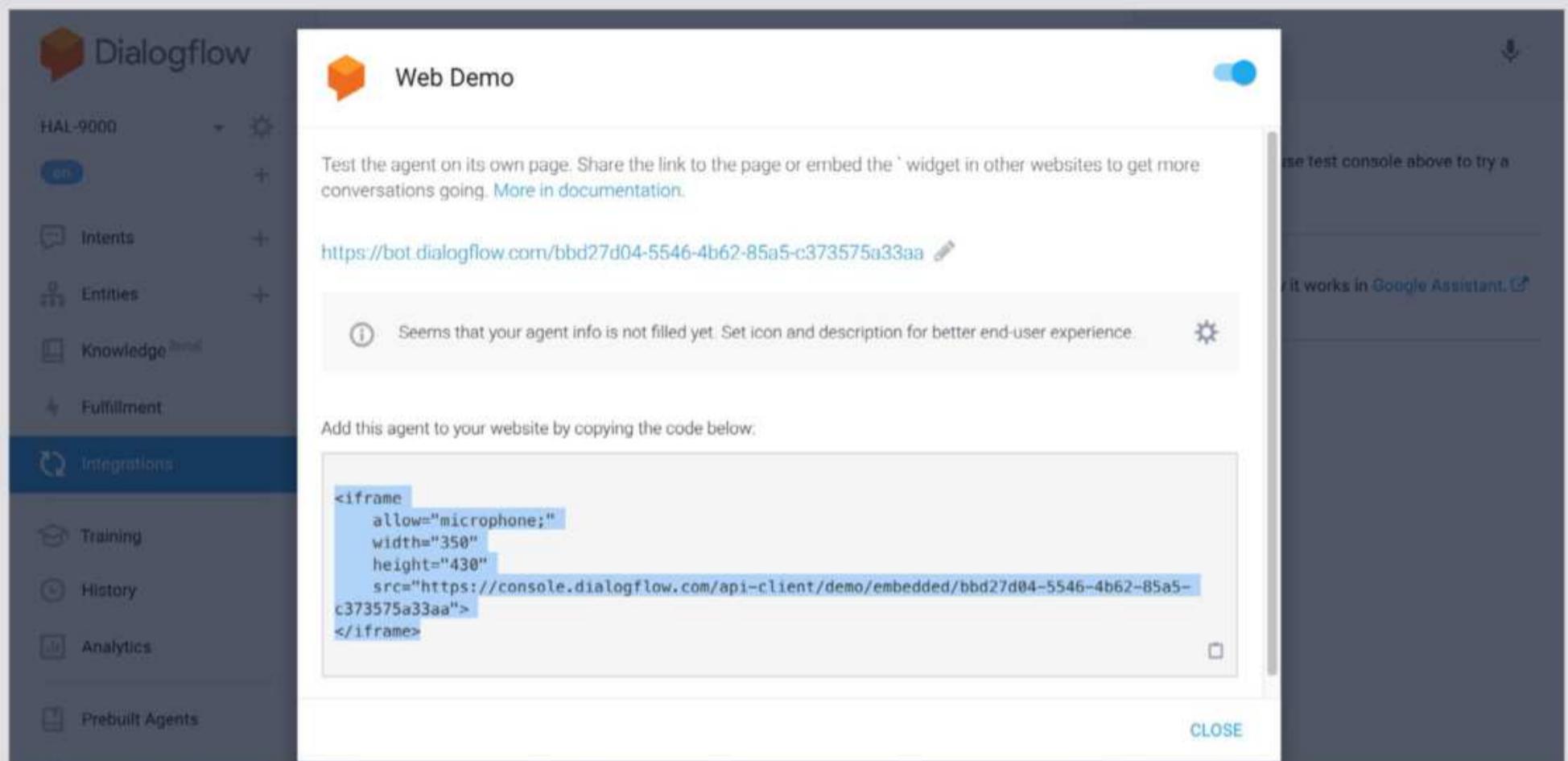
Next add new training phrases such as 'you're scaring me', 'you're making me mad' and 'I'm very angry', using variations of angry and scared keywords. This will train the agent to understand the various ways that a user may phrase this emotional statement.

You'll notice the system highlights the scared and angry words for you. It's already flagging these as entities. It has also added an entry into the 'Actions and parameters' window. This enables you to use these entities in your responses, too.

ADD A RESPONSE USING THE NEW 'EMOTION' ENTITY

9 In the Responses window, add new responses that use this new entity. Note the '\$' to denote the '\$emotion' Entity. Try adding these responses:

- 'I am sorry you are feeling \$emotion, Dave.'
- 'Feeling \$emotion is a human response, Dave.'



Click 'Add Responses' and press the 'Save' button at the top of the screen to save the entire Intent.

TEST YOUR CHATBOT AGAIN

10 Try saying or typing the following phrases in the testing tool.

- "You're making me very angry Hal."
- "You're freaking me out."

Notice how it responded using 'scared' with the second one? It used our synonym, 'freaked out' to know that we meant scared. Very cool.

Feel free to play around with this as well as add some more intents and responses that you like and then we'll add this to a web page.

ACTIVATE WEB INTEGRATION

11 To add it to your web page, click 'Integrations' on the left-hand menu. Then click on the 'Web Demo' box to turn that option on.

A pop-up will appear that shows you a direct link so you can use to test your integration out right away. It will also display a code snippet that you can use to drop the widget into your own web site. Copy that snippet to the clipboard so you can paste it into your site.

The technology creates fantastic opportunities but it also comes with a need for responsible, ethical use

CREATE A BASIC WEB PAGE AND ADD THE SNIPPET

12 Create a basic HTML page and include that code snippet next. Try out the following code and upload it to your server or run it on your local server. Replace the snippet below with the one you copied from your Dialogflow agent:

```
<!DOCTYPE html>
<html>
<head>
  <title>NET - AI Chatbot</title>
</head>
<body>
  <iframe
    allow="microphone;"
    width="350"height="430" src="https://
    console.dialogflow.com/api-client/demo/
```

```
embedded/bbd27d04-5546-4b62-85a5-
c373575a33aa">
</iframe>
</body>
</html>
```

Parting thoughts

Artificial Intelligence (AI) enables us to create new ways of looking at existing problems, from rethinking environmental strategies to how we learn. Your projects – whether apps, web sites or games – can leverage AI to make them more engaging, easier to use and have more valuable results. The technology creates fantastic opportunities but it also comes with a need for responsible, ethical use. Seek ways to enhance experiences and make life better as you learn and grow. ■

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THIS MONTH FEATURING...



BUILD CROSS-PLATFORM APPS WITH REACT NATIVE

76



GET GLITCHY IN THREE.JS USING VFX SHADERS

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USE SERVICE WORKERS TO OFFER OFFLINE ACCESS

92



Banjo brunch, freegan crucifix locavore fashion axe poke hot chicken.



COGNITIVE ACCESSIBILITY ON THE WEB

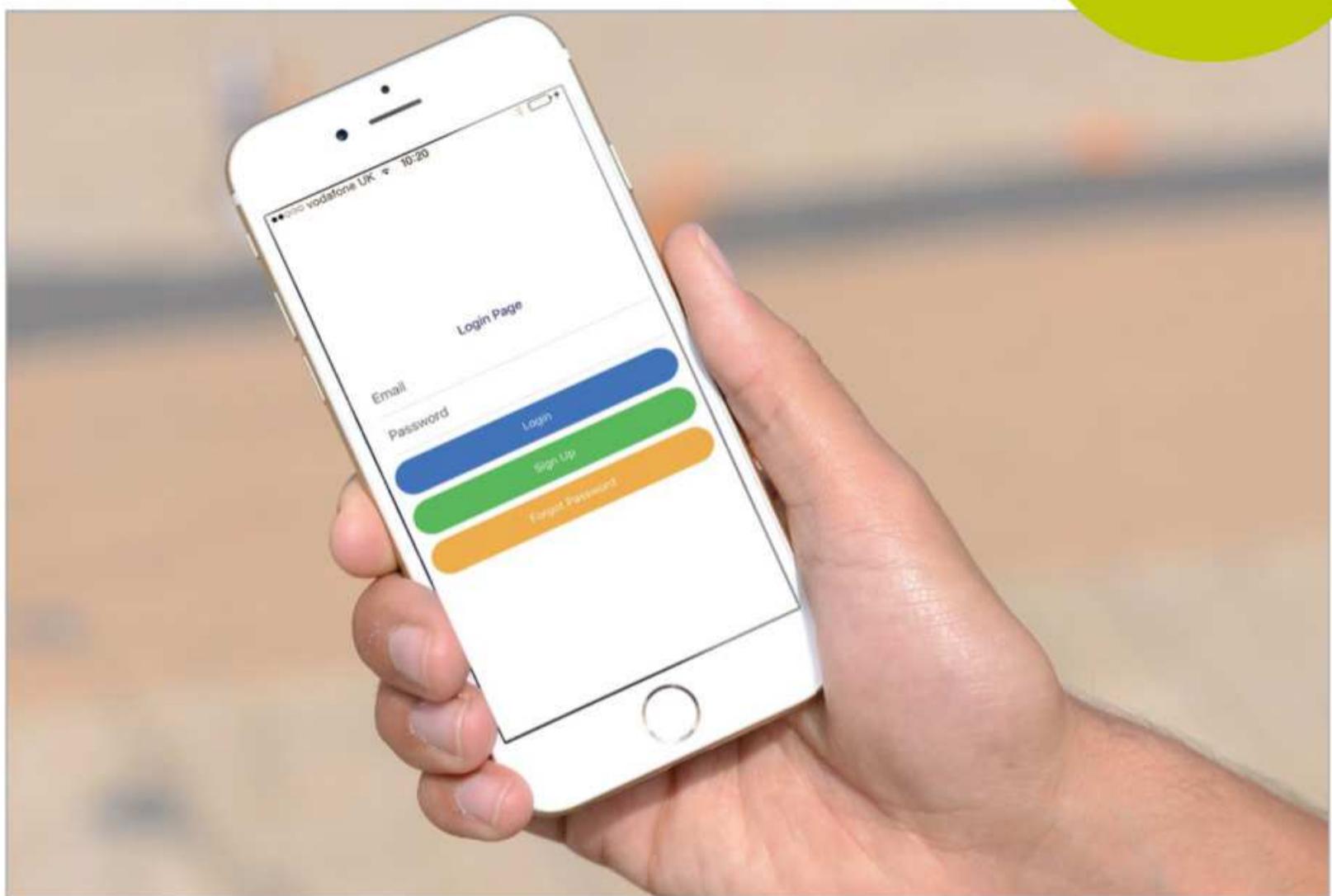
98

GET CREATIVE WITH CSS MASKS AND CLIPPING

82



ABOUT THE AUTHOR

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Mobile Development[View source](#)[files here!](#)All the files you need for this
tutorial can be found at
netm.ag/2Mrshfe

★ REACT NATIVE

BUILD CROSS-PLATFORM APPS WITH REACT NATIVE

Darryl Bartlett demonstrates how you can use React Native to build fully functional mobile apps for iOS and Android

There used to be a time when developers would need to learn Swift/Objective C to build an iOS app, or Java if they wanted to build an Android app. We have now reached an exciting time where web developers can use their existing skills to build both websites *and* apps without having to learn a completely new language.

React Native is a JavaScript library developed by Facebook. It was released back in 2013 and has helped shape apps like Skype, Bloomberg, Wix and many more (facebook.github.io/react-native/showcase.html). Not only can you use your existing knowledge of JavaScript but you can also use the same codebase to build for both iOS and Android.

GETTING STARTED

To get started building your React Native project, you will need to make sure that you have Node.js (nodejs.org/en/) installed. You can then install the `create-react-native-app` command line utility by opening a new terminal window and running the following command:

```
npm install -g create-react-native-app
```

You can then create your new project by running the following command:

```
create-react-native-app YourAppName
```

You will then need to navigate to your folder via the command line and start the development server.

```
cd myNewApp
npm start
```

You can then begin working on your app by opening the App.js file using a code editor.

RUNNING YOUR APP

Since you used `create-react-native-app` via the command line to build your project, you can use the Expo client app to test your application. All you need to do is download the app from the iOS App Store or Google Play Store and then scan the QR code from inside the terminal. You will need to make sure your device is on the same Wi-Fi network as your computer. You can also use the iPhone or Android simulator, if you have Xcode or Android Studio installed.

“Not only can you use your existing knowledge of JS but you can also use the same codebase for both iOS and Android”

BASIC REACT NATIVE EXAMPLE

Let's start by adding something very basic. To add some text to your application, you will need to type:

```
<Text>Login Page</Text>
```

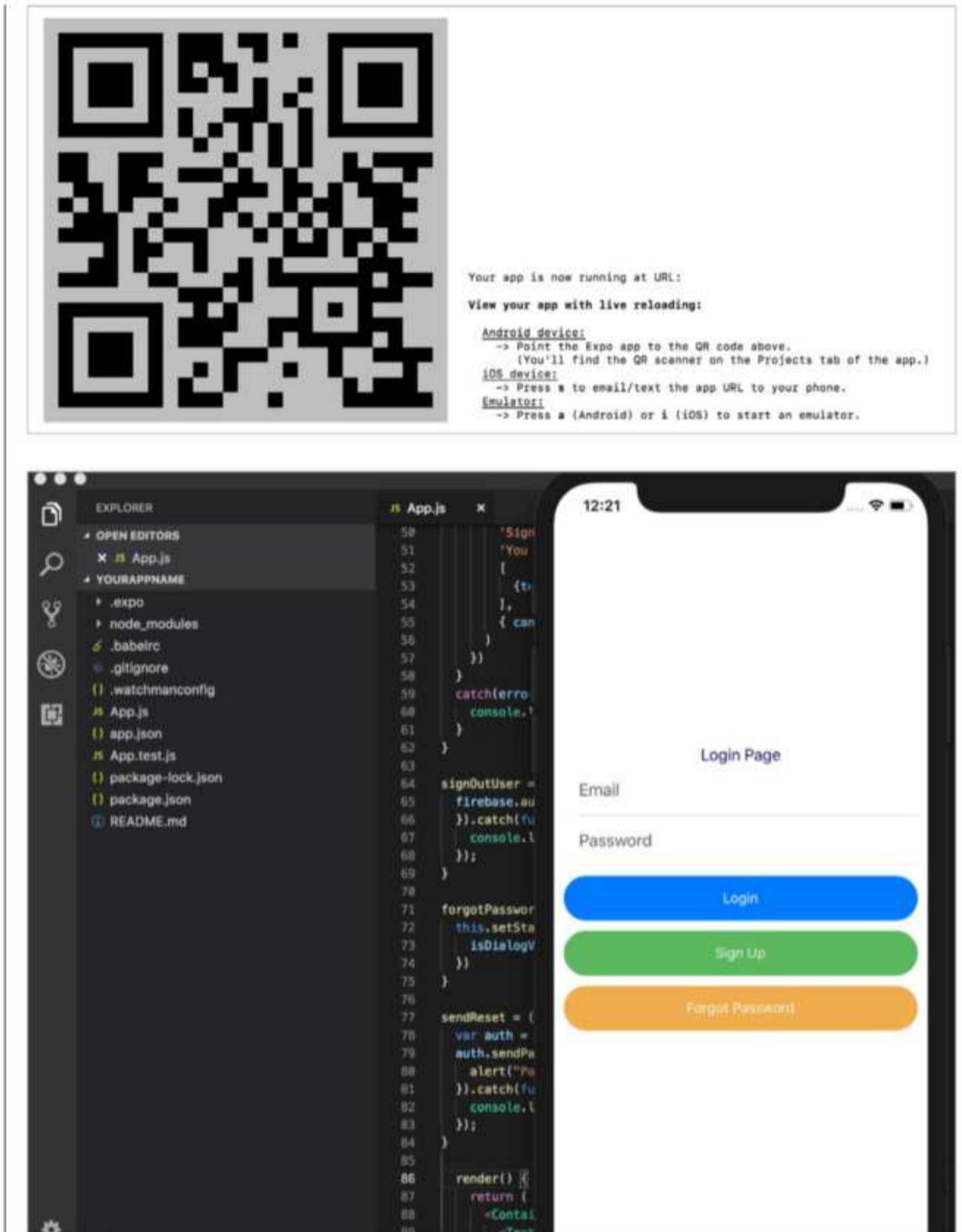
Working with styles is very similar to CSS. If you wanted to add a style to the line of text that you just created, you would simply edit that line of text to:

```
<Text style={styles.mainheader}> My Login App</Text>
```

You can then add the text style under `Stylesheet.create`.

```
mainheader: {
  color: '#000066',
  textAlign: 'center',
  fontSize: 16
},
```

We are now going to create a fully functional login screen so that users can login, register for a new account, sign out and even reset their password. This is something you will see a lot in mobile apps, so it lays down a nice foundation for future projects.



Top Since you used `create-react-native-app` via the command line, you can use the Expo client app to test your application

Above We're now going to create a fully functional login screen so users can login, register and sign out

SETTING UP FIREBASE AND NATIVE BASE

We are going to start by installing three more libraries. The first is called Firebase, which is what we will use for our user authentication, and the second is called NativeBase, which is a UI component library. The last one is called React Native Dialog Input, which enables us to display a dialogue box where users can enter text. Navigate to your project folder using the command line and enter the below:

```
npm install firebase
npm install native-base
npm install --save react-native-dialog-input
```

Make sure you import Firebase, NativeBase and React Native Dialog Input at the top of the App.js file.

```
import * as firebase from 'firebase';
import { Container, Content, Header, Form, Input, Item,
```



Above
Firebase is what we will use for our user authentication. We will need to setup the Firebase config just underneath the import commands

► Button, Label } from 'native-base'
import DialogInput from 'react-native-dialog-input';

Next, we will need to setup the Firebase config just underneath the import commands. You will need to go and setup an account with Firebase to get your various settings. You can do this by registering at firebase.google.com and creating a new project. Remember that you will need to enable email and password authentication from the dashboard.

```
var config = {
  apiKey: "<API_KEY>",
  authDomain: "<PROJECT_ID>.firebaseapp.com",
  databaseURL: "https://<DATABASE_NAME>.firebaseio.com",
  projectId: "<PROJECT_ID>",
  storageBucket: "<BUCKET>.appspot.com",
  messagingSenderId: "<SENDER_ID>"
};
firebase.initializeApp(config);
```

BUILDING THE CONTAINER

The next step is to remove the `<View>` section underneath `render()`, which was automatically placed there by React upon creating the project, and replace it with the following container to setup the login form. The form will contain a label and an input field for both an email address and password. We will also create three buttons: one to login, one to sign up and the final button is for when a user wants to reset their password. We will set a margin at the top of each button to 10 pixels and set the font colour to white.

"We're going to create a login screen so users can login, register for an account, sign out and reset their password"

```
<Container style={styles.container}>
  <Text style={styles.mainheader}>Login Page</Text>
  <Form>
    <Item>
      <Label>Email</Label>
      <Input
        autocorrect={false}>
    </Item>
    <Item>
      <Label>Password</Label>
      <Input
        secureTextEntry={true}>
    </Item>
    <Button style={{marginTop:10}} primary full rounded>
      <Text style={{color: 'white'}}>Login</Text>
    </Button>
    <Button style={{marginTop:10}} success full rounded>
      <Text style={{color: 'white'}}>Sign Up</Text>
    </Button>
    <Button style={{marginTop:10}} warning full rounded>
      <Text style={{color: 'white'}}>Forgot Password</Text>
    </Button>
  </Form>
</Container>
```



Above We will also create three buttons: one to login, one to sign up and the final button is for when a user wants to reset their password

```
Text>
  </Button>
</Form>
</Container>
```

SETTING UP THE EVENTS

Firstly, we need to set up a constructor to set up the default state. The email and password default values will be set to empty. We will also set the value of isDialogVisible to false: this is going to be used for our password reset dialog box later on.

```
constructor(props) {
  super(props)
  this.state = {
    email: '',
    password: '',
    isDialogVisible: false
  }
}
```

We will now add onChangeText events to both of our text inputs, so that every time the user types something into the email or password fields, it will update the state of both email and password to that value.

```
onChangeText={({email}) => this.setState({ email })}
onChangeText={({password}) => this.setState({ password })}
```

We also need to add onPress functions to our login, sign-up and forgotten password buttons. Each one will call a different function. The login button will call a function called loginUser, the sign-up button will call signUpUser and the forgotten password button will call forgotPassword.

```
onPress={() => this.loginUser(this.state.email, this.state.
  password)}
onPress={() => this.signUpUser(this.state.email, this.state. ▶
```

★ REACT NATIVE ADVANTAGES OF USING REACT NATIVE

When it comes to building apps for mobile, a lot of people are very worried about developing apps outside of their native languages. Here are some of the reasons why React Native is perfect for your next mobile project.

Popularity

React Native is the most popular cross-platform framework available. It has a big community and there is always someone out there who can help when you hit a problem.

Code sharing

95 percent of the codebase is shared between iOS and Android, meaning you can use the same code for both platforms.

Instant updating

During development, you can see the results of your code updates instantaneously without having to constantly build and run the project.

Performance

You will find that the performance of a React Native app is very similar to that of a native app. You will find that hybrid solutions can affect performance and you don't always get the feel of a native app.

Release

Because you are building for both platforms using the same codebase, you will be able to release for both iOS and Android at the same time.

Update approval

If you are hosting your own bundle, then there is no reason why you can't use over-the-air updates. This cuts out having to go back through the app store approval process for updates.

Outsourcing

If you head up a development team, then you will only need to find one developer for both platforms rather than having to hire one for iOS and another for Android.

Learning

If you are coming from a JavaScript background, then React Native is incredibly easy to learn.

★ RESOURCES

ADDITIONAL TOOLS

+ Here is a list of resources that will help you on your way when building mobile apps with React Native.

React Native official documentation
facebook.github.io/react-native/docs/getting-started.html

This is the best place to get you started on your journey with React Native. It's filled with documentation and code examples, which are constantly updated.

Expo
expo.io

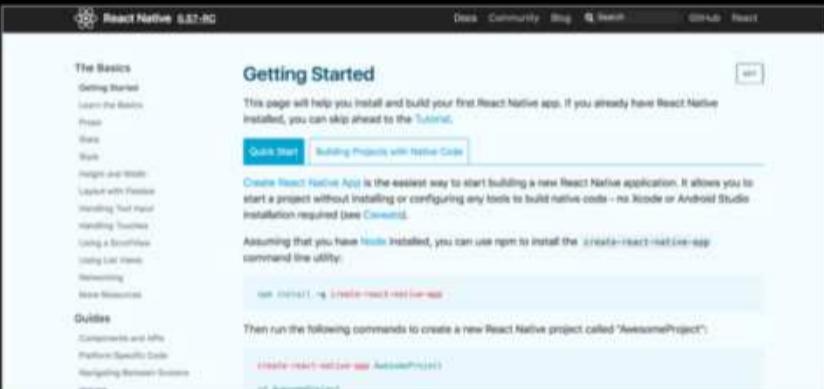
Expo offers a set of tools based around React Native, for things like sharing your app via a QR code or handling config steps for deployment.

The Complete Native React and Redux Course
udemy.com/the-complete-react-native-and-redux-course

This Udemy course by Stephen Grider will help developers of all levels get started with React Native and you will even build some cool projects along the way. The course is currently one of the bestsellers and is highly rated.

Essential React Native Development Tools
instabug.com/blog/react-native-development/

Instabug has compiled a huge list of tools that will help you with development. Everything from IDEs to UI components.



```
► password})  
onPress={() => this.forgotPassword()}}
```

SIGN-UP FUNCTION

It's now time to begin building out our functions. We will begin with the sign-up function (`signUpUser`), which will attempt to create a new user inside Firebase; if it succeeds, then we will display an onscreen alert to inform the user that their account has been set up. However, if the user chooses a password that is less than six characters in length, it will prompt them to enter something that is a minimum of six characters long. Finally, we need to add the catch error handler, so that if the sign-up attempt fails through Firebase, we will print the error message to the console.

“The `loginUser` function will try to login the user with the email and password that has been supplied”

```
signUpUser = (email, password) => {  
  try {  
    if(this.state.password.length<6)  
    {  
      alert("Please enter at least 6 characters")  
      return;  
    }  
    firebase.auth().createUserWithEmailAndPassword(email, password)  
    alert("Congratulations, your account has been setup")  
  }  
  catch(error){  
    console.log(error.toString())  
  }  
}
```

LOGIN FUNCTION

Next, we will add the login (`loginUser`) function. This will try to log in the user with their email and password. If the user successfully signs in, it will display an alert to say that sign-in was successful, along with a sign out button. Once again, we will need to make sure we add a catch error handler in case there is an error with the login attempt.

```
loginUser = (email, password) => {  
  try {
```

```

firebase.auth().signInWithEmailAndPassword(email,
password).then((user) =>{
  Alert.alert(
    'Signed In',
    'You have signed in. Well done!',
    [
      {text: 'Sign Out', onPress: this.signOutUser},
    ],
    {cancelable: false}
  )
})
}
catch(error) {
  console.log(error.toString())
}
}

```

SIGN OUT-FUNCTION

It's now on to the sign-out function, which ensures that the user is signed out once they click the sign out button on the alert.

```

signOutUser = () => {
  firebase.auth().signOut().then(function (user){
  }).catch(function(error) {
    console.log(error)
  });
}

```

FORGOT PASSWORD FUNCTION

To finish off our project, we are going to build out a function that will enable the user to easily reset their password in case they've either forgotten it or want to change it for some other reason. First, we need to create the dialog box just outside of our `<form>` tags.

```

<DialogInput isDialogVisible={this.state.
isDialogVisible}
  title={"Forgot Password"}
  message={"Please input your email address"}
  hintInput={"john@test.com"}
  submitInput={(useremail) => {this.
sendReset(useremail)}}
  closeDialog={() => { this.setState({
  isDialogVisible: this.state.isDialogVisible = false
})}}
>
</DialogInput>

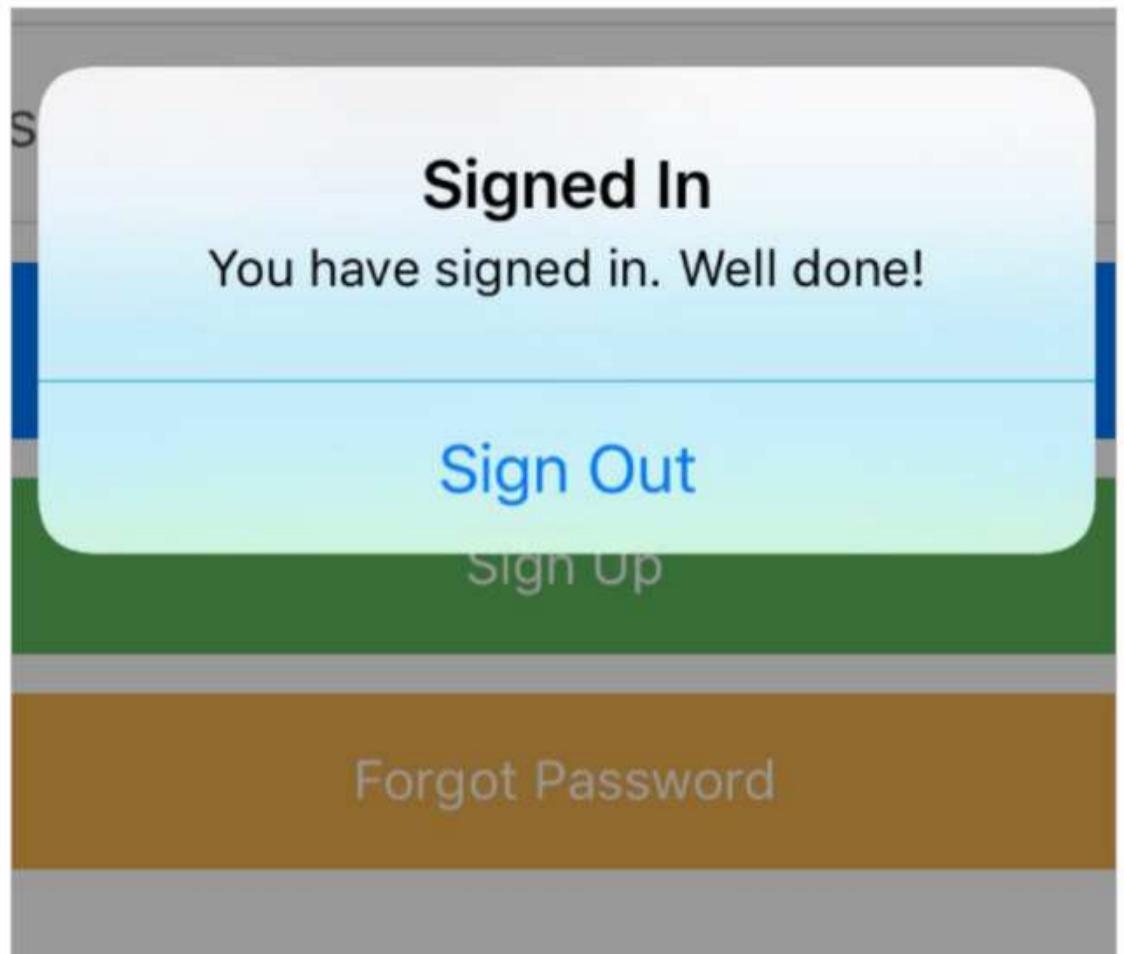
```

We now need to make the dialog box appear, so we will create the `forgotPassword` function, which will change the state of `isDialogVisible` to true.

```

forgotPassword = () => {
  this.setState({
  isDialogVisible: this.state.isDialogVisible = true
}

```



```

  })
}

```

The dialog box will prompt the user to enter their email address. If the user clicks the cancel button, then the box will close, as it changes the state of the `isDialogVisible` back to `false`. If the user clicks the submit button then it will call a function called `sendReset` along with the email address.

Inside our `sendReset`, we will use the email address to create the Firebase `sendPasswordResetEmail` request.

```

sendReset = (useremail) => {
  var auth = firebase.auth();
  auth.sendPasswordResetEmail(useremail).then(function()
  {
    alert("Password reset email has been sent")
  }).catch(function(error) {
    console.log(error)
  });
}

```

CONCLUSION

This is a great starting point for your own app and it could easily be improved upon by adding more screens, displaying errors on the front end and much more. I hope this project has helped you understand the possibilities that are available with React Native. Don't forget that you can grab the project files at github.com/darryl-bartlett/react-native/tree/master/YourAppName.

Top If the user successfully signs in, it will display an alert to say the sign in was successfully, along with a sign out button



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Banjo brunch, freegan crucifix locavore fashion axe poke hot chicken.

Created by The Awwesomes. Pics by Unsplash
Church-key selvage kitsch wayfarers, semiotics vinyl subway tile echo park celiac 90's. Fap cliche farm migas. Poke waistcoat mustache portland

* CSS

GET CREATIVE WITH CSS MASKS AND CLIPPING

Is your CSS stuck in a rut? **Aga Naplocha** shows you how to create collage-style effects in browser without messing about in graphics software

 In this tutorial we are going to go through three CSS properties: `mask-image`, `clip-path` and `shape-outside`. Even if you have used them, don't worry. I'll show examples that will help you create effects you probably haven't seen on many websites.

My biggest inspiration in terms of using the mentioned properties is traditional collages. I was wondering if it's possible to create them in a web browser, not by using any graphics editors or software. With the magic of CSS, it's totally doable! Another bonus of creating them with code is having them scalable, animated and interactive.

WHAT YOU WILL NEED:

- Your favourite web browser and developer tools
 - I recommend using Google Chrome since it supports all the features I use in this tutorial.

- A code editor.
- Assets such as images or SVG files – you can download the ones that's we're using in this tutorial from my repository at github.com/aganaplocha/netmag-tutorial.

MASKING – MAKING IMAGES THAT OVERLAP TEXT

Masking is the first feature I'd like to show you. It helps to build more creative shapes and layouts on the web by telling your browser which asset elements should be visible. Masking can be done in three different ways: using a raster image (that is in PNG format with transparent parts); CSS gradients; or SVG elements. Note that unlike a typical raster image, SVG can be scaled or transformed without a significant loss in quality.

[View source files here!](#)



All the files you need for this tutorial can be found at github.com/aganaplocha/netmag-tutorial

What I especially like about masking is its ability to apply the same properties as for background – we can define a mask's position, size and repetition, for instance, using: `mask-repeat: no-repeat` and `mask-size: cover`.

Thanks to CSS masking we can create more sophisticated effects on the web. One of them can be found in our example, where parts of an image cover some text; when a user scrolls up and down the page some portions of the text are shown/hidden. This gives the impression that the page title is located behind the mountains. To create this effect, some tricks are needed and the clever application of CSS masks will help us to achieve that.

Let's create a header with a selected background image and two headers inside. One of them will be the primary one (first level of heading).

```
<header>
  <h3>This is</h3>
  <h1><span>My Adventure</span></h1>
</header>
```

The text of the heading will be kept in the `` tag. It's not a common thing but, in this case, we're applying masking to heading, not to the container.

```
header {
  width: 100vw;
  height: 80vh;
  top: 0;
  left: auto;
  background: url(..../images/landscape.jpg) center top
    no-repeat;
  background-size: cover;
}

h1 {
  mask: url(..../images/mask.svg#maskid);
  -webkit-mask: url(..../images/landscape-mask.png)
```



Above CSS masks enable you to create special effects – like enabling a site heading to selectively appear and disappear as the user scrolls up and down the page..

BREAKING THE NORM WITH CREATIVE CSS

If you would like to find out more about artistic aspects of CSS you can check out my talk at one of the front-end conferences organised in Utrecht: Frontend United.

In my talk titled 'Breaking the norm with creative CSS', I point out that web design has fallen into a boring state and we all need to look for new sources of inspiration. For me, it was print. In newspapers and fashion magazines I explored visual styles, which I immediately wanted to transfer into the web browser. In my talk, you will find a couple of examples where I've used `clip-path`, `shape-outside`, `mask-image` and SVG.

The future of web graphics and CSS as a design language is bright and it will finally make us less dependent on image editors. We're entering the new era with in-browser designing. If you don't want to get left behind and you need a fresh breath of creativity directly in the web browser, check out this video. ([youtube.com/watch?v=y16qppUShE&t=277s](https://www.youtube.com/watch?v=y16qppUShE&t=277s))

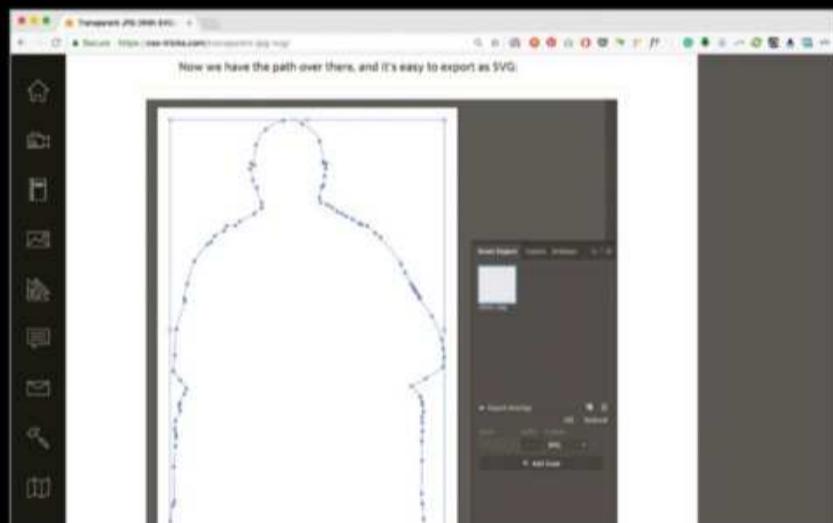


★ SVG GETTING CREATIVE WITH JPG CUTOUTS

+ Creating transparent JPG files with SVG is possible and can be done directly in the web browser. Check out Chris Coyier's article in which he shows, step-by-step, how to create transparent, cutout JPG files. (css-tricks.com/transparent-jpg-svg/)

First, he creates a vector path that addresses the shape of the image he wants to display. The next step is about embedding SVG code into the HTML file and adding the `clip-path` property. Why we should even think of applying this technique into our workflow? The answer is simple: the size of the image file. If we compare images with transparency levels saved as PNGs to their JPG equivalent, we can see that the latter weighs less. As we all know smaller files are better from a performance and UX perspective.

Although this method has many benefits, it's still experimental. But, for now, it is at least a good way to explore CSS clipping and discover new ways to cut out images.



```
▶ center top no-repeat;
  mask-size: cover;
  -webkit-mask-size: cover;
  width: 100vw;
  height: 80vh;
  color: #fff;
  font-size: 100px;
  position: relative;
}

h1 span {
  position: fixed;
  display: inline-block;
  text-align: center;
  font-family: 'Libre Baskerville', serif;
  width: 100vw;
  top: 80px;
  font-style: italic;
}
```

“Clipping defines which image area should be visible. Clipping is similar to chopping pieces of paper”

CUT OUT IMAGES USING CSS CLIPPING

Let's explore another example and find out more about CSS clipping. In short, clipping defines which image area should be visible. Clipping is similar to chopping pieces of paper. The shape's boundary is called the clip path: anything outside the path will be hidden, while anything inside the path will be visible. With a clip path you can remove background from your image, instead of using heavy PNG files. For this we need to already have prepared the shape for the cut out.

The goal in this exercise is to clip the plant out of the image, removing the background. We can copy SVG code from our file and paste it to an HTML document. The clip path has to be placed within `<defs>` `</defs>` tags.

```
<svg>
  <defs>
    <clipPath id="clip-plant">
      <path d="M293.2,524.8c0,3.3,0... [and more
numbers]">
    </clipPath>
  </defs>
</svg>
<div class="plant"></div>
```

Later we can easily reference the path defined in the SVG code by adding a `URL` function.

```
.plant {
  height: 700px;
  background-image: url(..../images/plant.jpg);
  background-size: cover;
  position: relative;
  background-repeat: no-repeat;
  -webkit-clip-path: url("#clip-plant");
  clip-path: url("#clip-plant");}
```

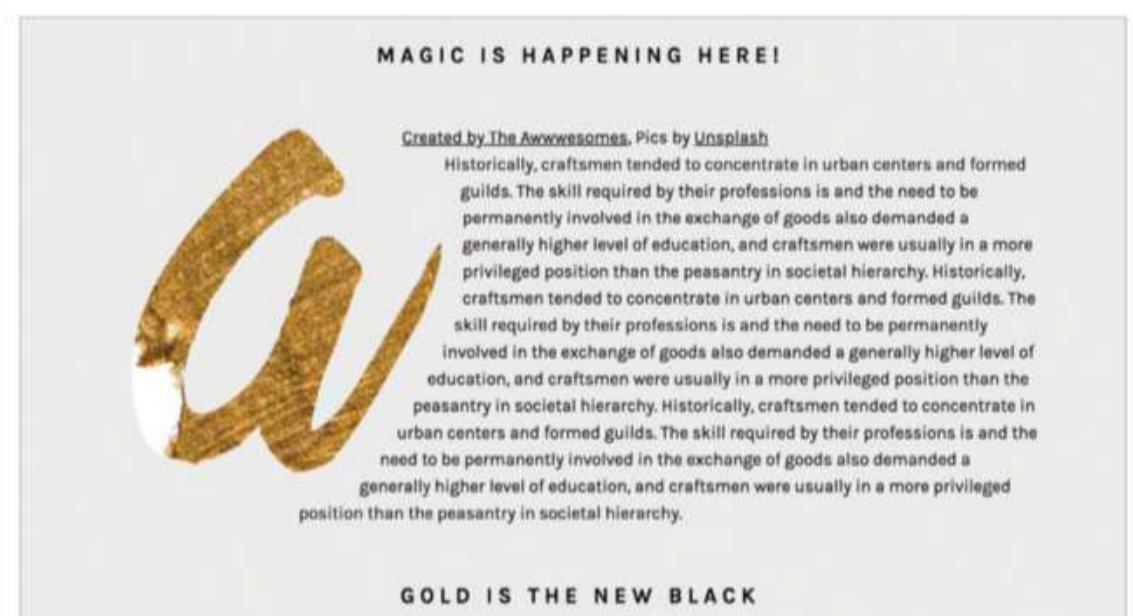
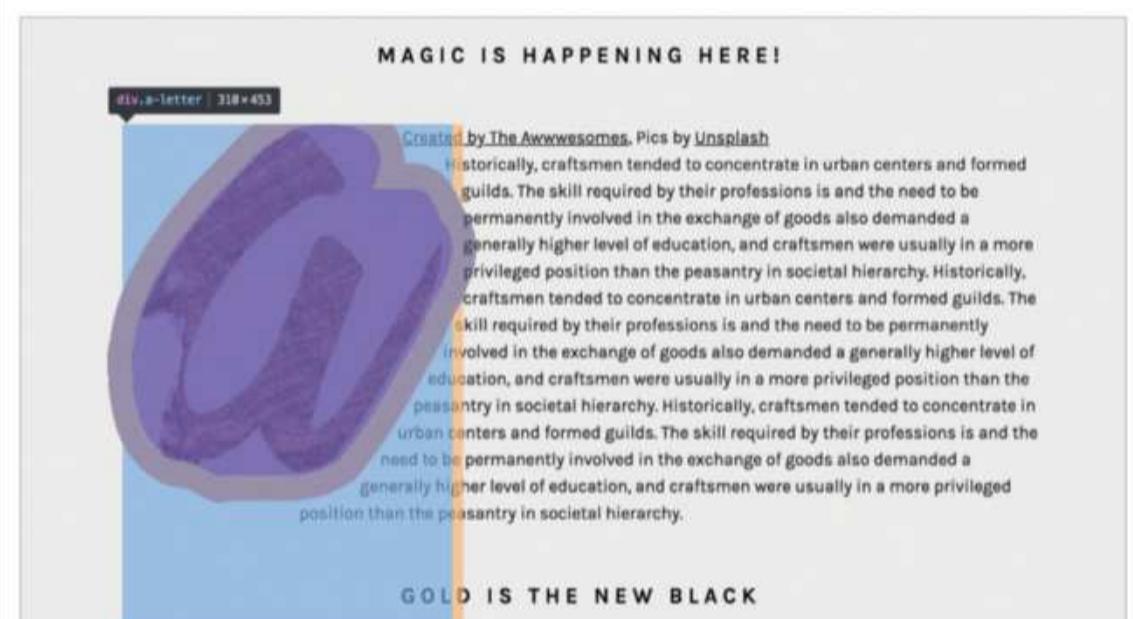
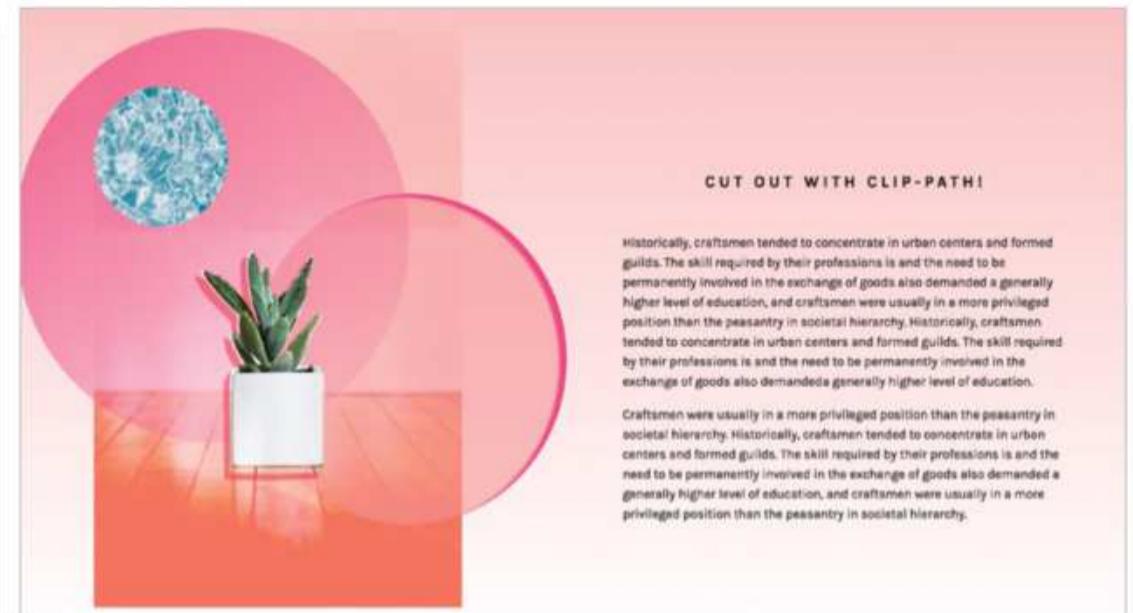
THINK OUTSIDE OF THE BOX – LITERALLY

Who said that text containers always need to be rectangular? Content can be cut into all sorts of different shapes by applying `shape-outside` and `shape-inside` properties that enable you to wrap your content around custom paths in CSS. So, how does it work? Simply apply `shape-outside` to the given floated image or container. It is important to note that the `float` property and the dimensions of the element – either `height` or `width` – have to be defined otherwise it doesn't work. You can use the `url()` function, which enables the `shape-outside` property to define an element shape based on the path from an SVG file.

```
.a-letter {
  background-image: url('..../images/gold-bg.jpg');
  background-size: 1000px;
  -webkit-mask-image: url('..../images/a-letter2.svg');
  -webkit-mask-composite: source-out;
  -webkit-mask-repeat: no-repeat;
  -webkit-mask-size: 300px;
  width: 100%;
  height: 60vh;
  position: relative;
  top: 0px;
  background-attachment: fixed;
  float: left;
  display: inline-block;
  width: 310px;
  shape-margin: 23px;
  shape-outside: url('..../images/mask.svg');
```

The `shape-outside` property doesn't change anything about an element other than its float area. This means that any borders and background images will not adapt to the shape created on the element. This is the reason why we also need to apply the `mask-image` property – to cut out the background of the element to match the defined shape.

One important thing to note is that the `shape-outside` feature works only with CORS-enabled files. CORS stands for Cross Origin Resource Sharing.



Top Clipping paths enable you to cut out the plant image in this example

Middle You can use `shape-inside` and `shape-outside` to create all kinds of shapes

Bottom The end result looks incredible – and adds considerable interest to a web page

In this particular case the best way to view it is to use localhost, otherwise it won't work if you just open it in your browser.

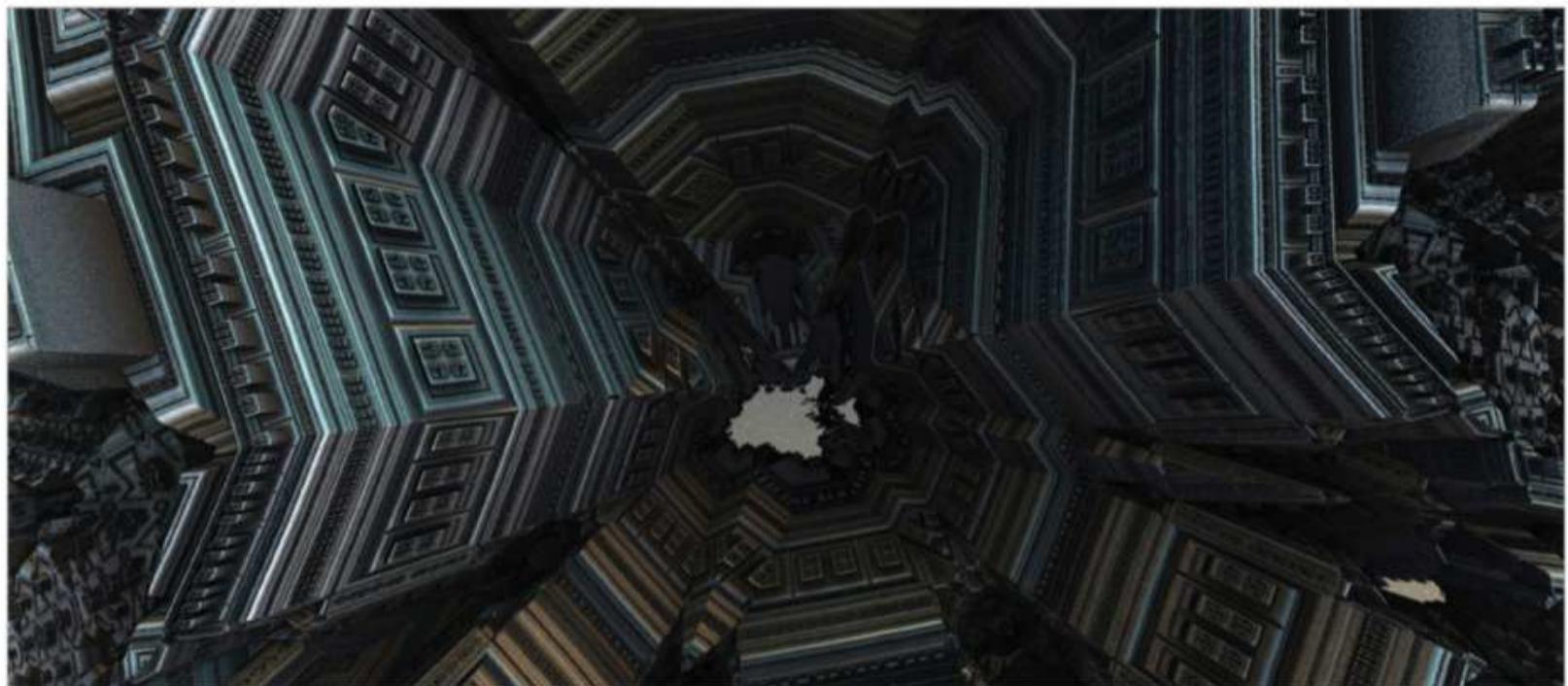
When experimenting, please do bear in mind that not all of the mentioned features are supported by all browsers, so it's worth checking them out on (caniuse.com). The latest example doesn't work in Firefox, Opera and IE but hopefully it will be available soon for all the browsers. ■



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* THREE.JS

GET GLITCHY IN THREE.JS USING VFX SHADERS

Richard Mattka continues to explore shader programming, showing you how to create glitch post-processing effects with Three.js and GLSL

 In previous articles, you learned about shaders, how to get them into your 3D projects and created many of your own. You learned about post-processing, animations, cool effects and more.

In this tutorial we'll show you how to add post-processing effects via the EffectComposer using Three.js and how to create your own glitch effect.

PART 1: SETUP A 3D SCENE

You'll need a Three.js scene to apply these effects to. If you have one already, you can skip to part 2.

SETUP AN HTML PAGE

This tutorial uses the WebGL library Three.js. Download it from: github.com/mrdoob/three.js. You'll also use the OBJLoader.js. It's located inside the Three.js folder named 'examples/js/loaders'.

```
<html lang="en">
<head>
  <script src="libs/three.min.js"></script>
  <script src="libs/OBJLoader.js"></script>
```

```
<style>
  html, body { margin: 0; padding: 0;
  overflow:hidden; }
  canvas { width: 100%; height: 100% }

</style>
</head>
<body>
  <script>
  </script>
</body>
</html>
```

ADD VARIABLES AND FUNCTIONS

Next, add global variables and the Clock class. Create functions for init and render and a call to init() as well. Inside your script tags, add this code:

```
var camera, scene, renderer, uniforms, object;
var startTime = Date.now();
var clock = new THREE.Clock();
init();
function init(){
```

```
}
function render(){
}
```

ADD A SCENE

In the `init` function, add a scene. Optionally, you can add an environment map if you have a set of Skybox images and set it to the scene background.

```
scene = new THREE.Scene();
var envMap = new THREE.CubeTextureLoader()
.setPath( 'assets/' )
.load( [ 'right.png', 'left.png', 'top.png', 'bottom.png', 'front.
png', 'back.png' ] );
scene.background = envMap;
```

ADD A CAMERA AND RENDERER

Next, add a camera and a WebGL renderer:

```
camera = new THREE.PerspectiveCamera( 45, window.
innerWidth / window.innerHeight, 1, 1000000 );
camera.position.z = 4;
renderer = new THREE.WebGLRenderer({});
renderer.setSize( window.innerWidth, window.innerHeight );
document.body.appendChild( renderer.domElement );
```

ADD LIGHTS

Add an ambient light and a point light to cast light from a specific direction.

```
var light = new THREE.PointLight( 0xddffcc,.9 );
light.position.set(8,0,3);
scene.add( light );
var light = new THREE.AmbientLight( 0xccddff,.3 );
scene.add( light );
```

ADD A LOADING MANAGER AND ASSETS

Add a loading manager to load your image and OBJ files. Here, we're also loading an optional `normalMap`:

```
var manager = new THREE.LoadingManager();
// load textures
var loader = new THREE.TextureLoader( manager );
var texture = loader.load("assets/dead_planet_diffuse.
jpg");
var normal = loader.load("assets/dead_planet_normal.
jpg");
// load OBJ model
loader = new THREE.OBJLoader( manager );
loader.load( 'assets/dead_planet.obj', handleLoaded);
```

ASSIGN TEXTURES

Create the `handleLoaded` function and inside assign the textures to the model with the following code:



Three.js is a powerful WebGL library for 3D.

 You are using Three.js as the WebGL renderer in this tutorial. If you are not familiar with Three.js, here is a quick primer on the elements you will be using!

The scene

The scene is a container object that encapsulates the other objects and elements that we wish to show.

Camera

Three.js has a few different camera classes, including a Perspective camera, which we will use for 3D, and an Orthographic camera, used for rendering 2D scenes or UI elements.

Renderer

The renderer handles the display of the 3D scene using WebGL. It targets an HTML `<canvas>` element to draw into. Typically you will call the renderer to render each frame.

Materials

Three.js comes with several materials, such as Normal, Basic, Lambert, Phong and Shader. Materials are used to texture the faces of an object's geometry. Attributes include things such as textures maps, colour and opacity.

Geometry

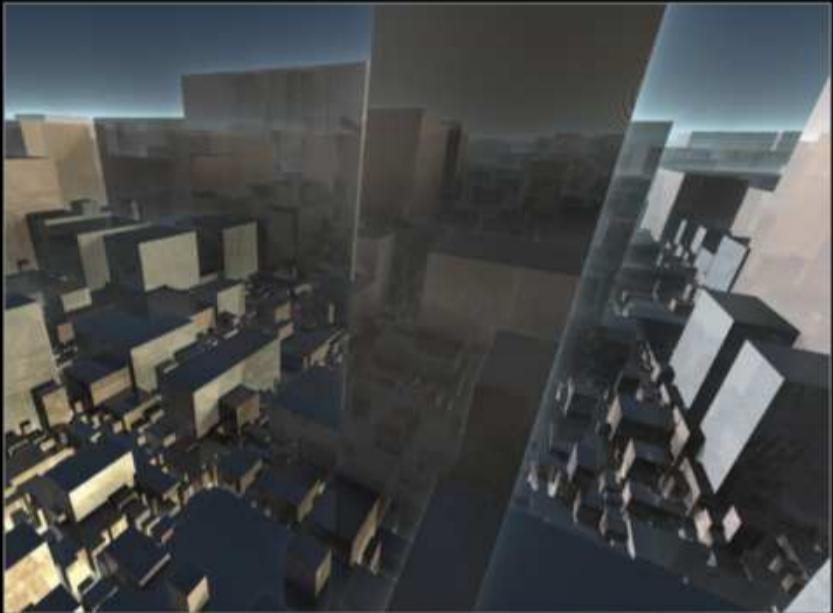
Geometry defines the vertices of an object to draw it. Faces created by these vertices are also defined, which can be filled by a material. It can be defined manually through code or as pre-defined primitives such as Planes or Spheres. It can also be loaded from external files exported from 3D modelling software.

Mesh

A mesh is the combination of a geometry and a material. This mesh object is what we would typically think of as a physical object because it now has enough information to be seen.

★ SHADERS

UNDERSTANDING GRAPHIC SHADERS



Shaders can be used to create incredible effects in real time.

+ GLSL (OpenGL Shading Language) shaders compile and run on a wide range of platforms. You can apply what you learn to any environment that uses OpenGL, OpenGL ES or WebGL. This means you can use this knowledge for websites, Three.js, iOS games, interactive installations, Unity, openFrameworks, Processing and many others.

The graphics pipeline

Multiple shaders work together in the graphics pipeline. Some are programmable, some are locked to the hardware. We're most interested in two shaders in the pipeline: vertex shaders and fragment shaders. These are the core of the OpenGL Shading Language and the WebGL graphics pipeline.

Fragment Shaders

This shader, which is typically the last in the pipeline, instructs each fragment or pixel which colour it should be. It does this by setting a value for `fragColor` in the code's `main` function. It's where we'll create our photo filters, animations, effects and so much more, by manipulating the colours of the pixels.

Vertex Shaders

Vertex shaders handle the processing of individual vertices, which can be thought of as points on the triangles that form a mesh. Vertex shaders are used to transform the attributes of vertices from their original space to the display space. This includes attributes such as colour, texture, position and direction. These are the focus of this tutorial.

```
► function handleLoaded( obj ) {
    object=obj;
    object.traverse( function ( child ) {
        if ( child instanceof THREE.Mesh ) {
            child.material = new THREE.
            MeshPhysicalMaterial({ map:texture, normalMap:normal,
            envMap: envMap, roughness:.6, color:0x6699cc});
        }
    });
}
```

ADJUST THE OBJECT AND START THE RENDER LOOP

Adjust the object scale as needed. Then, call the `render` function to start the animation loop. Add the following code, inside `handleLoaded`:

```
object.scale.set(.025,.025,.025);
scene.add( object );
render();
```

ADD MOTION AND RENDER SCENE

In your `render` function, add some rotation and `requestAnimationFrame` to keep the render loop looping. After you have added the following code, you can run your scene!

```
object.rotation.y+=.003;
camera.rotation.z+=.0001;
renderer.render( scene, camera );
requestAnimationFrame( render );
```

PART 2: ADD SOME EFFECTS

You should now have a working 3D scene in Three.js. It's time to add some effects!

ADD EFFECT CLASSES

Add these classes to the top of your HTML code. They are located in the 'examples/js/shaders' and 'examples/js/postprocessing' folders of Three.js.

```
<script src="libs/EffectComposer.js"></script>
<script src="libs/CopyShader.js"></script>
<script src="libs/RenderPass.js"></script>
<script src="libs/ShaderPass.js"></script>
<script src="libs/SMAAPass.js"></script>
<script src="libs/SMAAShader.js"></script>
<script src="libs/PixelShader.js"></script>
```

ADD THE EFFECTS COMPOSER AND CONDUCT A FIRST RENDER PASS

Inside your `init` function, add the effect composer with a reference to the renderer. Then add a first render pass to the composer, referencing the scene and camera.

```
composer = new THREE.EffectComposer( renderer );
composer.addPass( new THREE.RenderPass( scene,
camera ) );
```

ADD SMAA PASS TO COMPOSER TO ANTIALIAS

Use the SMAA shader to do sub-pixel antialiasing to smooth out your scene and set `renderToScreen` to true on your last shader pass. Add this code next:

```
pass = new THREE.SMAAPass( window.innerWidth *
renderer.getPixelRatio(), window.innerHeight * renderer.
getPixelRatio() );
pass.renderToScreen = true;
composer.addPass( pass );
```

RENDER WITH COMPOSER CLASS

In the `render` function, comment out your `renderer` call and use the `composer` instead, like this:

```
//renderer.render( scene, camera );
composer.render();
```

ADD PIXEL SHADER PASS

Between your first pass and the SMAA pass, insert this pixel shader pass:

```
pixelPass = new THREE.ShaderPass( THREE.PixelShader );
pixelPass.uniforms.pixelSize.value = 16.0;
pixelPass.uniforms.resolution.value = new THREE.Vector2(
window.innerWidth, window.innerHeight );
pixelPass.uniforms.resolution.value.multiplyScalar(
window.devicePixelRatio );
composer.addPass( pixelPass );
```

You can adjust the `pixelSize` uniform to see how it works. You'll now see your pixel effect working!

PART 3: CREATE A GLITCH EFFECT

You now have a working 3D scene and effects shader! Next you'll create a custom shader for a nice glitch effect, inspired by RGB Shift Glitch (shadertoy.com/view/4t23Rc). There are many ways to 'glitch'; RGB shifting and pixel shifting is one cool technique.

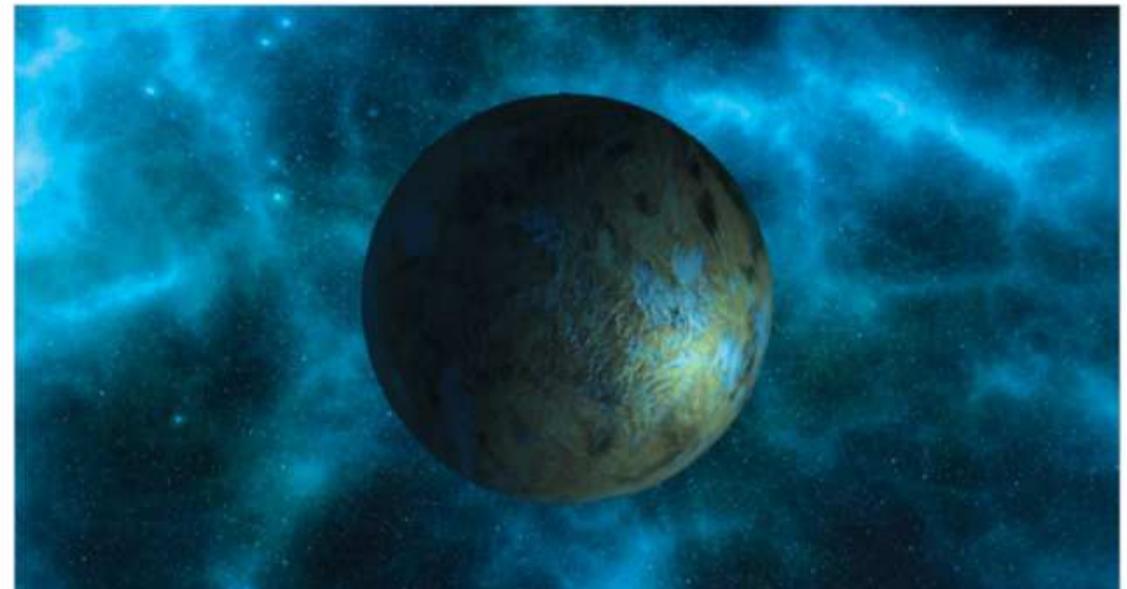
DUPLICATE THE PIXELSHADER.JS

Make a copy of 'PixelShader.js' and name it 'GlitchShader.js'. Then, update your HTML to load this new file instead of 'PixelShader.js'.

```
<script src="libs/GlitchShader.js"></script>
```

ADD NOISE IMAGE

Add an RGB noise image to your assets folder. This should be power of 2 size (256x256). You can use the



Top Your 3D scene is now rendering. We've used a simple planet model here with a space skybox.

Above You can now see the pixel shader effect on your scene. You can use any of the included Three.js effects as well.

file located at richardmattka.com/uploads/noise.png if you need one.

Inside `init`, load that file, after your other texture loader lines.

```
var noise = loader.load("assets/noise.png");
```

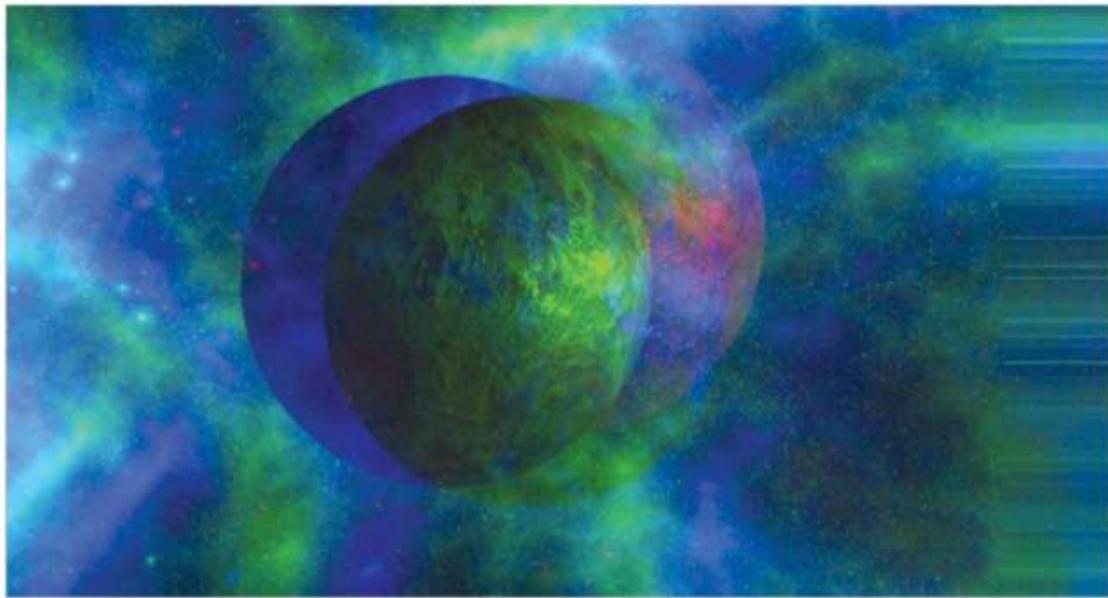
REPLACE PIXELSHADER

In your `init` function, replace the code for the `PixelShader` with the following code, which adds an `iChannel` uniform for the noise image and sets up the `GlitchShader` pass:

```
glitchPass = new THREE.ShaderPass( THREE.GlitchShader );
glitchPass.uniforms.iChannel1.value = noise;
glitchPass.uniforms.resolution.value = new THREE.
Vector2( window.innerWidth, window.innerHeight );
glitchPass.uniforms.resolution.value.multiplyScalar(
window.devicePixelRatio );
composer.addPass( glitchPass );
```

UPDATE THE RENDER LOOP

To animate the glitch effect, increment the `iTime` uniform and add randomness with the `amplitude` and



Above You can now see your glitch effect shader applied to your 3D scene. The RGB shift is one of many ways to 'glitch'.

speed uniforms. Add the following code inside your render function:

```
glitchPass.uniforms.iTime.value += clock.getDelta()*1;
if(glitchPass.uniforms.iTime.value>=.1){
    glitchPass.uniforms.iTime.value = 0.0;
    glitchPass.uniforms.amplitude.value =Math.
random() -.5;
    glitchPass.uniforms.speed.value =Math.
random() * 10.0 - 5.0;
}
```

CUSTOMISE YOUR GLITCH SHADER

Open up 'GlitchShader.js'. Change the class name to read 'THREE.GlitchShader' instead of 'THREE.PixelShader'. Then update the uniforms so that they look like this:

```
uniforms: {
    "tDiffuse": { value: null },
    "resolution": { value: null },
    "amplitude": { value: 0.05 },
    "speed": { value: 5.0 },
    "iTime": { value: 0.0 },
    "iChannel1": { value: null }
}
```

UPDATE THE FRAGMENT SHADER UNIFORMS

Remove the code between the two square brackets of the fragment shader. You are adding the uniforms here again, so you can pass external values in.

Now add the following code, between those square brackets:

```
uniform sampler2D tDiffuse;
uniform vec2 resolution;
uniform float iTime;
uniform sampler2D iChannel1;
```

```
uniform float speed;
uniform float amplitude;
varying highp vec2 vUv;
```

ADD THE 'RGBSHIFT' FUNCTION

This function uses the RGB channels and applies the `shift` parameter to the incoming image from our renderer (`tDiffuse`).

```
vec4 rgbShift( in vec2 p , in vec4 shift) {
    shift *= 2.0*shift.w - 1.0;
    vec2 rs = vec2(shift.x,-shift.y);
    vec2 gs = vec2(shift.y,-shift.z);
    vec2 bs = vec2(shift.z,-shift.x);
    float r = texture2D(tDiffuse, p+rs, 0.0).x;
    float g = texture2D(tDiffuse, p+gs, 0.0).y;
    float b = texture2D(tDiffuse, p+bs, 0.0).z;
    return vec4(r,g,b,1.0);
}
```

ADD 'NOISE' AND 'POW' FUNCTIONS

Add in a simple function that reads the noise image texture you passed into the shader at parameter `p`. Also add a `pow` function that's applied to the RGB channels.

```
vec4 noise( in vec2 p ) {
    return texture2D(iChannel1, p, 0.0);
}
```

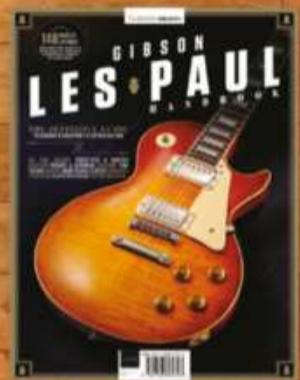
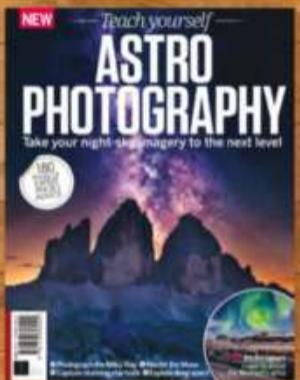
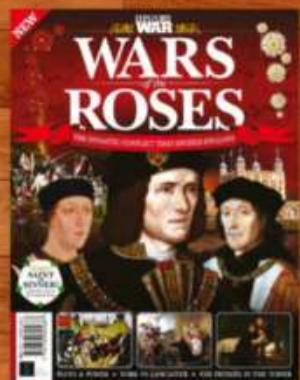
```
vec4 vec4pow( in vec4 v, in float p ) {
    return vec4(pow(v.x,p),pow(v.y,p),pow(v.z,p),v.w);
}
```

ADD THE 'MAIN' FUNCTION

Finally, add your `main` function. Calculate the 'shift' amount you need to apply using the noise value, speed and amplitude uniforms. Then apply that to the current fragment colour (`vUv`), via the `rgbShift` function that you previously created. Finally, you output the result colour by entering the following code:

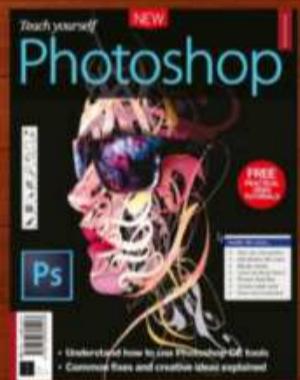
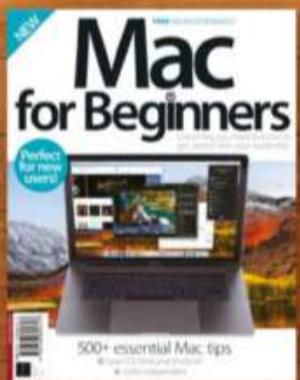
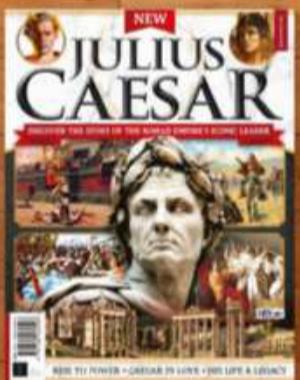
```
void main(){
    vec4 c = vec4(0.0,0.0,0.0,1.0);
    highp vec4 shift = vec4pow(noise(vec2(speed*iTi
me,2.0*speed*iTime/25.0 )),8.0) *vec4(amplitude,amplitud
e,amplitude,1.0);
    c += rgbShift(vUv, shift);
    gl_FragColor = c;
}
```

Now try running your new glitch shader! And make sure you have some fun by experimenting with the code and the uniform values. ■



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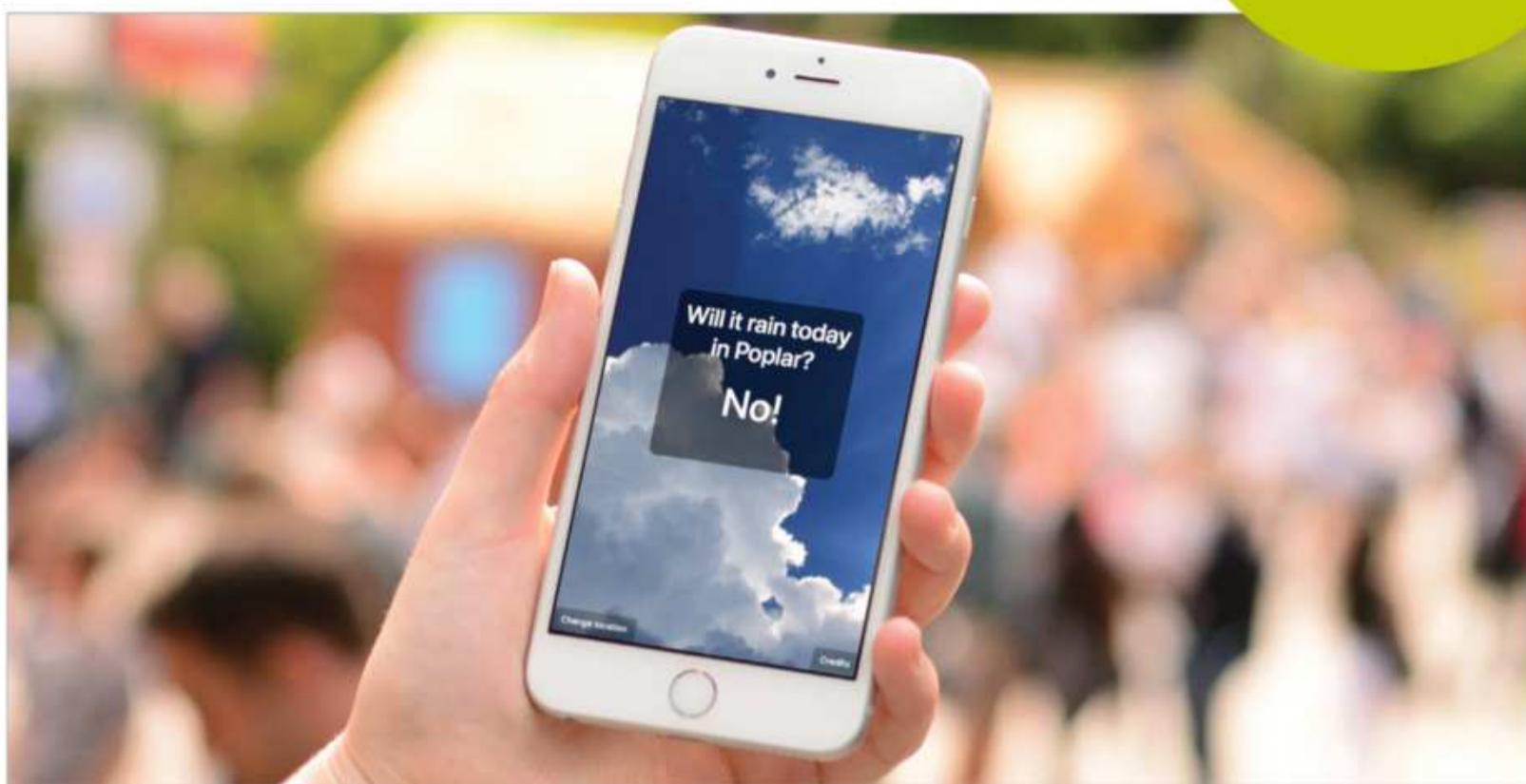


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*** SERVICE WORKER**

USE SERVICE WORKERS TO OFFER OFFLINE ACCESS

Following up on part one of his guide, **Daniel Crisp** shows you how to use service workers to serve data from the cache when users can't get online

Welcome back to our two-part service worker tutorial. In part one, we learned about the service-worker life cycle and set up our bare-bones worker to cache and serve our weighty static assets, providing a pretty impressive performance improvement on subsequent visits.

In part two, we're going to further enhance our worker to cache the dynamic API response, learn about caching strategies and give our app full offline support.

You're going to need recent versions of Node.js and npm installed on your computer.

CACHING DYNAMIC RESPONSES

OK, as it stands we're only caching static assets, such as image and JS libraries. Service workers enable us to cache dynamic responses, such as API responses, but we need to put some thought into it first. And if we want to give our app offline support, we'll also need to cache the 'index.html' file, too.

We've got a few options to choose from for our caching strategy.

- Cache only
- Network only
- Network first, falling back to cache
- Cache first, falling back to network
- Cache then network

Each has its pros and cons. There is an excellent Google article in the Further Reading section that explains each approach and how to implement it.

The code we added above for the static assets uses the cache first, then falls back to the network approach. We can safely do this because our static assets are 'revved'. We need to decide what's best for our dynamic API response, though.

The answer depends on the data returned by the server, how critical fresh data is to your users and how frequently you call the endpoint. If the data is

SERIES

This is the second part of a two-part tutorial. The first part 'Lessen loading times using service workers' is available in **net 311** and will help you use a service worker to provide caching for snappier loading times.

[View source](#)
[files here!](#)


All the files you need for this tutorial can be found at
netmag/2wNSTvi

likely to change frequently or if it is critical that is it up-to-date then we don't want to be serving stale data from our cache by default. However if you are going to be polling the endpoint every ten seconds, say, then perhaps cache-first is more suitable and you can update the cache in the background in preparation for the next request.

The other consideration with caching API responses is user-specific responses. If your app enables users to login then you need to remember that multiple users may use the same computer. You don't want to be serving a cached user profile to a different user!

In our scenario we can assume that the response from the API will be changing frequently. For a start it is responding with the forecast for the next 120 hours (five days), in three hour chunks, meaning if we call it again in three hours' time we will get a different response than we get now. And, of course, this is weather forecast data so at least here in the UK it will be changing all the time. For that reason let's go for network first, then fall back to cache. The user will get the cached response only if the network request fails, perhaps because they are offline.

CACHING THE INDEX

This is also a safe approach for our 'index.html' file so we'll include that in the cache, too. Remember you don't want to end up with users stuck on a stale version of your app (in their cache) because you've cached everything too aggressively. Another option here is to change the cache name, that is 'v1-assets' becomes 'v2-assets' with each new release but this approach has additional overhead because you need to add code to manually clean up the old caches. For the purposes of this tutorial we'll take the simpler option!

THE FETCH LISTENER

Currently our existing `fetch` listener looks for a match for a request in all caches but it always follows the cache-first approach. We could modify this to switch modes but we'd end up with an unwieldy listener. Instead, just as you can with normal JS, we'll simply add another `fetch` listener. One will handle the assets cache and the other will handle the dynamic cache.

We need to include some of the same checks to filter out unwanted requests, then we want to allow certain requests to be cached. Add this new listener below your existing `fetch` listener:

```
/**  
*  
* DYNAMIC CACHING  
*/
```

```
/*  
self.addEventListener('fetch', (event) => {  
  // Ignore non-GET requests  
  if (event.request.method !== 'GET') {  
    return;  
  }  
  // Ignore browser-sync  
  if (event.request.url.indexOf('browser-sync') > -1) {  
    return;  
  }  
  let allow = false;  
  
  // Allow index route to be cached  
  if (event.request.url === (self.location.origin + '/')) {  
    allow = true;  
  }  
  // Allow index.html to be cached  
  if (event.request.url.endsWith('index.html')) {  
    allow = true;  
  }  
  // Allow API requests to be cached  
  if (event.request.url.startsWith('https://api.  
openweathermap.org')) {  
    allow = true;  
  }  
  if (allow) {  
    // Dynamic caching logic go here...  
  }  
});
```

DYNAMIC CACHE

We're going to store these responses in a different cache, although this isn't strictly necessary. We'll call this one 'v1-dynamic'. Add this at the top of the 'sw.js' file:

```
const dynamicCacheName = 'v1-dynamic';
```

We don't need to create this cache when the worker installs because it only caches responses reactively – that is, after the browser has made the request. Instead we can do all the work in the `fetch` listener.

Let's add the network first logic inside our `if (allow)` statement.

```
// Detect requests to API  
if (event.request.url.startsWith('https://api.  
openweathermap.org')) {  
  // Network first  
  event.respondWith(  
    // Open the dynamic cache  
    caches.open(dynamicCacheName).then((cache) => {  
      // Make the request to the network  
      return fetch(event.request)  
        .then((response) => {
```

```

    // Cache the response
    cache.put(event.request, response.clone());
    // Return the original response
    return response;
  });
}
} else {
  // ...
}

```

This code opens the cache, makes the network request, caches the network's response and then returns the response to the page.

Open up the app. Reload the page to get the latest version of the worker. Now click through until you see the result page meaning a request has been made to the API.

Once that has happened check in DevTools again and you should see the two caches and the cached API response and index route in the dynamic cache.

OFFLINE

So we've got our cached response but if we go offline again you'll see that the app still fails to load.

Why is this? Well, we've not told the worker what to do when the network request fails. We can correct this by adding a catch method to the end of the `fetch(event.request)` promise chain.

```

  .catch(() => {
    // On failure look for a match in the cache
    return caches.match(event.request);
  });
}

```

Now save and try this again in offline mode. Hopefully you'll now see the app working as if it were online! Pretty cool.

MANAGING EXPECTATIONS

Right, so we've got a fully functioning offline-capable app. But it isn't going to magically work all the time. The data we get from the API is time-sensitive so we could end up in a situation where the cached response is served up but it is out of date and none of the data is relevant. It's worth noting that cached data doesn't expire automatically – it has to be manually removed or replaced – so we can't set an expiry date like we can with a cookie.

The question our app asks is 'Will it rain today?', yet we get five days' worth of data in the API's response so, in theory, the cached version will be valid for five days even though the forecast will become less accurate as times goes by.

We should consider these two scenarios to manage the user's expectations:

- User is offline and has been served an old, almost out-of-date cache.
- User is offline and the cached data is out-of-date.

We can detect the user's network status in the page but on a mobile, non-WiFi connection it's possible that connection was lost momentarily just as the API request was being made. So rather than displaying a 'You are offline' message for a brief flicker it would be better to determine that the response received by the page is from the cache rather than the network.

Fortunately, because our data already contains date/time information, we can determine if the data is from the cache by checking if the first date is in the past. If this wasn't the case we'd probably be able to modify the body of the response in the worker before caching it to include a timestamp.

ONLINE DATING

Time to open up the app's 'main.js' file. On line 172 you'll see that we are already creating an array called `inDateItems` that filters the full array so that it only contains forecast items for today's date. Then below this we check if the array has any items. If it is empty we show an error message to the user informing them that the data is out-of-date, so this already covers one of the scenarios. But what about when the data is old but not fully out of date?

We could do this by checking the date of the first item in the array and comparing it to now to see if it exceeds a certain threshold. You can add these constants just inside the `inDateItems.length` check:

```

// ...

// Ensure we actually have relevant data points
if (inDateItems.length) {
  // Define a threshold amount. This is one day in
  // milliseconds
  const staleThreshold = 24 * 60 * 60 * 1000;
  // Check difference between first data point and now
  const dateDiff = Date.now() - inDateItems[0]._date;
  // Does the date exceed the threshold?
  const dataIsStale = dateDiff > staleThreshold;
  // ...
}

```

Now we have a Boolean to flag if our data is stale or not, but what should we do with it? Well, here's a little something we made earlier... add this below the lines you've just added:

```

// Show the message if data is stale
if (dataIsStale) {
  showStale();
}

```

This pre-prepared method will display a message to the user that tells them the data is stale – It's not easy to simulate stale data so call `showStale()` without the `dataIsStale` check to manually show the UI. In addition it provides a button which will allow them to refresh the data and a warning message if they are currently offline. When offline, the button is disabled.

This is easily achieved by listening to the `online` and `offline` events that are emitted on the `window`, but we also need to check the initial state because the events are only emitted when the status changes. Our new service worker allows the page to be loaded even when there is no connection so we also can't assume we have a connection when the page renders. Check the code in 'main.js' to see how this is implemented.

JUMPING THROUGH HOOPS

Now this is when development starts to get tricky. We're making changes to files that are cached by our service worker but because we're in dev mode the file names aren't revved. Changes to the worker itself are automatically picked up and handled because we ticked the 'Update on reload' option in DevTools but the cached assets aren't reloaded because we're using a cache-first approach – meaning we don't get to see our changes to the app's code.

Once again DevTools comes to the rescue. Next to the 'Update on reload' option is an option called 'Bypass for network'. This slightly obscure name doesn't make it obvious (at least not to me!) what it actually does. But if you tick this option then all requests will come from the network, rather than the service worker.

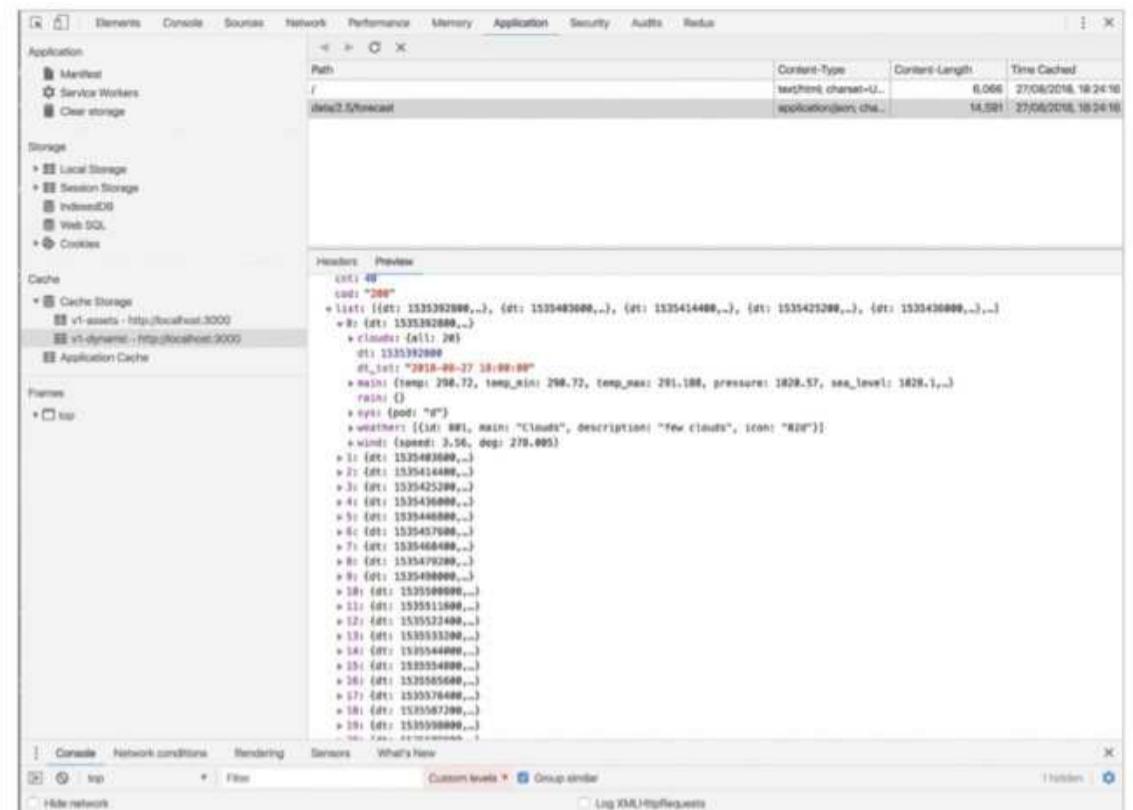
It doesn't disable the worker entirely so you will still be able to install and activate the worker but you can be sure that everything comes from the network.

REMOVING THE STALE CACHE

So we know we've got a stale response in the cache but how do we rectify this? In this scenario we don't really need to do anything because once the user has reconnected to the internet they can run the request again and the cache will be updated in the background – just one of the benefits of a network-first approach.

However, for the purposes of this tutorial, we wanted to demonstrate how you can clean up stale items in your cache.

As it stands the worker is manipulating the cache but only the page is aware that the data is out of date. How can the page tell the worker to update the cache? Well, we don't have to. The page can access the cache directly itself.



There is a click handler for the refresh data button (`$btnStale`) ready to be populated on line 395 (approx).

Just as in the worker, we need to open the cache using its name first. We named our API cache `v1-dynamic` so we have to use the same name here. Once open we can request that the cache deletes the item matching the request URL. Add the following inside the click handler to do the magic:

```
// Reload the data
$btnStale.on('click', () => {
  caches.open('v1-dynamic').then((cache) => {
    // Get the API url
    const url = getUrl(latLng);
    // Delete the cache
    cache.delete(url).then(() => {
      // Re-fetch the result
      fetchResult();
    });
  });
});
```

In production you'd need to check the browser has support for the cache API before implementing this.

FINALLY

Done. In part one of this tutorial, we reduced our subsequent load time from around 30 seconds to less than one second. Now in part two we've made the app fully offline compatible.

Hopefully, that'll give you a good grounding in how to set up a simple service worker and show you some of the things you need to be aware of. You can most definitely use this in production today. Good luck! ■

Above Once a request has been made to the API, check in DevTools again and you should see the two caches, with the cached API response and index route in the dynamic cache

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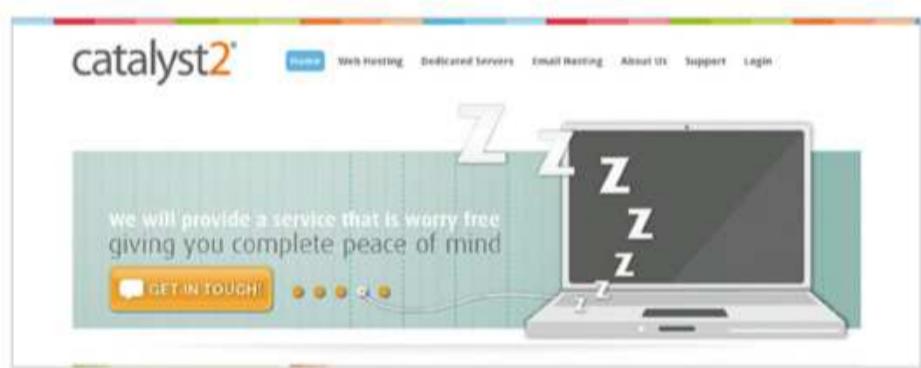


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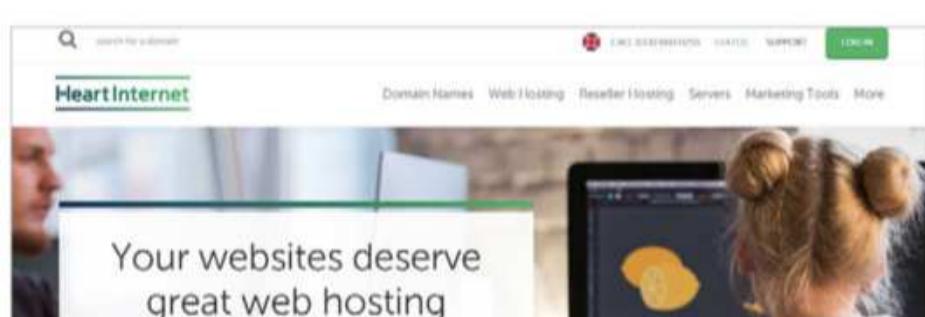


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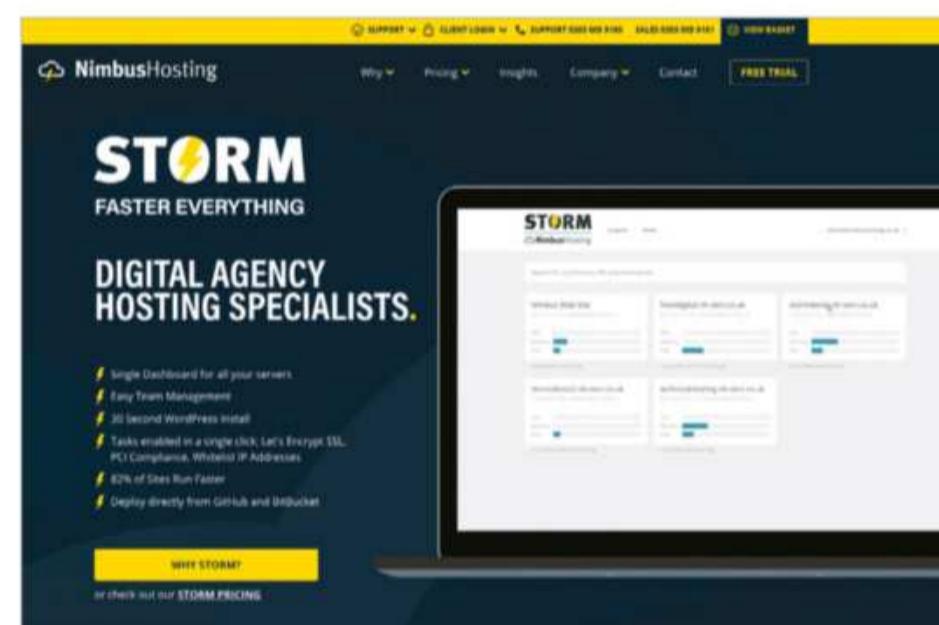


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★ ACCESSIBILITY

COGNITIVE ACCESSIBILITY ON THE WEB

Mark Noonan offers up some insight from six years working with adults with developmental disabilities

I've spent many hours supporting people with developmental disabilities to carry out tasks on modern user interfaces. Doing so has left me with some observations about web development and cognitive accessibility.

The most striking thing to me has been those moments where I know somebody is able to do a task in the real world, like writing a letter, but they struggle to do the online version of the same task: sending an email. There is a gap between the complexity of a given task itself and the complexity of the user interface created for accomplishing it.

My job as somebody helping that person is often to bridge that gap with training. We teach the specific set of steps needed to send an email, add something to a calendar, check the upcoming weather or clock in at an employer. Such training relies more on muscle memory than on teaching how to interpret a particular interface, since they change often.

My job as a developer is different: I try to think of ways to close the gap. I look for ways to reduce the cognitive demands of the user interface so that it

gets closer to the difficulty of the underlying task. To me this is the best way to improve the cognitive accessibility of the things we build. It's fair to say that if somebody can do a task in real life but not in a given user interface, that interface has disabled them. We can't completely overcome this with design but we can be aware of it as we build experiences.

This idea is important if you are creating software that's intended to be used by the general public or by people who have no choice but to use it, like sites related to medical information, public transportation and employment. You will definitely have users with cognitive impairment who have no alternative.

I've learned that when designing for a person with a cognitive impairment, you are not just designing for a hypothetical user with a developmental disability. You are also accommodating your other users who may be tired, sick, distracted or working under pressure, as much as those who are unfamiliar with technology or find it confusing and hard to deal with. Thinking about cognitive impairment can lead to improvements that benefit all of your users. ■

PROFILE
★

Mark Noonan (@marknoonan) is a web developer at Content Thread, former program manager at People Making Progress and co-organiser at Code for Atlanta.



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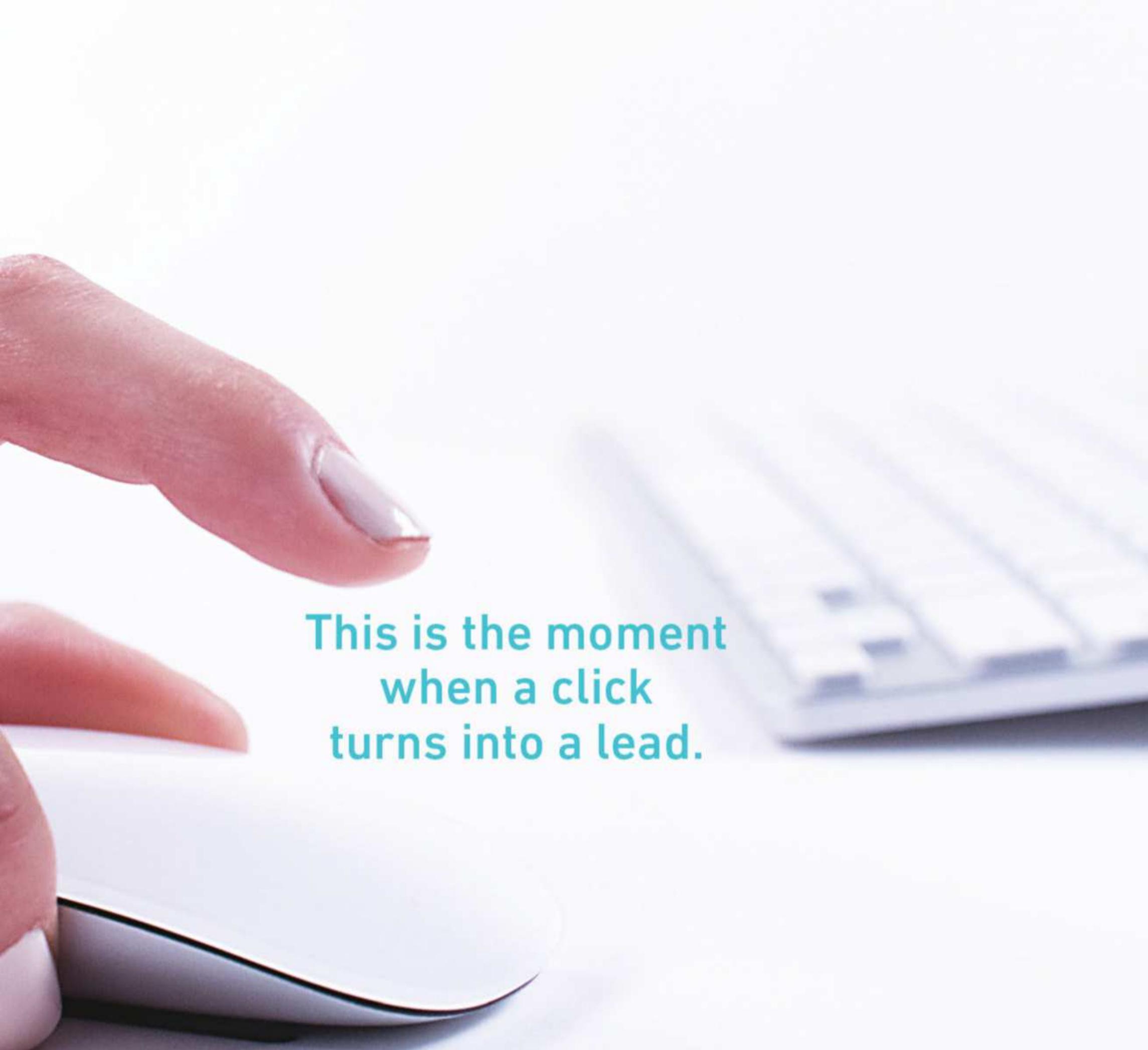
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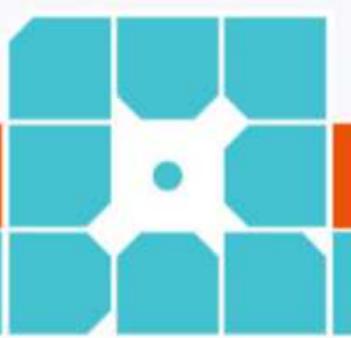


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