

LESSEN DATA DEMANDS WITH NODE.JS

Why using Node.js streams can significantly decrease the strain on users' memory

CREATE COLOURFUL FX

Add colour animations and light effects with graphic shaders

The voice of **web design**

net

Issue 307 : July 2018 : net.creativebloq.com

*TOP TRICKS

10 TIPS FOR BETTER TESTING

From tiny unit tests to site-wide scrutiny, learn how to get the best out of your build

TUNE UP YOUR DESIGN PROCESS

- Access tools to tighten up workflow
- Inject DesignOps into your systems
- Put your dev work into top gear

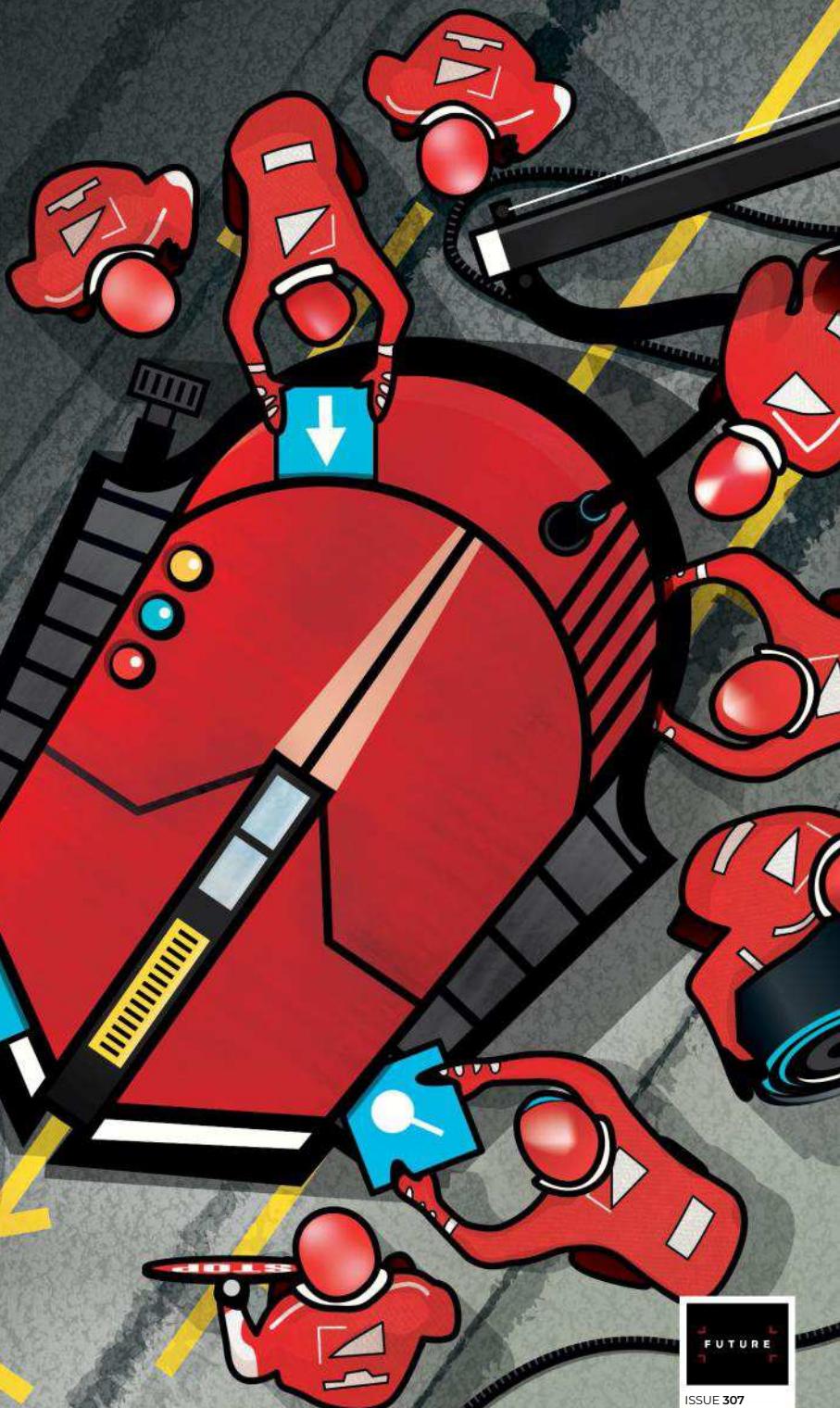


SARAH RICHARDS INTERVIEW

IS DATA HARVESTING A CYBERCRIME?

PRODUCE POLISHED UI ANIMATION

KEEP COOL WHEN CONTEXT SWITCHING



ISSUE 307

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★ WELCOME

EDITOR'S NOTE

► Truly elegant design is about achieving transformative results in as few steps as possible. It wasn't just braggadocio when Archimedes claimed a lever and a place to stand would enable him to move the world; it was the perfect illustration of how innovative design produces maximal results for minimum toil. This is a principle every designer should aspire to: creating friction-free products that amplify their users' efforts.

That's why this issue we've been looking at streamlining design and reducing friction in the way you work. Tom May investigates how tuning up your process and making your workflow as aerodynamic

as possible can optimise your output, helping you to deliver designs at scale. Meanwhile, our guide to better testing will help you clear any grit from the engines of your dev work, ensuring your sites run smoothly in all conditions.

But that's not all: our interview with Sarah Richardson reveals how compelling content design can significantly boost the efficiency of your site's primary fuel source. And Samer Buna demonstrates how Node.js streams enable you to work with large data files without flooding users' memory – offering the same results for a fraction of the CPU load.

Enjoy the issue!

FEATURED AUTHORS

TOM MAY



Tom is a freelance writer and editor with more than 20 years' experience in journalism and is currently editor of *Professional Photography*. On page 60, he offers up his handy manual on tuning up your design process.
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MATT CROUCH



Matt is a software engineer for Vidsy in London, where he helps bring creators and brands closer together. He runs down his ten tips for better testing on page 68.
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DAREN OLIVER



Daren is managing director of Fitzrovia IT, a London-based consultancy providing cutting-edge IT solutions. On page 22, he asks whether data harvesting is becoming the new face of cybercrime.
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NEIL PEARCE



Neil is a front-end developer and designer with expertise in CSS3, JavaScript and Vue.js. He offers up his insight on page 82 with a guide on creating slick UI animations.
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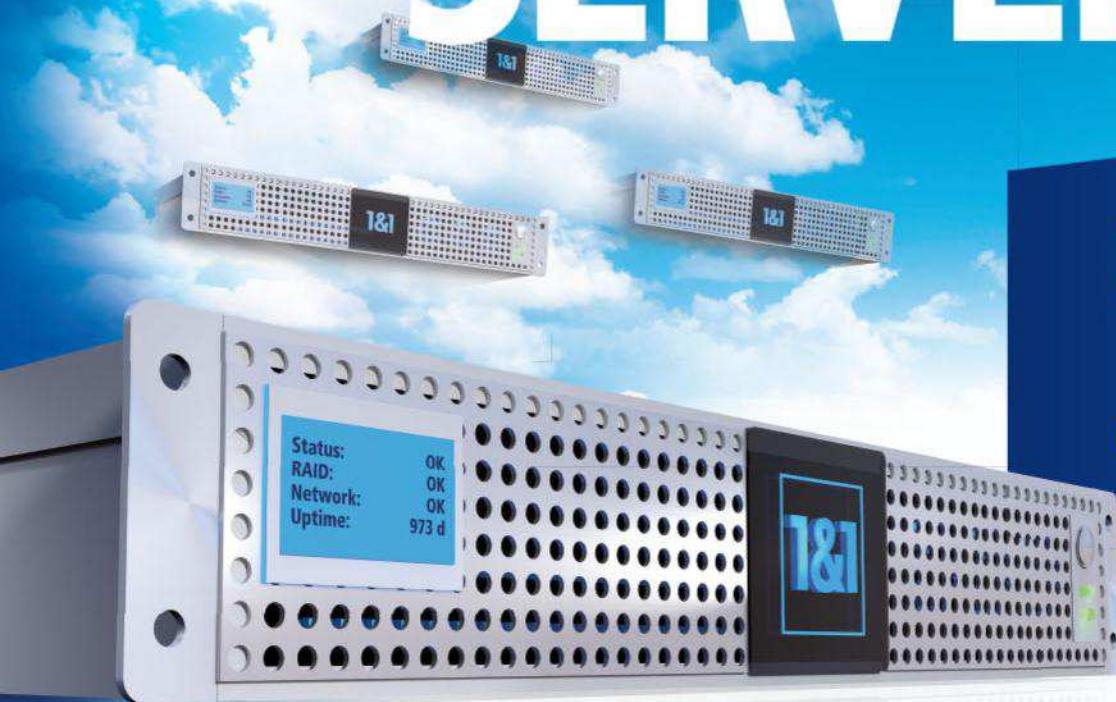


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*VOICES

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Photo: Paul Clarke Photography (paulclarke.com)

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*REGULAR

GALLERY 40

> Maximo Castellarnau runs down his favourite websites of the month, including Design Canada's crisp CSS-animation gallery



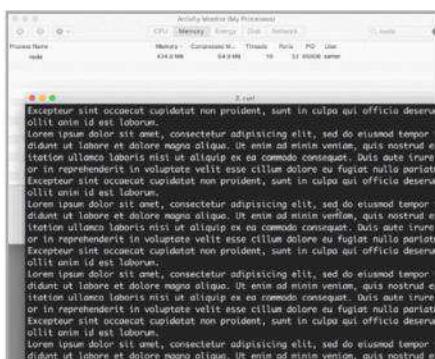
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EXCHANGE

Send your questions to netmag@futurenet.com

Practical
advice from
industry experts

THIS MONTH FEATURING...

THOMAS LEWIS



Thomas, aka Tommy, has been working as technical evangelism manager for Microsoft Canada in Vancouver since 2012.

His interests include project management, HTML5, CSS3, JavaScript, design, inclusive design, bot design and otters.

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MORTEN RAND-HENDRIKSEN



Based in Burnaby, Canada, Morten is a senior staff instructor at LinkedIn Learning and Lynda.com, with more

than 60 courses published. He also teaches Interaction Design at Emily Carr University of Art and Design.

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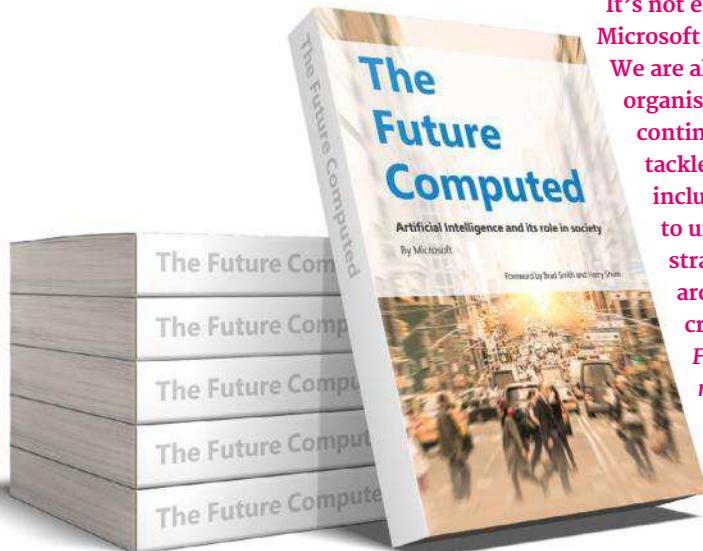
★ QUESTION OF THE MONTH

What is Microsoft doing to eradicate systemic human bias from its AI?

Phil Nash, Australia

TL: First, we're recognising that there is unintentional bias in existing AI algorithms. Then, creating a set of design principles for AI such as: fair, reliable and safe, private and secure, inclusive, transparent and accountable. It is fundamental that we use AI not to replace humans but to augment the human experience.

It's not enough, though, just for Microsoft to follow its own principles. We are also working with other organisations and companies to continually come together to tackle the big challenges and include government. If you want to understand Microsoft's strategy and thoughtfulness around these issues, we've created a book called *The Future Computed* at: <https://news.microsoft.com/futurecomputed/>.



The Future Computed is a free ebook from Microsoft that explains its thinking around the development of AI

CSS Grid

CSS SUPPORT SADNESS

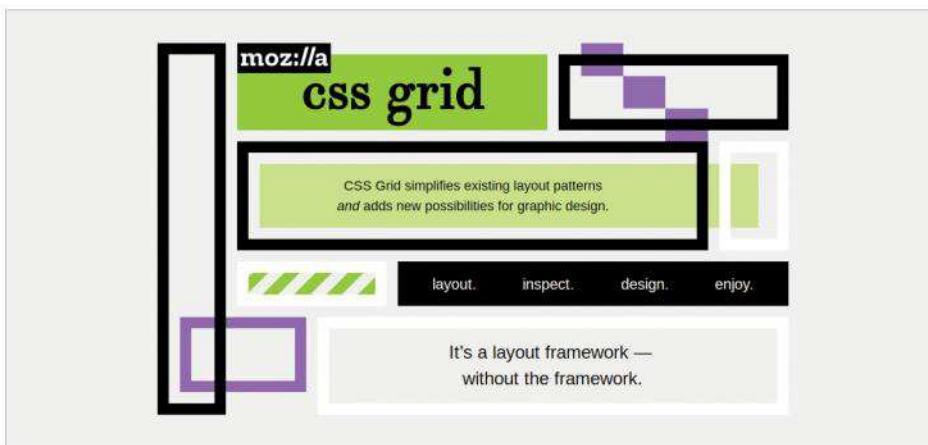
Does it make you cry when you create great CSS Grid layouts and then have to look at it in IE?

Sush Kelly, Birmingham/Leamington Spa, UK

MR: This short answer is no. My job is to make sites with layouts that work in all browsers. That does not mean all browsers need to get the same layout. While CSS Grid has broad support in the

latest browsers, there is effectively zero support in older ones except for Internet Explorer, though that support is for the old syntax. I think the real question here is how to deal with backwards compatibility for a feature that has no backward support. The answer is progressive enhancement.

Progressive enhancement means building a site that works everywhere first, then adding CSS Grid for those browsers that support it. My



You can test CSS Grid support in the browser using an @supports feature query

recommendation is to build a mobile-first layout to work across all screen widths as the baseline for all browsers, then create modern layouts with CSS Grid as an enhancement. Another more traditional approach is to build a layout that looks roughly correct using old tools like float, clear, table and flex, then progressively enhance with CSS Grid. In either case, you can test CSS Grid support in the browser using an @supports feature query (<https://developer.mozilla.org/en-US/docs/Web/CSS/@supports>).

Mixed reality MIXED MESSAGES

Mixed reality in the workplace: any interesting stories to share?

Ramesh, London, UK

TL: I think we are still at the precipice of what mixed reality can do in the workplace. I've been excited about what I have seen and how innovative even some of your most traditional companies have become when they incorporate mixed reality into their business. I've seen airplanes and oil rigs to scale while in a 10-by-10-foot room. I've seen projects that have helped with a wide range of disabilities. Factory floors are going to really be interesting places moving forward.

One thing I think everyone in the mixed-reality space should consider is voice capability. There is so much that can be done without hand gestures and it will be a big part of ambient

computing. I'm personally working and thinking about the intersection of mixed reality and AI.

CSS Grid

CMS AND CSS GRID

How useful is Grid for content management systems when different pages require a different number of rows, columns, photo galleries and so on within main content area?

Adam Saucier, Connecticut, USA

MR: Content management systems will probably see the most immediate benefit from CSS Grid, precisely because they need to provide solutions for different layouts depending on what content is displayed. CSS Grid is the first pure CSS tool we have for creating two-dimensional layouts in the browser, meaning we no longer have to litter our HTML with nested divs or rely on clunky 'grid systems' and frameworks.

CSS Grid enables a CMS developer to create custom layouts for pretty much any situation, both globally and at component level in CSS, all while serving up clean semantic HTML. The advantage of a CMS is that the server-side code can apply classes based on what contents are displayed in the current view. CSS Grid can then impose custom responsive layouts based on the current view. Which is kind of magical, if you think about it. CMS and CSS Grid are a match made in coding heaven and we haven't even begun to scratch the surface of what is possible here.



3 SIMPLE STEPS

I'd like to start learning some AI skills. Can you recommend a good place to start learning?

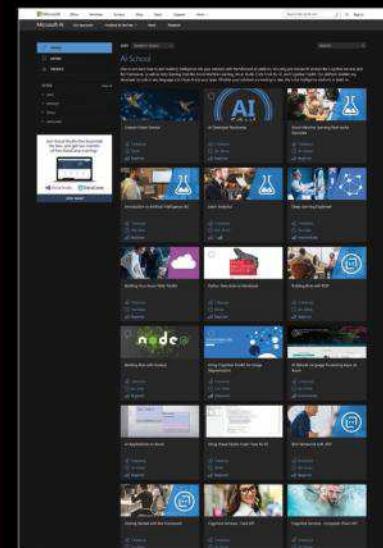
Alison James, Norwich, UK

High level

+ TL: It's VERY challenging to get started with AI, not because of the topic but because there is so much that is a part of AI and it's easy to get lost in the deep end of the pool! I tell attendees at my AI talks that the best thing to do is start small and practical.

Smart small

+ Perhaps begin by building a simple conversational bot that includes natural language processing, which is incredibly easy to do. Then begin working with cognitive services where you can write simple code to call complex services that do all the work, such as computer vision or sentiment analysis.



Back to school

+ At Microsoft we've tried to make it easy for AI enthusiasts by creating AI School at <http://aischool.microsoft.com>, which lets you approach AI in a thoughtful, bite-sized way.

COOL STUFF WE LEARNED THIS MONTH

VARIABLE FONTS DEMO

+ Variable fonts enable designers to use multiple font weights and widths without having to include lots of files; you include a single file and modify the font using CSS. This Microsoft Edge Demo gives you a taster of what can be achieved.

<https://bitly/2HupHnN>

IMPLEMENTING A REDUCED-MOTION MODE

+ Animation may be all the rage right now but not all users want to see it. People with impairments such as ADHD or conditions like motion sickness often wish to avoid animations and this article explains how you can let users turn off those effects on your site.

<https://bitly/2upssDQ>

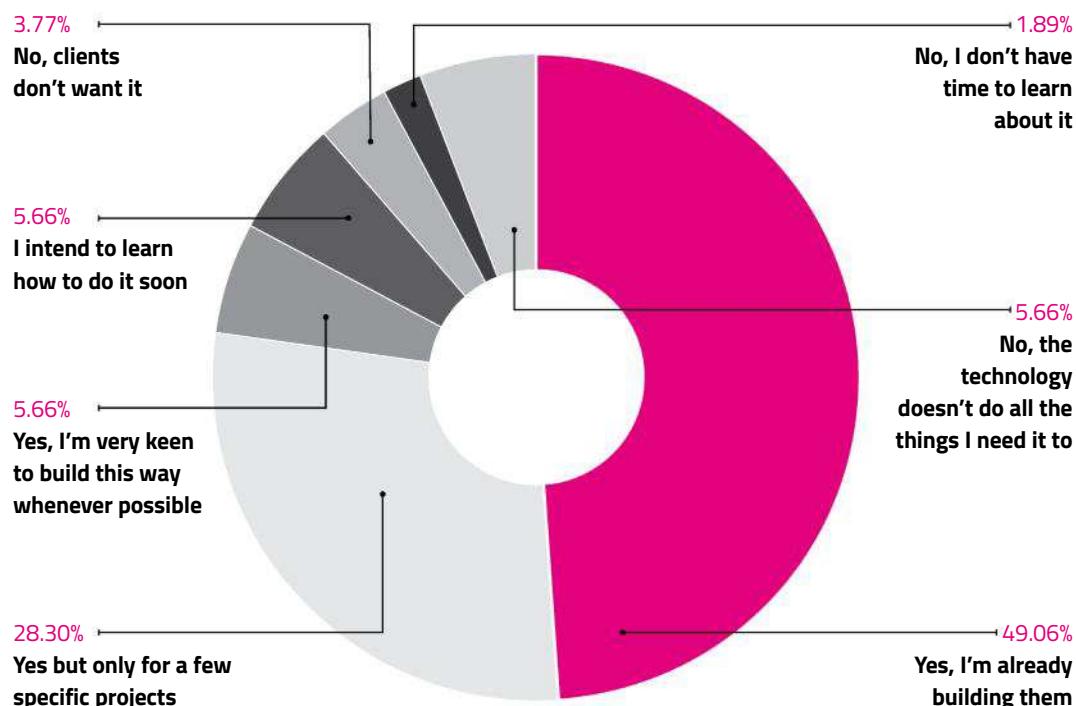
REDUCING THE FRICTION OF ONLINE PAYMENTS

+ Relying on advertising to make money from websites is becoming increasingly problematic but fortunately it's getting easier to take payments from users in a quick and painless manner – making other revenue models viable. Among other things, this article explores the potential of the Payment Request API, which enables the browser to provide the UI for the checkout process.

<https://bitly/2HgFmjx>

*THE POLL

ARE YOU GOING TO BUILD ANY STATIC SITES THIS YEAR?



From our timeline

What new web design things are you most excited about?



We're pretty excited about the latest version of @createwithflow having HTML5 / CSS export
@createwithflow



SERVICE WORKERS IN SAFARI! MORE DESIGNING FOR RESILIENCE! ehem. Yes, I am excited about that. Yes.
@philnash



Using 3D models in the browser with WebGL. I know this isn't new, but

I think we haven't even begun to see the potential in marketing and ecommerce sites.

@ryanIndustries8



I am currently excited about flexbox, since I'm finally really using it in production web apps to lay out the UI for different screen sizes.

@IndependentSw



The return of the mobile web movement in the form of Progressive Web Apps. @ionicframework is

making some remarkable headway here with [@schutzsmith](https://capacitor.ionicframework.com)



I find WebAssembly an exciting step towards getting performance well enough to be considered an alternative to native apps.

@sotaroraiste



People taking more responsibility for the project and end users as a whole. Designers and developers working together on the usability and accessibility of projects as a whole rather than in silos.

@HeX_Productions

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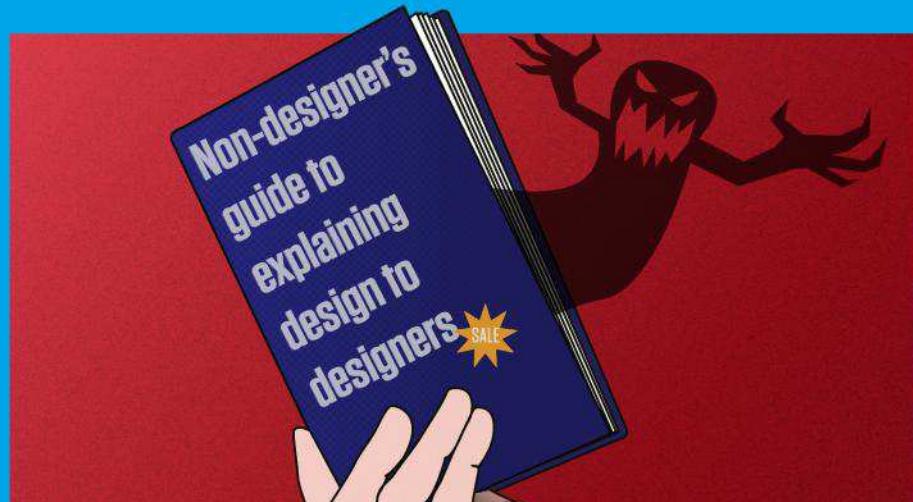
FEED

People, projects
& paraphernalia

THIS MONTH FEATURING...

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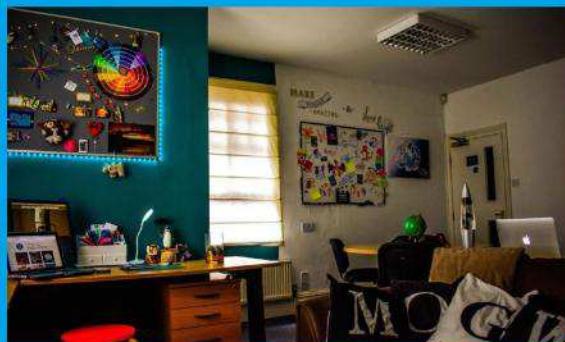
This month a client educates a designer on how their job works – with the help of Professor Google



BEYOND PIXELS

Sush Kelly's mission to bake the perfect sourdough loaf also proved the key to building better websites

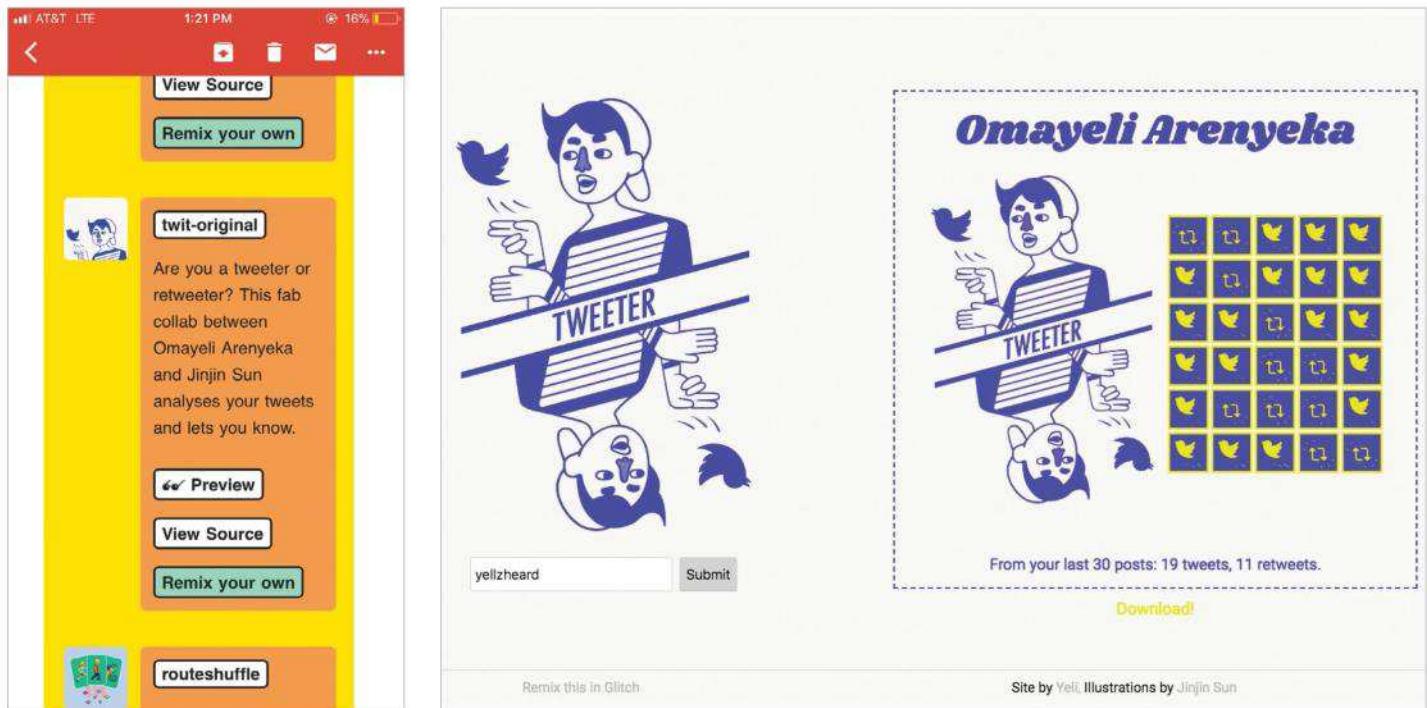
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WORKSPACE

Liz Morrison reveals red kites, colour swatches and hydrophobic critters fuel Mogwai Media's creativity

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DECLARE OR SHARE?

Omayeli Arenyeka explains how her Tweeter or Retweeter tool splits originators from circulators

* SIDE PROJECT OF THE MONTH



OMAYELI ARENYEKA

job: Omayeli is a creative developer studying at the School of Poetic Computation. Before that she worked as a software engineer at LinkedIn.

w: omayeli.com
t: @Yellzheard

Tell us about your Tweeter or Retweeter tool.
It tells you whether you're a tweeter or retweeter based on a certain number of posts scraped from your user profile. It also creates a graphic with that information you can download and share.

Why did you create it?

I kept seeing people talk about being "Twitter originals" and being super creative and clever with their tweets. I wanted a way to actually quantify that, something that people could show as proof. Also I think when you're on Twitter, at times a lot of the things you do are unconscious – you see a funny tweet and you retweet it. I wondered if people actually knew what their user profile looked like so I wanted to create something that revealed that.

What were you hoping to achieve?

I wanted to make something fun that would reveal a bit of who we are online so we can interrogate that and share with others. When people talk about how creative they are on Twitter, I wanted them to be able to point to something as evidence. And on the other

hand, if you say you are on Twitter to engage with the ideas of people, does your user profile reflect that?

What technologies were used in building it?

I built it on a platform called glitch because it allows others to 'remix' your project and make it their own. So it's hosted on glitch. I use Node.js to get all the relevant information from the Twitter API and then good ol' JavaScript, a bit of JQuery and the HTML Canvas to create the downloadable graphic.

How has Tweeter or Retweeter been received?

It's been received pretty well! It was featured on the glitch newsletter titled "cool and useful apps you won't find anywhere else". Lots of people shared the graphic online with captions like "apparently I'm a tweeter" or "Glad I share more than I blab!" or "all fresh content here folks".

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

The first thing is I want to make it easier to share, so just simply be able to draft a tweet with the generated graphic directly from the site. Secondly, I would like to have the user be able to compare their results to other users of the site. So I want to create a database of the results and have an (opt-in) collection of all the generated graphics. I also want to add a non-binary scale. So instead of retweeter or tweeter, have maybe super retweeter > retweeter > perfect balance > tweeter > super tweeter [in order] to make the results more specific. ■



★ HOW TO

REMAIN CREATIVE AS A DESIGNER

Short time frames, small budgets and other limitations can take away the chance for designers to solve problems in creative ways.

We asked @netmag followers which factors stifle their creativity and, more importantly, how they overcome them.

ASK THEM TO TELL STORIES

For @JamieKnight, creativity is stifled when the client tells him a solution rather than the problem they need to solve. "We overcome it by asking the client to tell us the stories they want to hear about their website. 'I used it too'... 'it was great because' etc," he says.

SCHEDULE FEEDBACK

@hackneydesign identifies slow and inconsistent feedback times in the public sector as a constraint on creativity, as well as a factor that makes time and resource management difficult. To deal with this: "Set expectations early, schedule feedback and clearly define feedback times based on their internal processes".

SHOW THEM A CONSEQUENCE

Again from @hackneydesign: "Make it clear that the defined project deadlines are dependent on them following the schedule. Make it clear that while you will always try to launch to schedule, every slip in the schedule from their end can have a consequence (as it also does from ours) and delay launch."



BRANDSPLAINING

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

★ CLIENTS FROM HELL



I was designing some branding and a website for a restaurant. I agreed to a **VERY** competitive price despite a short time frame. Because I'd recently finished some major projects, I was able to provide prompt service, responding within 15 minutes even though I was in a different city than the client.

Of course, no good deed goes unpunished.

Me: So tell me about your target group.

Client: We want a fresh design for young and middle-aged people with a higher income.

I proposed a concept with the little information I had.

Client: I don't like it: it will scare off older clients.

Me: Right but the brief said the branding should be targeted at younger people.

Client: No, I never said that. Our clientele is mainly older.

I had a written brief by the client that said otherwise but whatever. I made another design.

Client: I need to ask my friends and my brother what they say about it.

I said sure. Two days later:

Client: I'm very dissatisfied with your work. Things are going too slow. And you should also offer brand strategy consultation, written content and photography for free. That's how professional agencies work.

I stayed calm and continued working. After a couple of days her brother (who works in IT) was suddenly involved in the design process.

Client's Brother: My sister is really dissatisfied so I'm going to give you guidance. I googled 'Corporate Design Step by Step' – I'm going to read it to you so you know how things work.

Me: ...

CLIENTS FROM HELL
clientsfromhell.net

KNEADING THE PROCESS

Sush Kelly reveals making homemade sourdough didn't just have a tasty outcome – it also helped him build better sites

* BEYOND PIXELS

> It all started with a flat white. My local cafe is a nice little place with a bike workshop. They also sell amazing sourdough toast but it costs £3.50 a pop. I am a tinkerer at heart; being a full stack designer/developer means I am always trying new things and enjoy a challenge. So a little googling turned up that you can actually make your own starter for sourdough using nothing more than flour and water. The internet searching also suggested it was a bit of an art. A challenge you say? Hold my beer.

During the Christmas break I began trying my hand at this baking malarky. It turns out a sourdough starter was a little tougher to make than expected but I did manage it second time around. The key test at the end of the process is to put a blob in a glass of water: if it floats you are good to go. The excitement when the second attempt worked was palpable!

Making sourdough is a long and drawn-out affair. The process is key. Starting with the initial shaggy rough dough, you let it autolyse by adding some salt water, then more resting. After a few hours you begin folding and turning the bowl 90 degrees until you have done a circle. You must do this six times and then you can divide the dough and leave it some more. Two sets of shaping

happens and then into a proofing basket they go and sit in the fridge overnight.

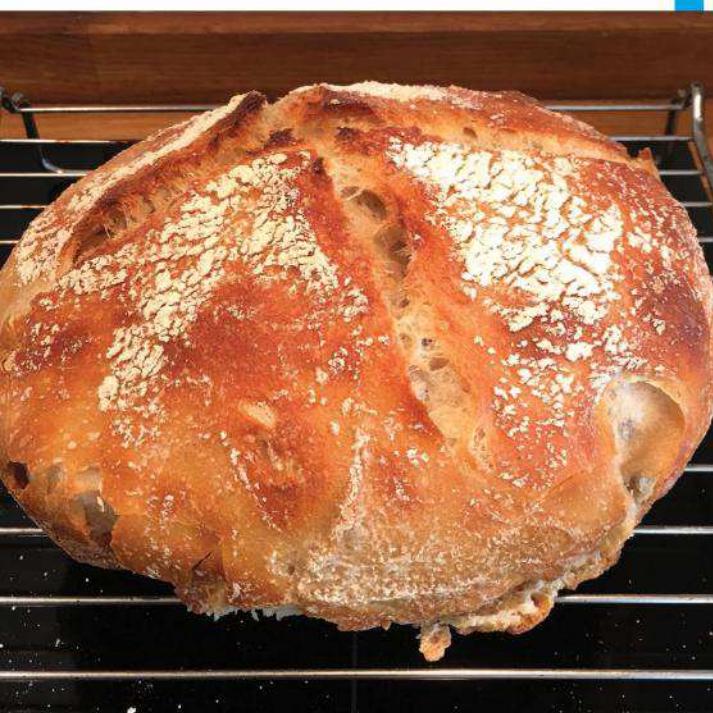
Finally you can bake something but even then there is a process to follow. A specific ritual of temperature and time. First heat up the dutch oven or casserole dish to 250 degrees, then pop in the sourdough and cover for 15 minutes at 250 then another at 225 and then you can open the oven just to take the lid off for a final 15 minutes. At this point out comes your loaf and you can squeal with delight as it looks just like the expensive loaves you see in the shops!

The parallels with web design started to become apparent. When you rush and throw things together out of order, sometimes they will work but often you end up with a deflated mess... and annoyed clients. Sticking to a process helps create cleaner, more manageable code. My new weekend baking ritual has instilled me with an almost zen-like calm, which I have been carrying into my development. ■

* PROFILE



Sush is a digital consultant, UX designer at Imagine and a general 'tinkerer of things'.



STUFF I LIKE



ALEXANDRA LOFTHOUSE

Senior UX designer at Fifteen

@loftio

HEADSPACE APP

I've found meditation and mindfulness through Headspace is incredible for self-care, especially for nurturing the creative part of our brains. It's free to try and easy to fit into life, so I'd encourage everyone to try it, not only creatives.

www.headspace.com

SENSE & RESPOND BY JEFF GOTHELF AND JOSH SEIDEN

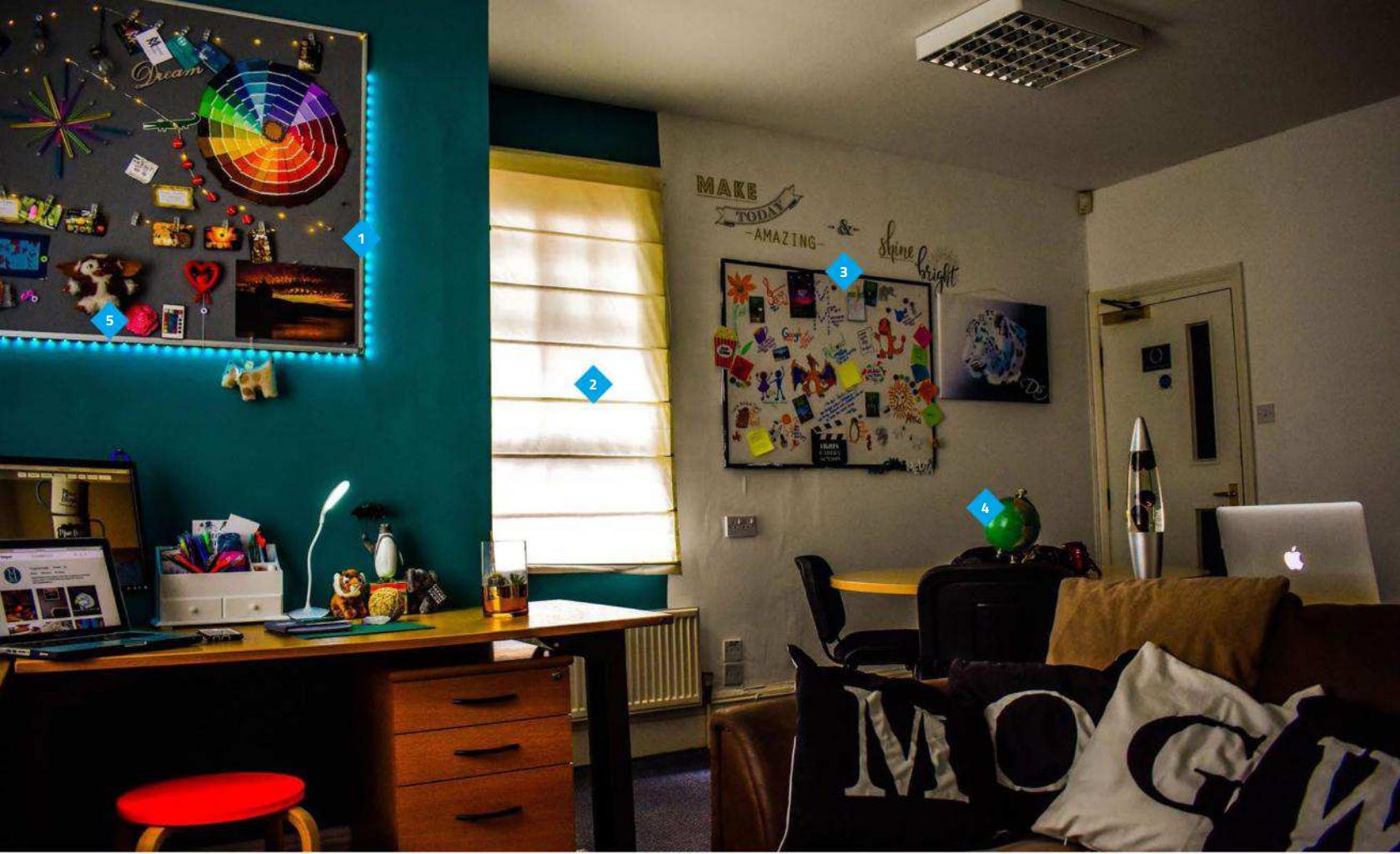
This is a great follow-up to Jeff's *Lean UX*. There are brilliant lessons on management responsibility and reshaping a dysfunctional organisation, which I'm keen to put into practice.

<https://amzn.to/2uTUBOM>

IT'S NOT HOW GOOD YOU ARE, IT'S HOW GOOD YOU WANT TO BE BY PAUL ARDEN

While some ideas in this book are outdated, it has some excellent parts to live by. I enjoy the quote – "The person who doesn't make mistakes is unlikely to make anything."

<https://amzn.to/2EDrAvf>



MOGWAI MEDIA

Liz Morrison reveals how red kites, colour swatches and hydrophobic critters fuel the Welsh agency's creativity

* WORKSPACE

If you wanted to create an office space where Chinese goblins could run riot then Mogwai Media has it covered in our homely first floor office, where the feminine clashes comfortably with the masculine.

(1) A dynamic mood board lit with twinkly fairy lights and rainbows of paint swatches stands out with examples of innovative art and photography. The fairy lights bring about feelings of late summer nights, open fires, a glass of something fruity and open-hearted conversations with friends – they're a magical background! The demonstrations of colour are also important. Each colour has an emotion attached to it and playing with colour is something that I never get bored of.

(2) The Mogwai Media office is not only a creative space but its location is very deliberate. The wilderness of a remote Welsh market town provides a space that suits creativity. Our inspiration comes from the landscape around us, from the sounds that we hear of the bustling market street outside, the rain hitting the window panes and the colours present in the landscape on the walk to work. Ultimately this is a work space that provides free reign with no limits to where ideas take us, a perfect – if poetic – analogy for the red kites circling overhead.

(3) The large whiteboard is crammed full of quotes, deadlines, dates for the diary and things to remember, all written in various psychedelic colours with cartoon

pictures for added emphasis. Then it's changed again a few days later. Then again a few days after that. It keeps us focused and is a creative process in itself.

(4) In the middle of the table we use for meetings is a globe, which sits there as a reminder of perspective, to encourage us to bring different experiences into our design and keep in mind that design, both good and bad, has an impact on the world. We believe in the cliché that the world's our oyster. Travel and experiencing new things, sights, smells and cultures is important. The world is an inspiring place. I've always loved globes; I had a light up one in my bedroom when I was a kid, with Canada extra highlighted because I wanted to move to Vancouver!

(5) Also, gremlins appear only minimally in our office. Although visitors will notice we don't have a water dispenser. ■

Written for Samantha Bibb-Macgregor and Dave Owen at Mogwai Media (mogwaimedia.com) by Liz Morrison, freelancing writer at Creative Solutions.

* PROFILE

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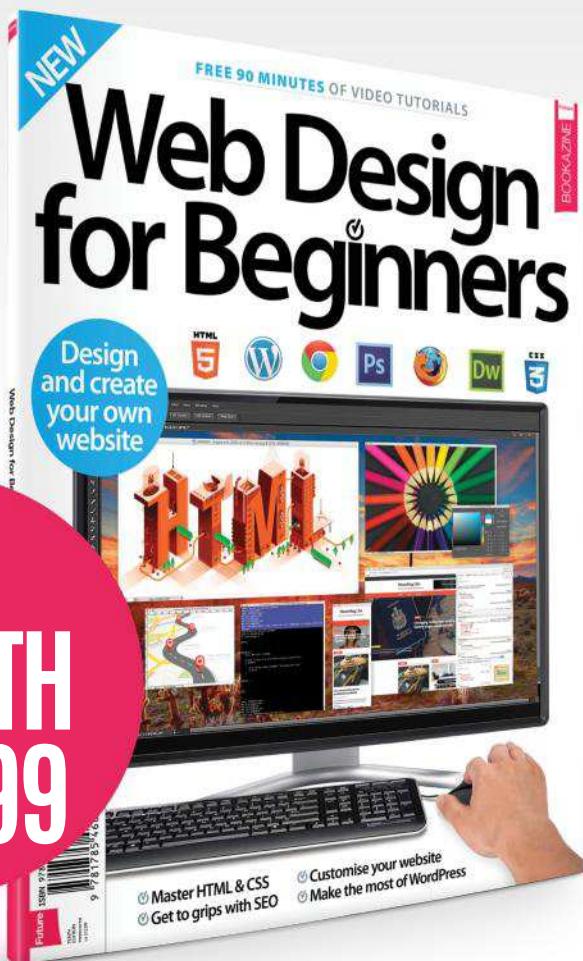
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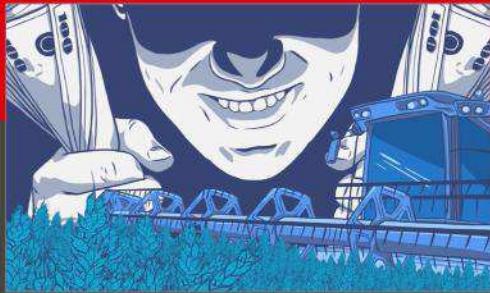
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VOICES

Opinions, thoughts & advice



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Daren Oliver asks whether data harvesting is becoming the most virulent strain of cybercrime



Photo: paulclarke.com

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Sarah Richards argues the key to hooking users' attention on digital platforms is compelling content design



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Stéphanie Walter explains why it is okay to 'cheat' when it comes to developing an effective UX strategy

★ PRODUCTIVITY

MULTITASK WHILE STAYING FOCUSED

Matt Obee provides tips for staying productive when context switching



I split my time between UX/UI design and software testing, which means that I'm constantly switching my focus between different projects, teams, tools and skills. Context switching like this can be a real problem because it takes time to stop thinking about the previous task and get fully engaged in the next. Research shows that we lose up to 40 percent of our productivity if we multitask because we make more mistakes and take longer to get things done. Fortunately, there are some simple techniques that we can use to manage our time and attention more efficiently, which we will share with you here.

SET A SCHEDULE

Instead of always trying to relentlessly multitask, reserve blocks of time to concentrate on specific tasks – an hour to write that blog, four to finish those wireframes and so on. I'm a fan of the

Pomodoro Technique, which breaks the day into 25-minute chunks, each followed by a five-minute break. After completing four of these 'pomodoros' you take a longer 15-20 minute break. Twenty-five minutes is generally enough time for me to make progress on a task and the five-minute break is just short enough not to interrupt my flow. You might prefer longer blocks of working time and fewer breaks, so experiment with the possibilities and find a rhythm that works for you.

BATCH YOUR TASKS

Save up all those small jobs and complete related tasks in one go. Examples include writing feedback for colleagues, checking RSS feeds, social media and email. Instead of checking and replying to email every few minutes, cast an eye over it in your next Pomodoro break. If it's not related to your current task, simply come back to it later. You might also like to batch all of your emails or phone calls into a single session when you have a quiet period and you don't have to think about anything else. This is similar to 'context lists' in the Getting Things Done (GTD) system.

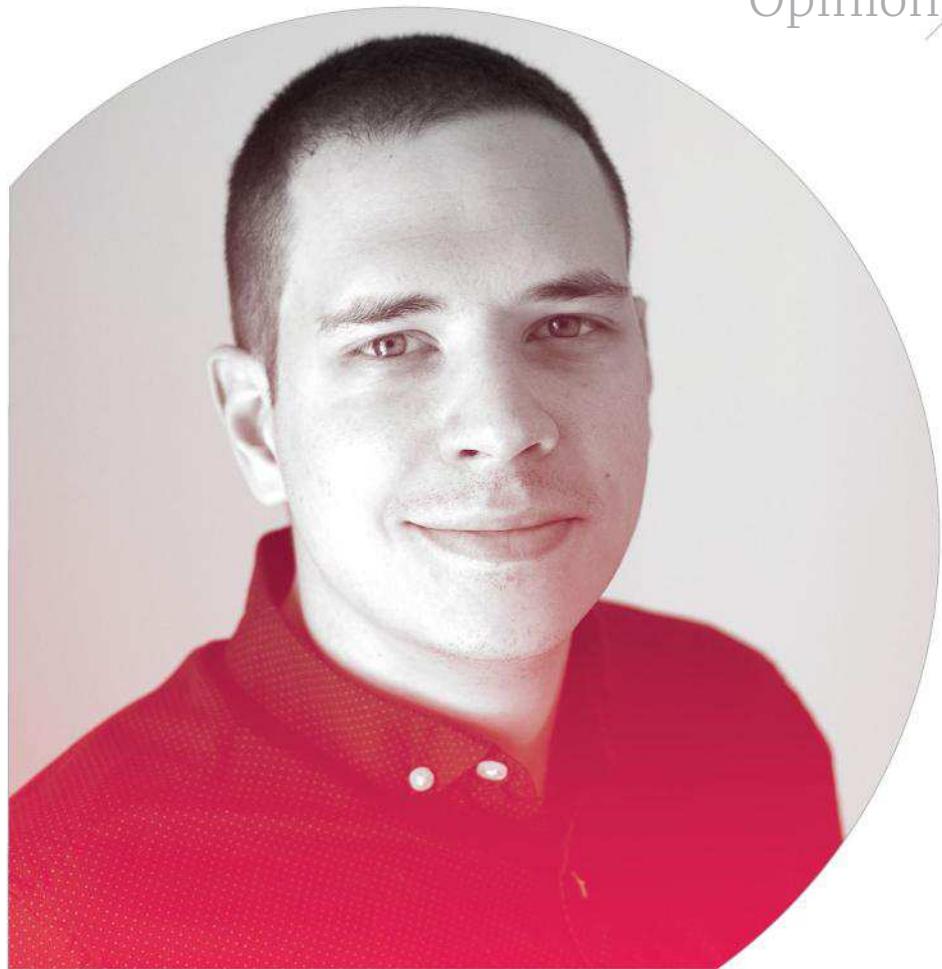
MINIMISE BROWSER TABS

Limit the number of tabs that you have open in your browser and keep only the stuff that you need in order to complete your current task. Articles to read, tools to try, cat videos to watch – there's no way that you can process that much information simultaneously and you're kidding yourself if you think you'll remember to come back to it later.

I add anything that I need to get done to Todoist and send articles that I want to read later to Pocket. If you need help with self discipline, try installing one of the browser extensions that close tabs for you. Start with a fresh browser session when switching contexts.

CLEAR YOUR DESK

Tidy desk, tidy mind. Be strict in clearing your workspace at the end of the day or when switching between tasks. As is the case with browser tabs, those notes and sketches from the previous task are just



a distraction that makes it hard to concentrate on the next piece of work. It's easier to keep things tidy if you remember to batch your tasks and minimise the number of times you have to switch context.

MOVE

I prefer completely different working environments for different tasks. If I'm solving a difficult problem or playing with design ideas, I tend to work at home where I can control the level of noise. When I'm working through a list of small testing tasks, the noise and energy of a busy office can be just what I need. What's more, the change of scenery and the physical act of moving between locations is an effective way to clear the mind and reset when switching contexts. If you don't have a choice of locations, try going out for a short walk instead.

MAKE DETAILED NOTES

Never underestimate the importance of writing things down. I like to think my memory is generally pretty good but I

certainly struggle to remember things when switching contexts. Having notes removes the pressure of trying to remember and makes it easier to shift concentration from one task to the next. I like to have my notes in the cloud instead of on paper, so I've experimented with various tools like Evernote and OneNote. Whatever tool you decide to use, remember to keep your notes up to date.

FIND A PLACE TO STOP

I try to complete each task before switching my attention to something else, otherwise I find myself covering the same ground again when I come back to it later. If you know that something is likely to take longer to finish than the time you have available, consider waiting until you have a longer, uninterrupted block of time. If this isn't possible and you can't completely finish a piece of work, look for a natural place to pause. ■

* PROFILE

Matt Obee is a UX/UI designer and software tester at Holiday Extras. He specialises in usability and accessibility.





* DATA HARVESTING

THE NEW FACE OF CYBERCRIME?

Illustration by Kym Winters

Daren Oliver explores the recent data breaches experienced by subscribers to social media and asks whether data harvesting is fast becoming the most virulent strain of cybercrime

> Cybercriminals were once shrouded in mystery. Faceless non-entities lurking in the murky environs of the darkest corners of the digital underworld carrying out carefully planned phishing attacks and unleashing herds of Trojan horses to help them storm PCs. Although it's true that phishing and hacking remain a lucrative pastime for many of the world wide web's underlords, it seems that harvesting is quickly becoming the new buzzword on the cybersecurity block and cybercriminals are cutting a more corporate appearance.

In the wake of the latest tidal wave of data privacy breaches that have swept the globe is the revelation that they were carried out not by shadowy underworld figures, but by well-known organisations that we have trusted and obligingly supplied with our most private and sensitive information, preferences and beliefs. But more alarming than this has been the unwitting participation of millions of social-media users in a worldwide data-gathering experiment at the hands of companies that would make Orwell's dystopian state of Oceania look vaguely tolerable. How ironic then that the premise behind Cambridge Analytica's audacious breach of millions of personal Facebook profiles was how it classified voters and targeted them by using the OCEAN technique – Openness, Conscientiousness, Extroversion, Agreeableness and Neuroticism.

One of the long-held arguments from the anti-social-media movement – or maybe just those who would rather not bandy about their life stories online – is 'what do you expect if you publicly post your personal updates on a platform the whole world can see?' Of course, we have always known Big Brother was watching in some format or another, be it CCTV outside the local supermarket or the tracking and mapping of our daily debit card usage. But it seems in the modern world, where nearly half of the global population owns a personal smartphone – a device that can rather disconcertingly and almost inexplicably predict our very whereabouts with the flicker of a traffic update to our proposed destination – that none of us are truly immune to having our personal information scrutinised and scavenged by data-hungry, corporate beasts.

Even if we aren't fully active on social media ourselves but our immediate connections are, then it could still make us fair game for having our information tapped into, downloaded and used without our permission. In the case of Cambridge Analytica, it appears that the masses of data it gathered was neither permissible nor ethical and was used to socially engineer and ultimately influence millions. Meanwhile, Facebook failed to protect its users by allowing the company to collect the data. So what can be done to preserve our privacy amid the ►

- unending stream of information that we have managed, either willingly or involuntarily, to post on the internet?

The introduction of the European General Data Protection Regulation (GDPR) in May will bring into force tougher and more stringent rules on the handling and storage of personal data. Initially Facebook indicated that the majority of its users will not be protected by GDPR but Mark Zuckerberg quickly followed this up with an announcement that he intended for Facebook to make the same controls available everywhere, not just in Europe. But will adjusting our settings be enough and will the company be globally implementing GDPR's more pertinent rules for consent, data control and the right to know how our data is being used? Facebook says 'yes' and although rules outside Europe could cause conflict, it intends for GDPR to apply to everyone.

Meanwhile the Information Commissioner's Office – the British government's privacy watchdog – has opened an inquiry into Cambridge Analytica and its use of data following allegations about its ties with the Leave.EU campaign and whether it, and similar companies, are a risk to voters' rights.

responsible for checking facts and keeping users' data safe and secure.

Utilising personal data and associated algorithms to specifically target an individual is not a new concept and is perhaps one of the main reasons why Facebook has enjoyed such unrivalled success – it made \$26.9bn dollars from direct advertising in 2016. However, it calls into question how data is stored, shared and ultimately used. The unethical harvesting of millions of accounts to launch a series of politically charged snipers into the datasphere that hunted down specific personas to manipulate them is not only morally dubious but potentially dangerous. And while the companies should be held accountable, what if they themselves became the subject of a cyberattack? Imagine how invaluable such data could be in the wrong hands and the endless opportunities for moulding and controlling global events.

It seems with this case there will continue to be more questions than answers – or indeed long-term solutions – until there is a worldwide overhaul of data-privacy law. Take, for example, Facebook's latest move to seek facial recognition consent in the EU and Canada ahead of the

"The unethical harvesting of millions of accounts to launch a series of politically charged snipers into the datasphere is not only morally dubious but potentially dangerous"

Giving evidence in the Commons to the Digital, Culture, Media and Sport Committee, a former employee of the company, Brittany Kaiser, revealed that the data of millions of Facebook users was used to promote right-wing political causes. She said "misuse of the data was rife" and that the work Cambridge Analytica carried out on behalf of UKIP and Leave.EU "was never reported to the Electoral Commission by the party, the campaign or our company." In a further shock to our privacy rights, she also disclosed it was almost certain that the number of Facebook users whose data was compromised is much greater than 87 million. Mark Zuckerberg meanwhile refused to appear, instead sending one of his senior executives. However, he did testify in a gruelling two-day hearing before law makers in the US Senate, who grilled him on privacy issues and third-party access. He made it clear that Facebook does not sell users' information to advertisers; however he would not commit to any specific data-policy proposals during the hearing, instead side-stepping with vague responses.

Facebook has consistently stated that Cambridge Analytica lied to them about holding data, despite Facebook requesting for it to be deleted in 2015. But ignorance isn't a defence and the company is still

introduction of GDPR. The company is already facing a class-action lawsuit in the US over its use of the technology, which it allegedly used without users' explicit consent. Given recent events, could the use of such technology add even more fuel to the already raging fire that is currently burning through global data-privacy regulations? And even if we do provide our consent for the technology to be used, will it ever be truly safe from cybercriminals, however they might disguise themselves?

Perhaps the most sinister and worrying thing about unauthorised data harvesting is the potential it has for manipulating outcomes through a method that could be considered as systematic brainwashing. It's this that could negatively affect the whole of humankind and cause catastrophic world-changing events. With this in mind, we should all be thinking more carefully than ever before about how we store our data and how we share information with each other. ■

PROFILE
*



Daren Oliver is managing director of Fitzrovia IT, a London-based consultancy that provides clients with cutting-edge IT solutions from across the globe.

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Sarah Richards

Words by Oliver Lindberg

Photography by Paul Clarke Photography (paulclarke.com)

We have just a few seconds to get our users' attention on digital platforms. Content strategist Sarah Richards argues the key to hooking them is compelling content design



INFO

job: Content strategist and digital consultant

w: <https://contentdesign.london>

t: @escmum



► Sarah Richards created ‘content design’ at the UK Government Digital Service (GDS). Between 2010 and 2014, her team worked on making copy on the public-sector information website gov.uk findable, usable and understandable. It was a massive, complicated project, based on user-centred design, which was unusual at the time – especially for governments.

She now runs the Content Design Centre (<https://contentdesign.london>), a small eight-people agency providing training and consulting in content strategy and design for organisations around the world. She’s also written a book about the discipline that she created, aptly named *Content Design* (<https://contentdesign.london/home/book/>).

“Content design is a way of thinking,” Sarah explains. “It’s about using data and evidence to give the audience what they need, at the time they need it and in a way they expect.”

It also considers both the medium and the user. “A lot of organisations just blast,” Sarah sighs. “They shove all their content out and hope that people will pick it up but that’s not the case. You have to write in a way that

people are going to consume. Digital is pull not push publishing. You have to do something to pull the content towards you, like following a link. And you have to write in that way. The most important skill for writing on the web is turning push content – what you want to say – into pull content – what your audience wants to read.”

Not surprisingly, given her enthusiasm for rethinking the way we approach content, Sarah has a background in both design and the media. After attending art school and working for a time in journalism and advertising, she went on to join the civil service and worked on a project called Convergence at Directgov, which provided a single point of access to public sector information and services before being replaced by gov.uk in 2012. “We had to take 185 sites down into Directgov,” Sarah remembers. “It was a really hard project because nobody wanted to go onto Directgov. It was such a bad platform.”

When Sarah started on the gov.uk beta, she was adamant that her team shouldn’t just be performing the role of proofreaders. “Most of what came out of the beta was just

born out of frustration from five years of working on Directgov. When [GDS co-founder and deputy director] Tom Loosemore asked what we wanted to be called, I said that we were not being called editors or writers because we were going to do so much more than that. We needed to change the conversation, so I came up with ‘content design’ and brought all of my skills into it. For example, the design critiques that I did at art school became content crits.”

Gov.uk stood out because of its simplicity and timelessness. It influenced many other government projects like 18F, a digital services agency within the United States Government. “Before gov.uk there was no real push or impetus,” Sarah explains. “It’s the government so you can take as long as you like, right? There’s no competition. Whereas we pushed and brought in developers who wore shorts in the office and wrote on the walls – crazy things like that. It was massive and hugely complicated, really hierarchical. We took 75,000 items down to 3,000, in transition took a further 482 government sites into gov.uk and dealt with 26 departments. And we still did it – on time.”





Since Sarah left GDS in 2014 she has led the digital transformation of Citizens Advice and created the content strategy for The Co-op's new single site. More and more organisations have started implementing content design, such as homelessness charity Shelter and NHS service Healthy Working Lives. As Sarah speaks and hosts workshops on content strategy and design around the world (dates are coming up at Pixel Pioneers Bristol and her own Content Design Centre), more people are discovering the discipline.

And fortunately anyone with a background in user experience and usability should take to the content design methodology like a duck to water. To start off with, you go through the user journey and identify user needs in discovery sessions, just like designers do. Then you figure out the language and find out what kind of vocabulary your audience uses. Psychology and the science of reading, the involuntary mechanics that govern how humans take in information, also play a big part.

"We need to understand our users' mental models and take into account user behaviour

online and offline," Sarah explains. "We need to understand the language they use and their emotions. Nobody has a magic idea they've never thought about before, goes to Google and types it in. You have all this baggage and these preconceptions that you have to consider."

Discovery sessions should ideally also be attended by designers and developers, product managers and people with the authority to sign work off. "If we find out that people like to have case studies, quotes or something else that needs to be a design element, I expect us to work together to make that happen," Sarah explains. "If designers are creating templates and throwing them over

the fence to us, it really dictates the way that we have to write. That may not be the best thing for the user. A site can only be exceptional if design and content work together. We're all impacting the user experience. That's why at GDS we took the

term 'user experience' out of job titles because it's everybody's responsibility."

Content design is not just limited to words. It's about working out what content will best meet the users' need. "This normally comes out of discovery," Sarah points out. "For example, if English is their second language or they're dyslexic, then we may see if a video would be helpful. But if we know that people just need something really quickly, like their VAT number, it'll be flat content and we show it to them quickly and easily."

And yet despite its ability to serve users the kinds of content they really need, content design is still undervalued as a skill. Sarah points out that many think if they have GCSE English

they can write but they don't appreciate the skills that go into content design. Some organisations are hesitant to invest in content designers. When new clients turn to Sarah for help and say they already have a team of content designers, it often turns out ►

**"You have to write
in a way that
people are going to
consume. Digital is
pull, not push
publishing"**



► that they're not content designers at all but editors and copywriters. "I'm an ex-copywriter," Sarah says. "I'm not dissing the skill. It's amazing and necessary but it's not content design. This perception of value has got to change. Your designers, devs and researchers can't show off their skills if there's no content. Or it's bad content."

It's also important to point out that content design is different from content strategy, the process that gives you an idea of what it is you're publishing and why. Sarah explains that, in an ideal world, you should understand your content strategy before you start working on content design. Content audits are often seen as a cornerstone of content strategy but Sarah is quite vocal about them and has historically blogged about how content audits need to die.

"I've revised my feeling about them a bit," Sarah admits. "Content audits are just done at the wrong time in my opinion. People will decide on a new content project and to audit everything they've got. But they do that without thinking about what they need as a business, what the users want from them and what value they can add. It's always backwards-looking and you can't make

forward- and future-thinking content decisions. I just find it really inefficient. If you're going to do a content audit, do it after the strategy session."

Sarah finds it a lot more useful to go through discovery sessions and come up with a range of user or job stories that the whole organisation can make use of. They're ways of capturing what a user wants to do. Often they're written on little cards and stuck up on the wall, so that the whole team can understand the user's perspective. "Having a bank of those, including relevant data, is far more useful than a spreadsheet that somebody will live in for three months and then it just dies."

Sarah is a big fan of designing with data. "Every bit of evidence that you get speeds up your journey and it's a lot easier to have conversations about something you have data on. You always have somebody in an organisation who says 'I just want this' and you have to do it because they're the CEO or another important stakeholder. But most of the time you can talk to them and ask them to take a look at what the users are saying and what language they're using. You can then look at your page and analyse why it's

failing. It's far easier to talk about a product and try and make it better as a team, with the person that's blocking you, than to just tell them they're wrong."

Sarah finds that 60 percent of the problem is explaining what content is and has dedicated a whole day of her content design course to stakeholder management. "It's not just a technical skill like how to structure a page really well. It's also how to work with stakeholders," she says.

Once you've designed your content and published it, you're not done though. You need to develop and evolve your content. "You still need a review process, maybe every six months," Sarah recommends. "You need to check if your content is still fulfilling the need because humans change their minds. And yet some people just publish something and leave it for five years. You really need to try and keep on top of it, as the user intentions and the user behaviour change."

As Sarah puts it at the end of *Content Design*, "Remember, if your content now isn't perfect because you had to compromise with a stakeholder, you are still further ahead than you were. One step at a time. Because of you, the internet is getting better." ■



“Your designers, devs and researchers can’t show off their skills if there’s no content. Or it’s bad content”



★ THE DESIGN OF BUSINESS

SERVICE

Christopher Murphy highlights the importance of ensuring you delight your customers at every step



job: Writer, designer and educator
w: tinybooks.org
t: @fehler

> In a world where we're faced with endless choice – one that offers a wealth of products and services, all just a hyperlink away – how do you stand out from the crowd and avoid a race to the bottom on price?

One answer is to focus on service, using the experiences you design around your products and services to ensure your customers return year after year. This 'halo' of secondary experience, which surrounds your core offering, enables you to build relentless loyalty around your brand.

The design of this halo – all of the touchpoints at which you come into contact with your customers – is as important as the design of your product or service itself and it needs to be considered as an integral part of your business strategy.

By delivering great customer experiences, you build a customer base that's in it for the long haul. Even better, you create customers who are evangelists for your brand.

Creating truly great and memorable customer experiences is hard work but if you value your customers it's hard work you should be happy to put in. Customers – myself included – are looking for more than simple transactions; they're looking for brands that they can believe in.

Great brands understand this. They realise that great service isn't an add-on: it's at the very heart of the customer experience – indeed it's expected and if it isn't there, it's noted.

FOAFOAFOAF...

Great brands make an effort: they say 'thank you' acknowledging your support; they follow up, ensuring you were happy with your purchase; and they stay in touch with you – with your permission, of course – nurturing their relationship with you, beyond the moment you've made a purchase.

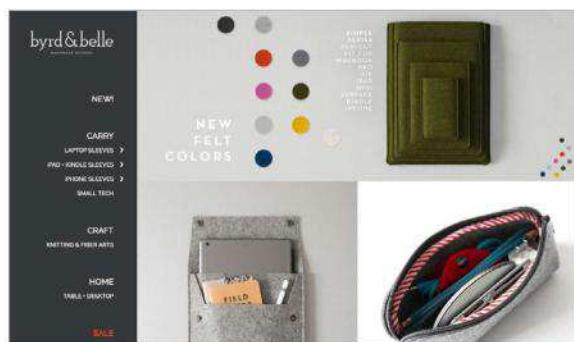
Importantly, when they email you, their emails aren't always focused on selling but instead are a healthy balance of sharing information you might find useful, with occasional product pitches. (As a rule of thumb, I'd suggest this should be 80% sharing, 20% selling.)

A few years ago I was in the market for a case for a Kindle I'd just purchased. There was no shortage of functional but uninspiring products on Amazon; however I was looking for something a little less run-of-the-mill, something a little more special.

A handful of tweets later I had a recommendation from a friend, who encouraged me to explore byrd & belle (www.byrdbandbelle.com). One look at their website and I was hooked. The purchasing experience was seamless and, when my package arrived some weeks later, I was delighted to discover a handwritten thank you note with my case (which was lovingly wrapped in tissue paper).

The case was beautifully made but what stuck with me most of all was the experience, which is one I've shared many, many times in conference talks and workshops (and again in this article). Angie Davis, byrd & belle's owner, stresses the importance of this on her site: "Service is paramount. Work is good. Small is awesome."

In a FOAFOAFOAF... (friend of a friend...) world where everyone is super-connected, focusing on service is critical. Don't just deliver; delight. Do that and the rest will fall into place. ■



byrd & belle's focus on service and attention to detail results in loyal customers who are repeat buyers



★ Q&A

STÉPHANIE WALTER

It's okay to 'cheat' when it comes to UX explains the well-known designer and speaker



INFO

job: UX/UI

w: stephaniewalter.fr

t: @WalterStephanie

You've been talking about 'cheating the UX' recently. What exactly do you mean by that?

You've optimised every request and piece of code you could, yet your users are still complaining. Even worse: they don't complain, they leave. This is where we start talking about perception.

Our human brain works in a certain way. Knowing how it works helps us to build sites and products that users perceive as easy and fast to use. So I'm talking about techniques such as micro-interactions, visual feedbacks, skeleton screens and optimistic UIs. At my talks, I show you the best progress-loading indicator depending on the situation. I explain how to deconstruct waiting time to build a video streaming experience and how to communicate speed perception to the developers.

Is it true that you find speaking stressful? If so, why do you do it?

I hated to speak in public when I was a student. When somebody asked me to give a talk at their conference,

I refused. Twice. They had to ask me three times. I was terrified and was wondering: 'Why would anybody want to listen to me?' Also, I gave this first talk in English, which is not my native language, so it was a huge challenge. And I'm still super nervous when I talk, especially in English. It takes me a huge amount of energy to go on stage. According to other speakers, it gets a little bit better but the stress does not really go away even after a few years.

So why do I speak in public? Sometimes because I want to share something I'm passionate about (like the things you can do in mobile browsers today) and get other people passionate about those things as well. Sometimes because I want to complain about something that doesn't work and drives me mad (hello mobile forms; people not letting me use the é in my name on the web) and raise awareness so we can find solutions together. And in general, I like to share my process, plus speaking at conferences is a nice way to meet other people from the industry.

What is the biggest challenge facing UX right now?

Figuring out what UX actually is. UX has become a buzzword. A lot of people will tell you they want a UX designer but they won't let you do your job properly. They just want a monkey pushing pixels in a software. It's hard to make people understand what this job actually means.

What's the latest tool or technique that's got you excited in web design?

I don't code for a living any more but I've been following Grid Layout since I read Rachel Andrew's article in 2013 (<https://24ways.org/2012/css3-grid-layout/>), and I'm super happy to see it's finally supported. I'm also a big fan of CSS Variables and the way they interact with JavaScript. This will help a lot for building micro-interactions, for instance. I'm also still super excited about mobile browser capabilities such as geolocation, push and media access. I like that we can do so many things on mobile using web technologies now. That's why I also keep following what's going on with Progressive Web Apps. Finally, the evolution of design tools makes me happy. We finally have great UI tools that let us prototype as well quite easily.

You live in Luxembourg: what's the web design scene like there?

There are a lot of designers working for consulting and tech companies like I do. We're in this strange phase where we try to make clients and stakeholders understand the value of design. There's still a lot of work to do to convince them. It requires patience but you can experiment in a fun playground. ■

* ORGANISATION

HOW DO YOU STAY ON TOP OF YOUR EMAIL INBOX?

Seven designers discuss their strategies for keeping the email beast at bay



ANNA DAHLSTRÖM
UX designer,
speaker and coach
www.annadahlstrom.com

 The truth is that I don't always. I've tried different strategies for minimising disruptions and for getting to inbox zero. What currently works best is filtering out newsletters into separate folders, using additional +<something> combined with folders for my Gmail account, turning off notifications for that one but having them on for my business account. I tried moving emails to 'to do' folders, 'to reply' etc but that ended up being a graveyard of forgotten emails. So now I tend to mark them unread.



CLARA ILENA
Digital art director, MRM//McCann
twitter.com/ClaraIlenna

 The main reason I get through my inbox really quickly each day is because little red notification bubbles really annoy me. I can't see them and not deal with them.

To avoid being completely unproductive, I switch my phone off and quit Outlook on my computer for a few hours to get through actual work. Apps such as Slack, Todoist and Monday also help me to stay on top of things and keep unnecessary communication to a minimum.



ALBERTA SORANZO
End-to-end service design and systems thinking director, LBG Digital
<http://lloydsbankinggroupdigital.com>

 At work, I prioritise responding to urgent matters and those emails that have the potential to become blockers for others. Whenever an email has been attended to, I file it away in a folder: project-related, team-related or committee/working group. At home, I rely heavily on Gmail's Archive function and labels. I have labels for everything, which makes it easier to retrieve communications on a specific topic, even when I don't actually remember who wrote to me. Despite my best intentions, I don't always have the bandwidth to be consistent and my inboxes tend to bloat up regularly. Inbox zero, the holy grail of email, has eluded me so far.

**JEFF TOLL**

Executive creative director, Bukwild
bukwild.com

 My daily routine includes immediately checking my email in the morning. But I don't reply to them unless it's an emergency; I simply flag and organise response priority. Once I get into work and have had a moment to think about my responses, I can knock them all out. Throughout the day, I'll flag important emails that don't need instant responses and make sure I get back to them before the day is over. On a good day I'll only check email three times: morning, noon and at the end of the day.

**KATE TARLING**

Digital and design director
katetarling.com

 I have 15,267 unread emails. I could reach inbox zero by filtering all unread mails, selecting, and marking as read. Even faster is to mentally set zero = 15,267. When we think of inboxes, we're really talking about attention and importance. I don't use filters, folders or repeatable strategies. I scan the sender, subject line and first few sentences and decide whether to ignore, respond or remember to respond. It's a calculated risk. I read with surprise but amusement someone's recent OOO strategy: "I won't read your email. Please email me again when I'm back if it's still important".

**MICHAEL SALAFIA**

Digital director,
Digimix
digimix.co

 I've trained my Inbox by Google app to filter most of my emails, allowing only important messages to reach my inbox and bundling the rest for reviews and batch archiving. I treat my inbox like a to-do list; I pin items that I need to follow up on the same day and set snooze reminders for anything requiring future action. Attachments are immediately organised into Google Drive from Inbox. I create a new contact for each project's Trello board so I can forward the emails and automatically create cards. I also have a bunch of custom Zapier Zaps to automate tedious actions, which are triggered by applying labels to emails.

**BROCK HALDEMAN**

Pivot Design
www.pivotdesign.com

 For me there's no magic to staying on top of my inbox. I try to use tools and technology effectively. I use spam filtering, unsubscribing and black-listing to minimise junk. I use filters to help prioritise and organise incoming mail. This one is key because it lets me address these in the right priority order and when it's most convenient. Any remaining mail that comes through are the ones that are generally most important and since there aren't nearly as many, they're much easier to stay on top of.

RESOURCES

EMAIL IS BROKEN. HERE'S HOW TO REALISE YOUR INBOX ZERO DREAM

www.wired.co.uk/article/inbox-zero-outlook-gmail-tips-how-to

 Your inbox doesn't have to be a mess, says journalist and author Matt Burgess. Stay on top of your emails and achieve inbox zero by thinking differently and using these expert tips.

THE 7-STEP GUIDE TO ACHIEVING INBOX ZERO – AND STAYING THERE – IN 2018

<https://bit.ly/2Earexm>

 Our inboxes have become overflowing mountains of irritation. In this article, tech writer JR Raphael offers his own formula for getting an inbox in order – forever.

5 GMAIL FILTERS TO GET YOU TO INBOX ZERO

<https://bit.ly/2GTm51E>

 Technologist and developer Chris Smith outlines some hacks to make managing your email easier. Use these Gmail filters to help clear out your inbox, achieve inbox zero and free up the time and space for what really matters.



★ CUSTOMER NEED

DEFINING THE PROBLEM

Tiffany Eaton explains that if designers want to develop truly useful products, they need to dig a little deeper to understand their users

The relevance of UX design in industries is important to note because it shows businesses are starting to intentionally centre their products around people. What we might not have realised before and what good UX design aims to accomplish is that, in order to create good products, we need to understand people.

Bad design often results in a lack of empathy and when I mean empathy, I mean a basic to deep understanding of who we are creating our products for. When we don't understand our audience, we fail to see the problem they are going through and end up designing for ourselves – essentially basing it on what we think is right for people. This mindset is detrimental because it wastes time and money and we fall victim to our biases. The best products are a result of putting aside our expectations to effectively listen and observe what people need.

Before we start designing products, we need to understand the market our product potentially exists in. A rich market is the result of a need. In order to design 'good' products, we need to understand people's desires and struggles. What problem do they need help solving? What are their inner desires or passions? Are there existing products that are helping people with this problem? What is the bigger goal people want to achieve but they don't even realise is possible? When we understand what people want, relevant ideas start to emerge.

Talking to people enables us to define design problems by seeing patterns based on their different experiences. When we don't even talk to or include people in the design process, our designs are inaccessible. To prevent this from happening, we need to validate our ideas with our users first and foremost. Including them throughout the process is a bonus, ensuring we are

intentional with the ideas we come up with and iterating with the user's best interests in mind.

In order to define a problem, we need to do these simple things:

Talk and listen to people

This can simply mean talking to people to get a sense of their problems if you don't have one in mind.

Define the problem

What is a person's core need and how can I help them?

Determine if there's a need

After defining the problem, is this design something people really need?

Include people in the design process – they are the core of your product. You are helping them with their needs so when you include them through your process, whether it's testing your designs with them or keeping track of their needs from user interviews, it brings clarity to your design. It also helps in creating constraints and principles that can keep you accountable for designing with the user's needs in mind.

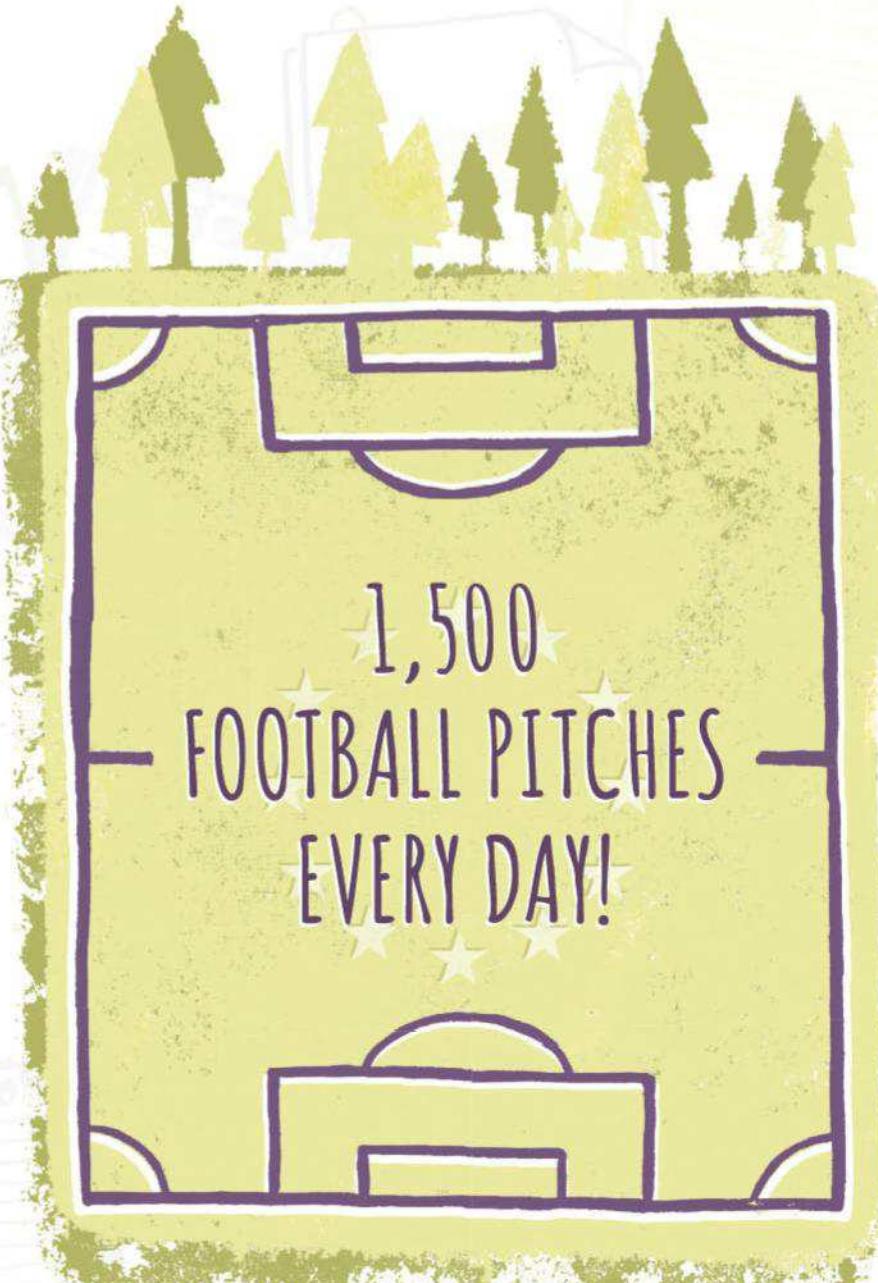
Make sure you have a solid rationale how your design solves the problem. Make sure you have solid design decisions behind what your product does and how it addresses a user's need to help them achieve their goals. If you can explain these things, you most likely have a 'good' design.

Test and validate your designs – when you have ideas, testing them with your users is extremely helpful and can address a lot of holes in your design. Is it grounded in a specific scenario? Can you explain how someone would interact with it? Can people interact with your product without you having to offer guidance? Testing your designs with people makes sure your design is contextual and accessible.

When we fail to define the problem and our audience, the products we create are useless. When we start with people, they influence our design. After all, we are designing products that are for people. ■

PROFILE

Tiffany is an incoming UX designer at Google and is an aspiring female leader trying to make a difference in design and tech. She writes weekly on medium.com/@tiffanyeaton



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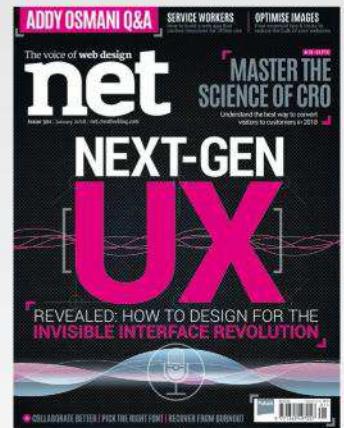
#303 MARCH 2018

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#302 FEBRUARY 2018

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

**MAXIMO
CASTELLARNAU**



Maximo is a full-stack digital designer, founder and editor of LDMagazine and co-leader of Digital Dosis Studio based in Barcelona.

w: artmaximo.com

t: @artmaximooo

We have integrated people of more than 20 nationalities into our team, each with different cultural backgrounds and multiple skills in the fields of agriculture, food-technology, logistics, chemistry and biology, creating a diverse, highly qualified and efficient team.

This is possible thanks to our staff members with their common sense, honesty, enthusiasm, disposability, responsibility and personal integrity in a human and fair environment.

* WEBGL, GSAP, PIXI.JS

ANALYTICA PROJECTS

<http://analyticaprojects.com/>

Analytica Projects is a quality assurance company specialising in food security and its new website has brought a different approach to the world of corporate design.

The top-view map navigation unfolds beautifully with smooth transitions that guide the user in a step-by-step experience with a full focus on the message. It is, in fact, all message. A navigation knob provides an interesting reference for progression and translates the linear nature of the site into a different dimension. The site's emphasis on storytelling speaks for itself and stands out because of its focus on the human side of the company. As stated by Rubén Sánchez, founder and designer of Veintidós Grados, the agency behind

What makes our processes robust? We act before the food enters the market. All our methods are scientifically justified. That is why our quality control which are continually being revised and improved, because our customers must take clear decisions based upon our services.

the site: "We wanted to show in a funny and visual way the multiple parts of the quality assurance process." Science is a serious discipline often dominated by serious language and imagery. But as technology and society evolves, more designers are distancing themselves from the coldness of strict corporate communications and are veering toward more warm and humanised stories that are relatable.

Encouraging designers to experiment with different languages and formats, out of the globalised clichés, this project is worth checking out.



* WEBGL, THREE.JS, TWEEN.JS

RUYA

<https://ruya.digital>

 RUYA is a well-known agency based in United Arab Emirates that has become a prominent figure in providing unexpected but clever digital experiences. The perfect example of this is its own digital portfolio site, which displays a good gallery of digital brutalist trickery that you could expect from one of its clients' sites.

Besides the apparently chaotic and eccentric look and feel, these guys manage to keep things extremely neat behind the curtains. The whole assembly relies on three.js to manage the 3D bits that are present in almost every single page, as well as TweenJS to smoothly animate the diverse elements on display. All of this is in a featherweight configuration that runs seamlessly on desktop and mobile devices, despite the processing load that these technologies usually imply. On top of this, it has fun features like the ability to change the whole site's colour scheme with just one random click, the click and hold interaction that triggers unsettling glitches in the design and the way each page loads with a viscous transition.

Finally, consider the way everything is packed together in WebGL, adding to the visual effects, and voila! You have a masterpiece.



“This is the coolest, most engaging and interactive website I have ever seen. Well done once again team RUYA. You’re so winning an award for this one!”

FAISAL NAZIR



★ WEBVR, JQUERY, CSS3

ROXHAM

<http://roxham.nfb.ca>

As far as VR has gone in terms of social journalism, the Roxham site has pushed the boundaries even further. Designed by digital studio Dpt., this experience puts the viewer on the Canadian-American border to present a remarkable work of journalism on asylum seeking and migration conflict.

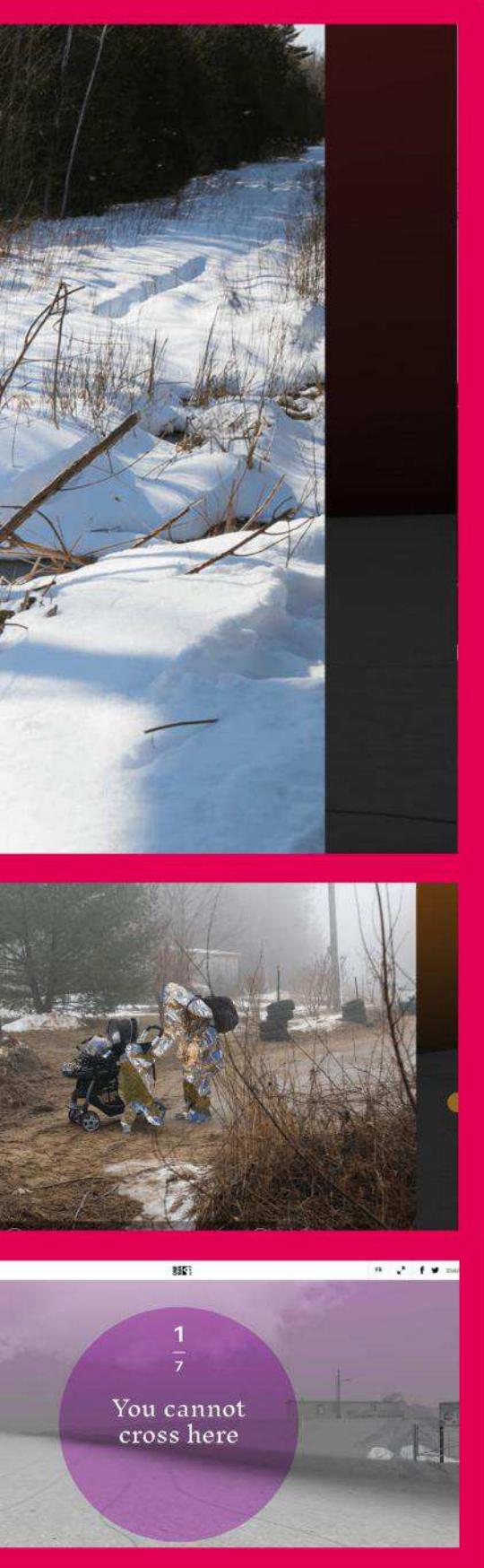
The use of open-source technology such as WebVR was deliberate. As Dpt. described it: "We support the open and democratic web being a public institution funded by the public. We believe that open web standards allow everyone to enjoy our content and be able to create content as well as express themselves. WebVR is a great example of how we can innovate what the web can do and still keep this progress accessible to everyone." Roxham has become a milestone of what can be achieved with relatively accessible tools, in terms of conveying a message through a simple but remarkable experience.

Let's hope this kind of simple yet powerful narrative will permeate other creative minds in the industry and we will soon see more examples like this in the future.



"Roxham is a VR experience chronicling 32 real interactions which took place in 2017 at the Roxham Road border crossing, where Quebec and New York meet."

UNLEASHED VR @UNLEASHED_VR



* GSAP, SVG, CSS3

PACIFICO & CO

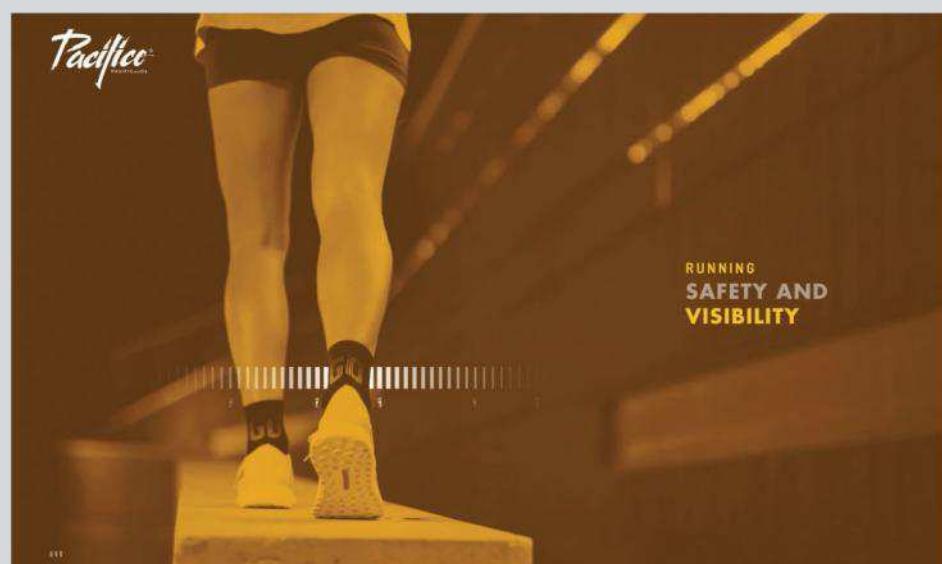
<http://performance.pacificandco.com>

> This little one-page site has made it into this gallery for a single reason. It sells. And it does it really well. Pacific & Co is a manufacturing company based in Barcelona that has committed itself to the arduous industry of artsy sock production. For its latest launch, called The Performance Collection, it has really raised the bar in the digital ecosystem.

It's a linear scroll single-page site with four sections and a clear call to action: shop. The quirk here is the way that the guys at Herokid Studio sorted

it out. They experimented with video post-production, 3D and photography to carve a cool infographic interactive video showcase of the product's key features. The site is almost completely a video background playing alongside a scroll-controlled timeline. It also uses click and hold interactions to display more information about each of the products, which is a nice functionality in today's multi-device environment.

It is a cool-looking yet effective project and carries its message in a beautiful way.



Design Canada
Film

Film Designers Filmmakers Screenings Contact News

**SITE OF
THE MONTH**

General
gregory.durant@gmail.com

Screening Inquiries
info@filmbytaco.com

A documentary film celebrating the golden era of Canadian graphic design.

A film by Greg Durant
Produced by Jessica Edwards
Executive Producer Gary Huntell

* WEBGL, JQUERY, CSS3

DESIGN CANADA

<https://designcanada.com>

The Design Canada site is part of a promotional campaign for a documentary film of the same name and also as a tribute to the main topic of the film: Canadian design legends.

This site exemplifies the best of CSS transitions to date, combined with a neat, bold design scheme displaying a healthy obsession with grid layouts. Rhythm and harmony emanate from every element, from the big, clean headlines to the fluid and measured animations. Every colour, font, white space and animation is crafted to produce a complex visual experience using geometric elements and texts. In other words, Design Canada is a perfect gallery of simplified, yet effective tweens that work with the message and guide the user across points.

A tribute to Canada's design legacy that amplifies the goal of the film: "Design Canada follows the transformation of a nation from a colonial outpost to a vibrant and multicultural society." ■

"Slick work from @LocomotiveMTL on the new Design Canada website."

THOMAS LOWRY @NEGATIVESPACECA

Canada's heritage of graphic design

A story never told. Until now.

Through the lens of graphic design, Design Canada follows the transformation of a nation from a colonial outpost to a vibrant and multicultural society.

Watch
the trailer

The biggest question we ask
Ourselves as a country is: "What

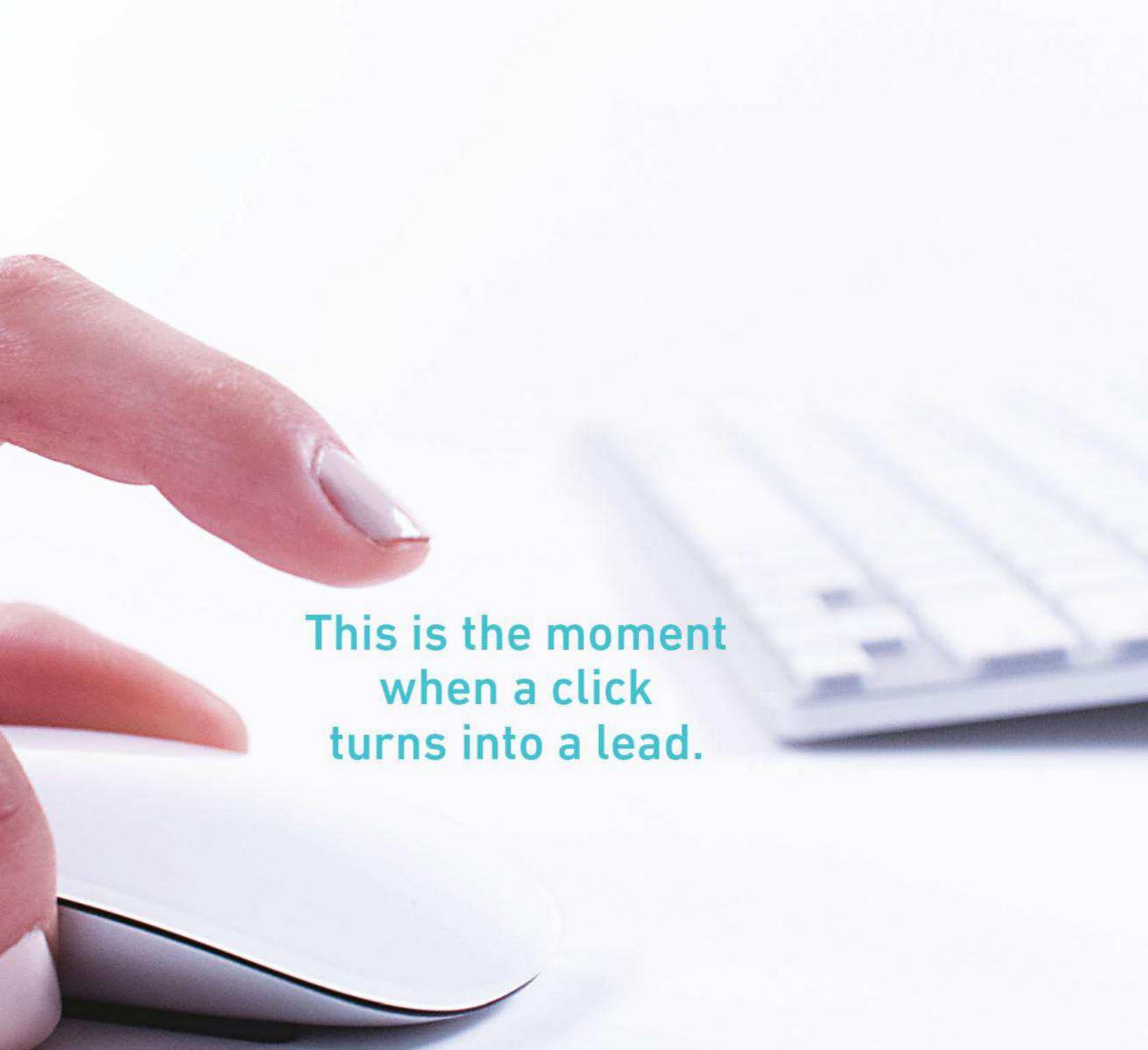
Design Canada
Film

A documentary film celebrating the golden era of Canadian graphic design.

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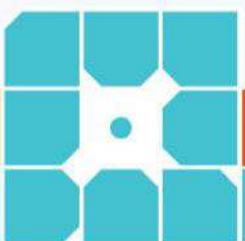
Watch the
Trailer

Stuart Ash



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when a click
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THIS MONTH FEATURING...



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The Leeds-based agency Grapple discusses design tools and building a digital identity for the world's best-known music compilation

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HOW WE BUILT

Are you a robot? To promote a people-focused investment service, Dawn created a Captcha that really sorts the humans from the bots

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DESIGN CHALLENGE

This month...

MUSIC FESTIVAL

* PROFILES



LIAM FITZGERALD

Liam is a multi-disciplinary designer at Frequency Design, based in Ireland.

w: frequency.ie t: [@frequencydesign](https://twitter.com/frequencydesign)



DANIEL KLING

Designer front-end developer at WebstaurantStore in Pennsylvania.

w: danielklingjr.com t: [@danklingjr](https://twitter.com/danklingjr)



GEDY LEÓN

Gedy is a UI/UX designer at Marketing in Color in Tampa, Florida.

w: gedy.me t: [@gedyleon](https://twitter.com/gedyleon)



BRIEF

This month we would like you to design a website for a fictional music festival. We want your site to convey the ethos of the festival via imagery and branding, while providing visitors quick access to all the important information such as dates and times, acts, location, ticket prices, facilities and so on.

The image consists of two side-by-side screenshots of the LoudFest website. The left screenshot shows the homepage with a large 'WELCOME' banner at the top, followed by navigation links for FESTIVAL, LINE-UP, TICKETS, NEWS, and MEDIA. Below this is a video player showing a live concert. The right screenshot shows the 'FESTIVAL PLANNER' page, which includes a schedule table for August 18, 2018. The table lists artists like KREATOR, THE STRYPES, MONSTER MAGNET, GOGOL BORDELLO, KING810, AWOLNATION, NOTHING BUT THIEVES, CHEVELLE, A PERFECT CIRCLE, PRIMORDIAL, VISIGOTH, ROYAL BLOOD, and MASTODON across three stages: MAIN, VICE, and EDGE. Various time slots are listed for each artist, along with notes about overlaps and walk times.

★ LIAM FITZGERALD

LOUDFEST

A timetabling system helps users to see as many of their favourites as possible

➤ Big field, multi-stage, multi-day festivals need serious planning to get the best experience, so it's surprising how many festival websites still present the line-up in the static 'poster' format.

The basic element of a festival website from a content architecture point of view is the stage slot, so you know that at 22.00 on the Friday night it's the headliner. By focusing on the time slots this site would help the festivalgoer to plan – they can instantly see which bands are clashing across the festival site and work out the best way to get from the main stage to a tent on the other side of the field to catch the new indie hopefuls. The idea here is to help the festival goer maximise their time and see as many bands as possible. The user can select their favourite bands and the system will automatically put them in the correct order, give an approximate 'travel' time between stages and even enable them to search for options for any gaps in their schedules.

CLOSE UP

(1) The high-contrast colour scheme with all long-form text is black on white and optimised for legibility. **(2)** A maximum of five main sections with subsections keeps navigation simple. **(3)** Login and registration to access planner and save schedules. **(4)** Festival planner uses time slots as basic units to arrange schedule. Overlaps will be highlighted as a CLASH and when gaps are detected between slots, the option to add another artist will be provided. **(5)** With time slots as the basic content unit, festival organisers will be able to easily substitute artists if required. Attendees are notified by email of any substitutions. **(6)** Approximate transit time provided between stages based on estimates from walking the site and allowances for heavy crowds and delays. **(7)** There's an option to output the planner as a PDF for printing or storage on phone. **(8)** The aggregate data from the festival planner will be available to the festival organisers and may be useful for site logistics, security and resource management.

MY MONTH

What have you been working on/doing this month? I've worked on sites for two authors, a tractor dealership and a religious organisation – variety is the spice of life.

Which two websites have you visited for inspiration? I don't really visit gallery sites anymore as I see many great sites in my daily work. Although I do occasionally visit Behance.

What have you been watching? I've been watching *The Sinner*, *Wild Wild Country* and a selection of cheesy 1980s horror.

What have you been listening to? Cattle Decapitation, Bastille, Mammoth Weed Wizard Bastard.

1

2

3

4

5



MY MONTH

What have you been working on/doing this month? A new shipping program and an internal application for employees to request time off.

Which two websites have you visited for inspiration? I visit the Font Review Journal and The Dieline for inspiration outside of web design. I love learning about fonts and seeing so many curated samples.

What have you been watching? Jessica Jones season 2 and *The Walking Dead*.

What have you been listening to? A lot of Makeup and Vanity Set and some other retro electronic music.

* DANIEL KLING

MONTRÉAL BLUES FESTIVAL

A site that uses a colour gradient with CSS blend modes to create strong visual impact

> Montréal Blues Festival is a music festival based around blues and blues-inspired rock n' roll. I decided to use bold imagery for the landing page and also for the general aesthetic. The hero section holds the main details of the festival. It will also showcase the festival line-up with rotating images and video clips.

The hero section is designed to scale so the text is set in viewport units to ensure it maintains layout and spacing. The text and colour layers use CSS blend modes on top of the images and video clips to give the content even more visual interest and appeal.

The site's most important function is to enable potential festivalgoers to get the information they need, so each section is accessible from the homepage. The line-up is highlighted and appears first, followed by a form to purchase tickets. An organised slide-out menu will make it easy to find what you're looking for.

CLOSE UP

(1) I planned on this being a long site so I wanted to fix navigation UI for easy access no matter where you are. For larger screens there is a fixed sidebar on the left side of the page that will enable quick access to the primary nav and social links. (2) The hero section is the first part of the site users will see, so it needs to give them an idea of what the overall festival will be like. To achieve this, I will show rotating video clips of performances by artists at this year's event. (3) I've added a countdown to the event date that will provide a sense of urgency and let users know that time is running out, so if they haven't purchased tickets yet they should hurry up. (4) The artist line-up is very important for any festival so that is highlighted as soon as possible with headliners getting top billing. (5) For the mobile nav I used a slide-out pattern that's right-aligned and vertically centred with big clickable primary links and several helpful links to find accommodation and food.

The biggest Latin party in Florida
05.25-28.2018 | MIAMI, FL.

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Maria
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Carlos Vives

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Willie Colón
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Luis Miguel
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GET TICKETS

Travel Guide
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LODGING **FOOD** **DIRECTORY** **EXPERIENCE**

Event Sponsors
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GEDY LEÓN

FIESTA 2018

A website that uses bright colours and imagery to reflect a vibrant and colourful event

> Fiesta 2018 is the best faux Latin music festival; the line-up features the top artists in the Latin music industry. Latin music lovers from all over the world converge at the yearly event held every summer in Miami, Florida, the Latin capital of the world.

The brand created for this epic event is very bold, bright and colourful, representing the lively spirit and passion of the Latin community, its rich culture and folklore. Due to the brand's bright and vivid colours it is important to keep the other design elements simple. I was able to achieve that by maintaining good use of space, light text areas, simple typography and clean lines within the layout.

The photography is vibrant and fun. I chose Gibson as the primary typeface because of its simplicity and clean lines in lighter weights, yet strong approach in bolder weights, which are perfect for call-to-actions.

CLOSE UP

(1) The design begins with a large hero area featuring the Fiesta logo, navigation, site description, dates, location and a call to action to purchase the tickets. These elements provide a good starting point for a user to understand what the site is about. **(2)** The site's straightforward navigation is crucial to enable users to access what they need at a glance, rather than having to search around. **(3)** The promo video is one of the site's most important features, showing users what to expect. For this reason, it's one of the first elements on the page. **(4)** Registration, event details and travel information are easily accessible from the homepage. A card-format carousel containing the most important details is available for easy navigation. **(5)** Call-to-action buttons are dispersed throughout the page for easy access. No need to scroll to make a decision. **(6)** Overall, the goal is to keep all of the information accessible with as few clicks as possible.

MY MONTH

What have you been working on/doing this month? I am working on redesigning a client's website, our company website and one of our product websites. I'm also a single mother to a very smart little boy who constantly wants to talk about Batman.

Which two websites have you visited for inspiration? The Everygirl.com & Pinterest.

What have you been watching? Atlanta (cannot get enough of Donald Glover), Black Mirror and Altered Carbon.

What have you been listening to? Lots of 1990s classics, Bomba Estéreo, and Ella Mai.

INFO

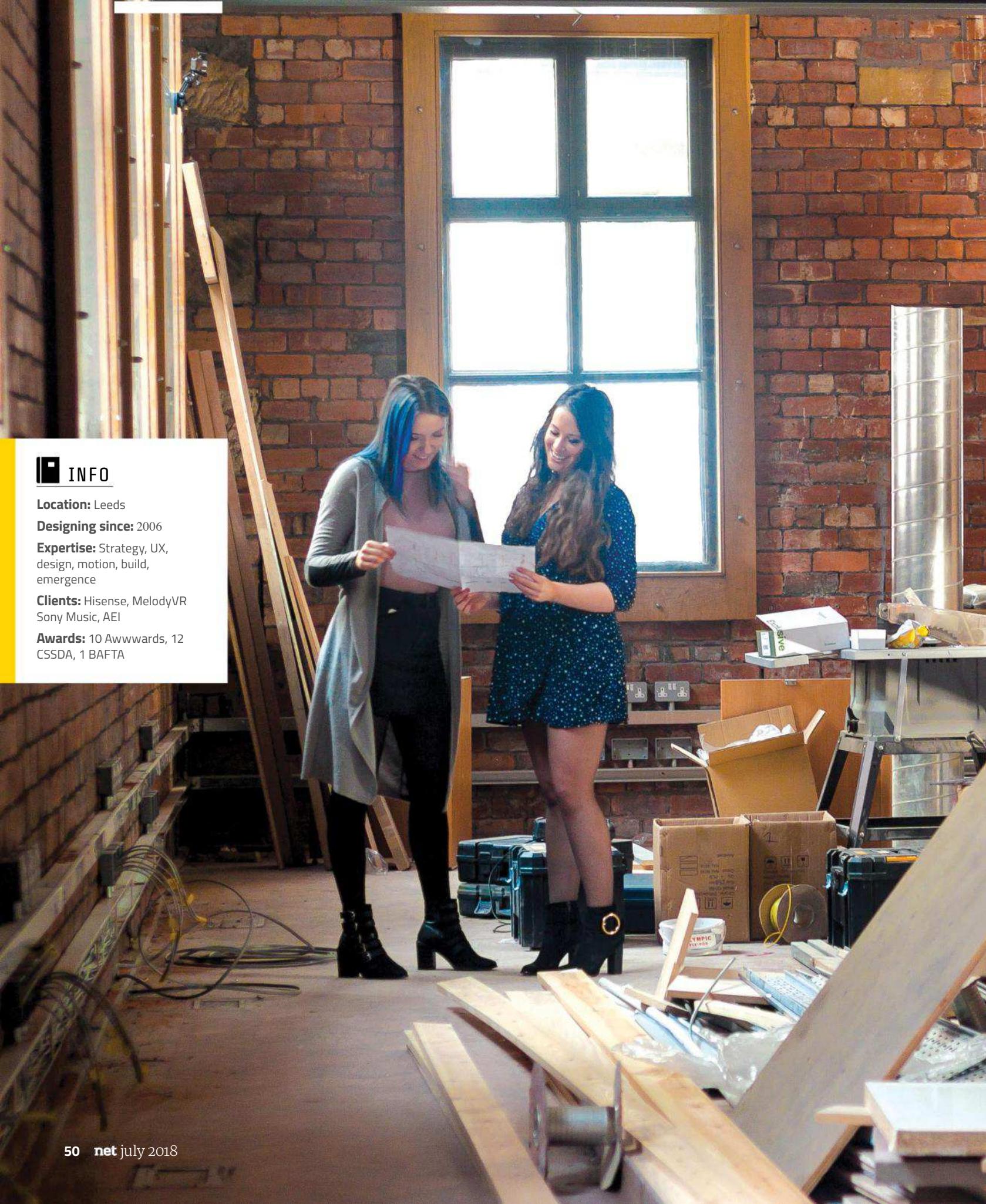
Location: Leeds

Designing since: 2006

Expertise: Strategy, UX, design, motion, build, emergence

Clients: Hisense, MelodyVR
Sony Music, AEI

Awards: 10 Awwwards, 12
CSSDA, 1 BAFTA





*PROFILE

GRAPPLE

grapple.co.uk

The Leeds-based agency discusses design tools and building a digital identity for the world's best-known music compilation



How did Grapple come together?

Chloe Waddington, account director

(CW): The history of the agency goes back to around 2005 and we would love to say that it was a visionary decision to launch a digital offering but the reality is a bit different. The current owner of the agency was running an agency called prego* and one of their largest clients was William Hill. In those days, most of the work we were doing for them was mailing game software CDs, as broadband hadn't been rolled out residentially. With the dawn of online access, William Hill started to ask us to produce emails, microsites and other digital properties and so our digital offering was born under the name of Digital Welly. Fast-forward over a decade and 300 websites and you get Grapple, with its enviable client list and portfolio.

Why do you think clients come to you?

CW: We have a reputation for disrupting an industry, especially with our corporate clients. We've often had feedback that when their website goes live, it creates a lot of noise. People sit up and pay attention. This is the product of a few things. Firstly our approach, which is built on true insight and then there is how far we can take them in a design and build capacity. Luckily for us, our clients welcome bold ideas.

Additionally, I believe our agency's culture is truly a unique point of differentiation. It is the one thing that a ►

- competitor can't really replicate and should be approached as a business asset. We emphasise our culture in a pitch process and get appointed often because of the chemistry.

Tell us about how you brought NOW

That's What I Call Music's site up to date.
Joff Lumb, design director (JL): NOW That's What I Call Music is the biggest-selling and longest-running compilation brand in the world so we were truly honoured to be appointed. Like all our projects, the process and insight defined the outcome.

Sony Music is a client that is willing to embrace digital completely and this was a great starting point for the project. Moving away from being a website that was only used as a tracklist lookup each time an album is launched, *nowmusic.com* needed to become an online destination for pop and chart news. Working with different user groups and audiences across social channels, it became apparent that there was a nostalgic affinity with the NOW numbered albums.

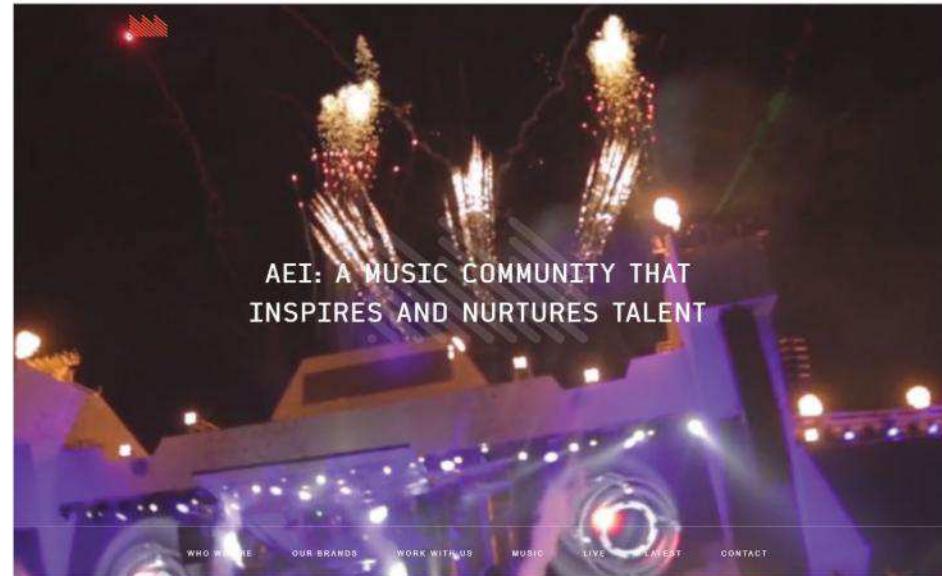
We used this insight to craft an immersive timeline experience, allowing users to take a musical step back in time and exploring each compilation from NOW 1 in 1983 through to present day along with track listings and events in popular culture for that time.

You relaunched the JORVIK Viking Centre's website. Tell us about that.

JL: JORVIK is a long-standing client of ours



Grapple wanted to make Lambs Navy Rum relevant to a younger, sceptical rum drinker



Grapple used engaging media, video content and imagery to support AEI's commercial story

and we worked together to design the previous iteration of its website. After an unfortunate period, which saw the JORVIK Centre close due to flooding, it wanted to make a big impact on its return. We began the process of developing the website with key dates in place for the launch to make sure the digital offering could support its message and business needs in the run up to its grand reopening. The process ran like a dream, as the guys at JORVIK allowed us free reign to create something visually engaging and fun, whilst being very functional, which was important due to the key information and user goals we had defined during the planning stage.

For Lambs Navy Rum you needed to make an old man's drink attractive to a younger audience. How did you approach that challenge?

JL: Lambs Navy Rum was one of those drinks that when you entered most boozers, you would discover a dusty bottle sat lurking on the shelf. Yes, it was the preferred tipple of the odd elderly local but it certainly wasn't the drink of choice for a younger crowd.

Working with our brand specialist, sister agency Ponderosa, we wanted to make the brand relevant to a younger, sceptical rum drinker, changing perceptions and

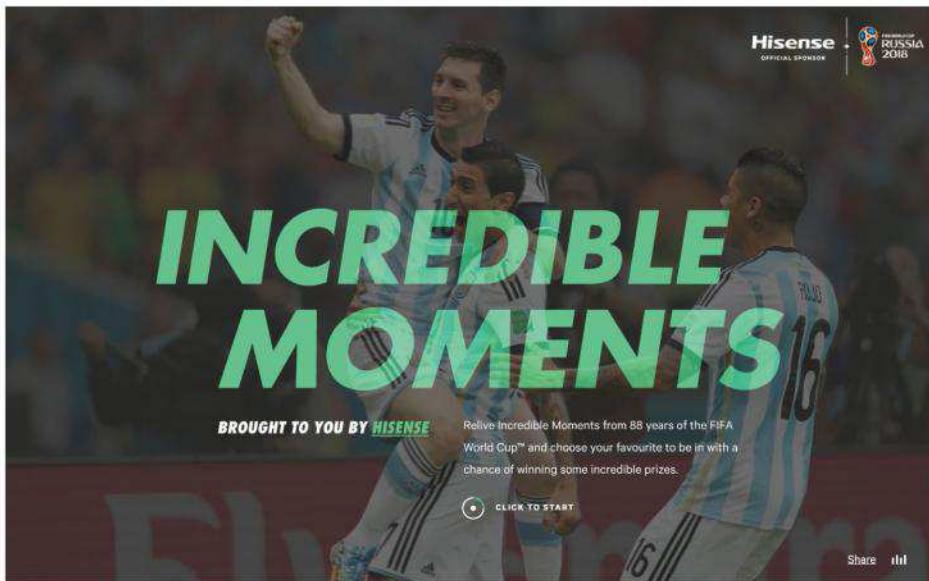
standing toe-to-toe with the brand leaders. The project was based around the fact that Lambs is a true British character. Our job now was to reflect this with the digital experience, bringing to life all of the collateral created for the above-the-line campaign.

Development were involved from the start so they had a good brief both structurally and visually. Once the basic layout had been developed the challenge was implementing the hexagonal content pods, both physically presenting them and then allowing them to flow and stack as you dropped size.

Can you talk us through the work you did with the London Institute of Contemporary Christianity?

CW: LICC required a bold digital presence that reflected the vision, mission and strategic objectives of its organisation. LICC's aim was to entirely rethink how it presented and delivered its unique content, products, fundraising and social activity online.

LICC appointed us after searching for an agency that had strong strategic expertise with bold and influential ideas. We started the process by defining the user base and their needs within three core sections of focus: life, church and work. This allowed



A new project for Hisense helps users relive 10 iconic moments from 88 years of the World Cup

us to design something that conveyed a message specifically to each of these groups, ensuring there was a reason to engage with LICC regularly. We ensured that the experience was very interwoven, linking to the numerous events, products and resources that LICC offers – always avoiding dead ends and ensuring that there is a wealth of content to explore.

How did you hope to disrupt the music industry with your work for AEI?

JL: In simple terms, to develop an online experience that engaged and informed unlike anything in that industry. AEI is a client that has so much energy and vibrancy in what it does, so we wanted to reflect that online. We used lots of rich media, engaging video content and exciting imagery to help support the commercial story that AEI wanted to tell. Like most of our web projects, we continue to develop them as the business develops, so we are currently working with the guys at AEI on a couple of exciting projects that are set to bring their already exciting industry to life!

How do you keep going when working on drawn-out projects?

Sam Smyth, Senior Developer (SS): Good question: it's probably one of the hardest

aspects of the job. Especially since your natural tendency is to tackle all the 'high impact', fun stuff at the beginning and leave the less interesting – and often much more time-consuming – parts until later. Several things naturally help, though. Due to the busy nature of the agency, you can't just let all the other client requests wait for months until you're finished with your current task. So the big builds will get punctuated with lots of mini tasks, which breaks up your workflow, taking your head out of that space for a short while and letting you come back to it when you're a little more refreshed.

My favourite [part] though is when you're on the final leg of a lengthy job and on the brink of running out of steam, the content gets populated and then you get to see the project start to come to life at last. It's like the finish line is finally in sight and someone has just given you a hit of adrenaline.

What are your current preferred tools and technologies to use?

SS: The vast majority of our work is still in WordPress. It's not particularly 'fashionable' anymore and there's a lot I don't like about it – like its bloated, antiquated code. But it's very well supported and maintained and clients are


SPOTLIGHT



JOFF LUMB
DESIGN DIRECTOR

What's on your desktop today?
Huel, T2 Travel Flask, Plant. Food...
all day.

What do you have on the walls?
Site architecture and research for any projects I am currently working on.

What will you do for lunch?
I fuel my body for peak performance by eating chicken, rice and broccoli.
Sometimes I add peppers to mix it up.

What hours do you work?
I like to keep a healthy work life balance of 9 to 5.30 – but occasionally put the extra hours in for the love of it.

What else do you do in the office?
There is a great atmosphere in Grapple. We've all worked together for going on seven years so it's a close-knit group. The quality of humour and the vibe the team brings makes it a cool place to hang out, not just a cool place to work. This is definitely reflected in the work we produce.

How often do you go out together?
We have the odd Friday night in Leeds, some of us gym together and then we have the more structured annual events like our summer sports day.



★ TIMELINE

Key dates for Grapple

2005

Digital solutions first offered under sister agency prego* and the team is recruited.

2008

Digital Welly then launched as separate limited company. Its first client was William Hill, providing emails and landing pages.

2009

Won the British Library interactive timeline project. This later won a BAFTA.

2013

Awarded our first AWWWARDS Site of the Day with the work for Lambs Navy Rum.

2015

Digital Welly was rebranded to Grapple and since then has received 22 industry awards.

2016

It broke into the music industry, working with the likes of Sony Music and AEI.

2016

Three websites featured in the CSSDA GREATEST CL/CKS.

2016

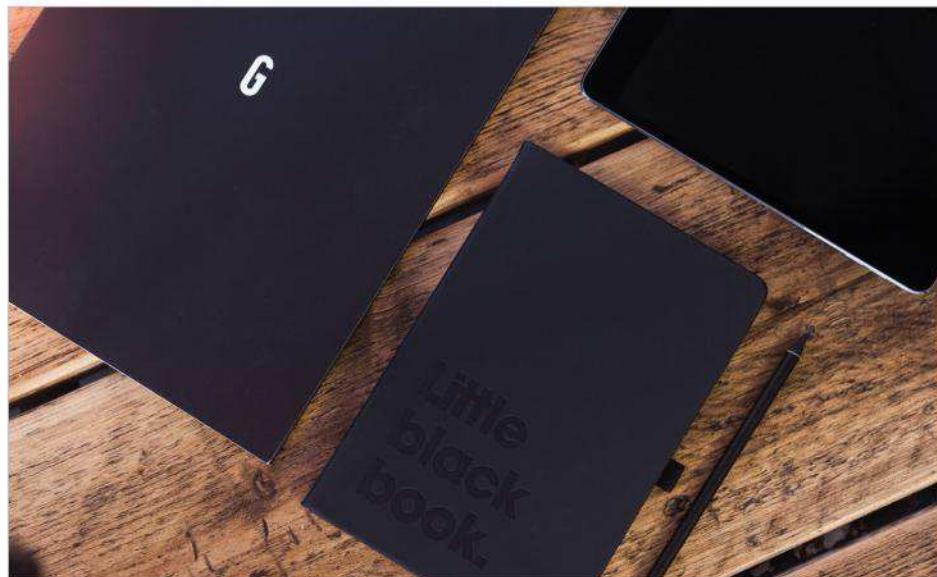
Thirty website launches under its belt in a single year.

2017

Two members of the team nominated as CSS Judges.

2018

Will see the launch of a FIFA World Cup experience for one of its key sponsors, an experience for the 100th Album of NOW MUSIC, lots of website launches and a new home.



Grapple is looking to develop its brand further and keep working with great clients that enable it to create cool digital stuff

► quite often already aware of it or have even used it before. We build our sites from a very minimal custom boilerplate theme and it's just really easy to get things up and running quickly. The CMS is already there, so we can concentrate on all the fun, front-end stuff.

For sites with more complex needs we use Laravel, which is great. The MVC approach makes it easier for developers to work on different parts of the same codebase at the same time – without too many clashing Git commits. Blade syntax is nice and clean. Laravel Mix just works without a ton of configuration and it's been around so long and updated so often that whatever you need to do, they've already thought of a way to make it easier for you.

On the front end I'm a little bit cautious of jumping in on whatever bandwagon's flavour of the month at the moment. The JavaScript world's moving so fast at the moment with libraries and frameworks moving in and out of fashion on an almost monthly basis, that it's simply not practical to keep switching out toolsets. Having said that, things like Grunt, Gulp and webpack have helped streamline how we build and having dabbled in Angular and Vue, React seems to have emerged as the winner of the JS framework wars, so we

can (cautiously) start to put some more eggs in that basket.

Can you tell us anything about any of your current projects?

CW: We are currently working on an exciting digital experience for Hisense, one of the leading global TV manufacturers and a key sponsor of the 2018 FIFA World Cup, that invites users to relive 10 incredible moments from 88 years of the World Cup by engaging in a series of questions and interactive answer mechanics.

We are also working on a fully immersive digital experience to launch the 100th album of the iconic NOW That's What I Call Music. No biggie then!

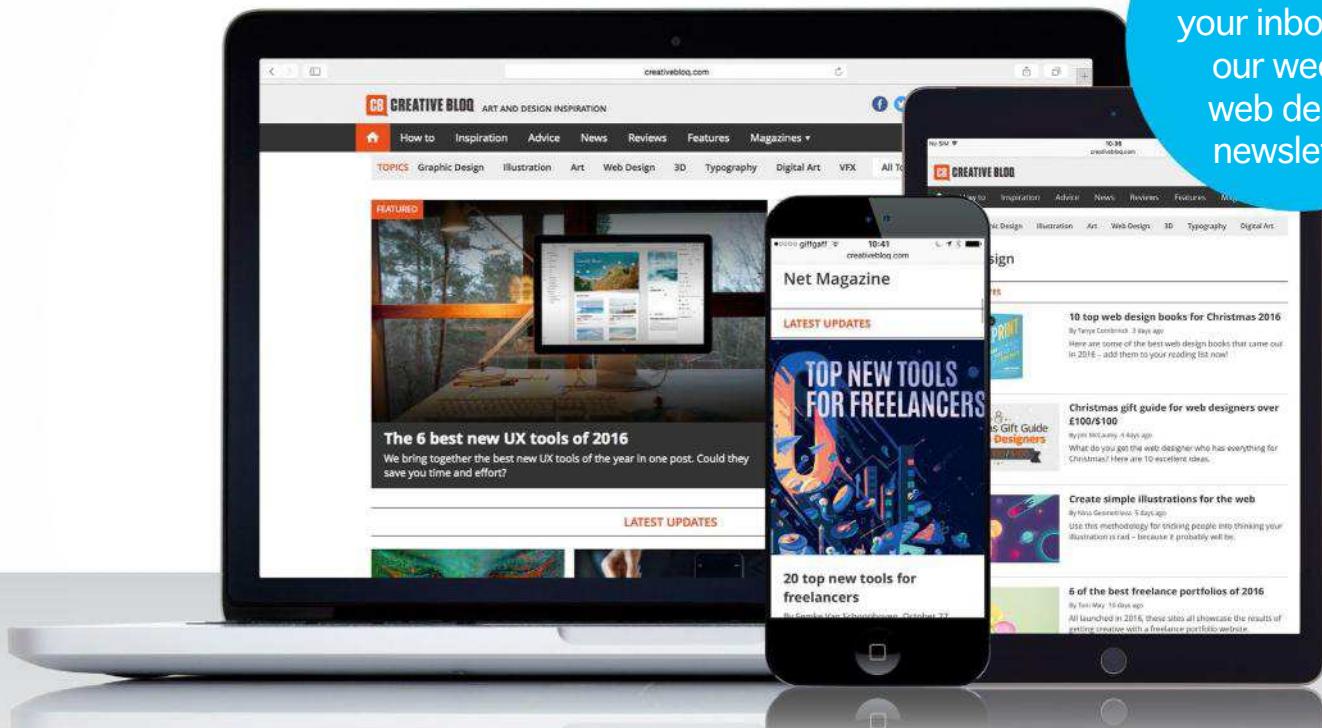
What does the future hold for Grapple?

JL: First is a change of location. After many years operating on the outskirts, as of April we will be moving to an amazing space, full of character, in the centre of Leeds. We see this bringing plenty of excitement being in the buzz of the city.

Outside of that we hope to continue to grow our team in all areas of the business with some exciting new hires. Finally, we'll continue to develop the Grapple brand further – something exciting is on its way – and keep working with great clients who allow us to create cool digital stuff. ■

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★ HOW WE BUILT

INVESTING FOR PEOPLE

Are you a robot? To promote a people-focused investment service, Dawn created a Captcha that really sorts the humans from the bots

This site is only accessible for humans.
Are you human?

1

2

3

4

5

6

7

8

Are you really human?
Because robots can do this too.

Congratulations.
You're human!

Investing for people.
What do you find important?

Heathy food
Fair opportunities
Smart innovations
Clean energy

CLOSE UP

BRIEF

As part of a campaign for Triodos Bank highlighting investment services powered by people rather than algorithms, Dawn set out to build the most robot-unfriendly Captcha test ever to demonstrate just how humans and robots really differ.

- (1) In the complete Investing for People campaign, we've showcased what happens when you let robots decide where your money goes. The site opens up in a similar vein with a clear question: are you actually human? (2) Robots are capable of more than you think. That's why we created a video of a robot passing the classic Captcha test. (3) The pixelated transitions help tie all the different elements together in a fitting way. (4) Through a classic Captcha style test,

we helped people understand the point of the site. (5) We also added moving and changing text, to reproduce by humans only. (6) Triodos' view on what is sustainable and would be right to invest in is never far away. (7) Once a person passes the human test they are congratulated and moved on to the 'real' Investing for People site, where we showcase Triodos funds. (8) Footage from the campaign is used in order to give the site a human touch.

REZA HAREK



Reza is Dawn's head of design and was responsible for the design of the website and Captcha test.
w: <http://dawn.nl>

JIM HAAKMAN



A creative developer at Nok Nok, Jim was responsible for the Investing for People site.
w: <http://noknok.studio>

JURIAN VAN DER HOEVEN



Jurian is a program manager at Dawn and oversaw the online part of the project.
w: <http://dawn.nl>

> There are few things on the web quite as irritating as having to fill out a Captcha before you can gain access to a site. Having a computer question whether you're really human is just the sort of ludicrous scenario that can get our inner Luddites bristling, so it's proved to be the ideal concept for Triodos Bank's new campaign showcasing the human side of its investment services. We caught up with the team at Dawn (dawn.nl) to discover exactly how they approached reinventing the Captcha for the Investing for People campaign (investingforpeople.com).

Could you tell us a bit about the client, Triodos Bank?

JvdH: Triodos Bank is the Netherlands' most sustainable bank, currently also working globally. They believe that banking can be a powerful force for good: serving individuals and communities as well as helping to build a more sustainable society.

What message is Triodos Bank trying to get across via this site?

JvdH: 'Investing for people' sounds pretty obvious but it's less and less the case. Algorithms and bots are taking over the investment world and increasingly they determine what grows and what doesn't. Not a great idea according to Triodos because investing is a powerful tool with which to influence the world. That's why in their latest campaign they set out to show what happens when you leave ethical choices to robots.

How did Dawn become involved in this interesting project?

JvdH: Dawn has been Triodos Bank's strategic and creative agency for almost 10 years now. First we came up with the 'Follow your heart, use your head' brand strategy and years afterwards we did our best to make a big impact through taking over Nasdaq's ticker tape and through community-driven endeavours like Buy The Change. Investing for People arose through discussions about how investment was moving away from being a logical human affair while Triodos always tries to keep it clear and transparent what you're investing in.

How did you plan and execute the opening Captcha test?

JvdH: As part of the broader Investing for People campaign, which also includes ►



★TIMELINE

Key dates in the Triodos Bank campaign

SEPTEMBER 2017

First ideas based on the Triodos investing brief were developed by Dawn

OCTOBER 2017

Start of the online-side of the Investing for People project

EARLY NOVEMBER 2017

First wireframes and ideas about journeys developed for the Investing for People site

MID NOVEMBER 2017

Jim Haakman is brought in to the project to work on the technical development of the site

MID NOVEMBER 2017

Presentation of the first designs

END OF NOVEMBER 2017

First beta of the site for internal testing and final copy complete

EARLY DECEMBER 2017

Finished designs are sorted after insights from the beta test and also multiple reviews

Investing in microfinance

A safe place for your savings. A loan to start a business. For us, of course, such things go without saying. But for billions of other people, that's not the case. By microfinancing, you give those people the opportunity to start their own business. And so take matters into their own hands. 83% of the people who receive such loans are women. Giving them a stronger position within their families and the chance, for example, to send their children to school.

These are the funds you can invest in if you want to invest in microfinance:

Triodos Fair Share Fund

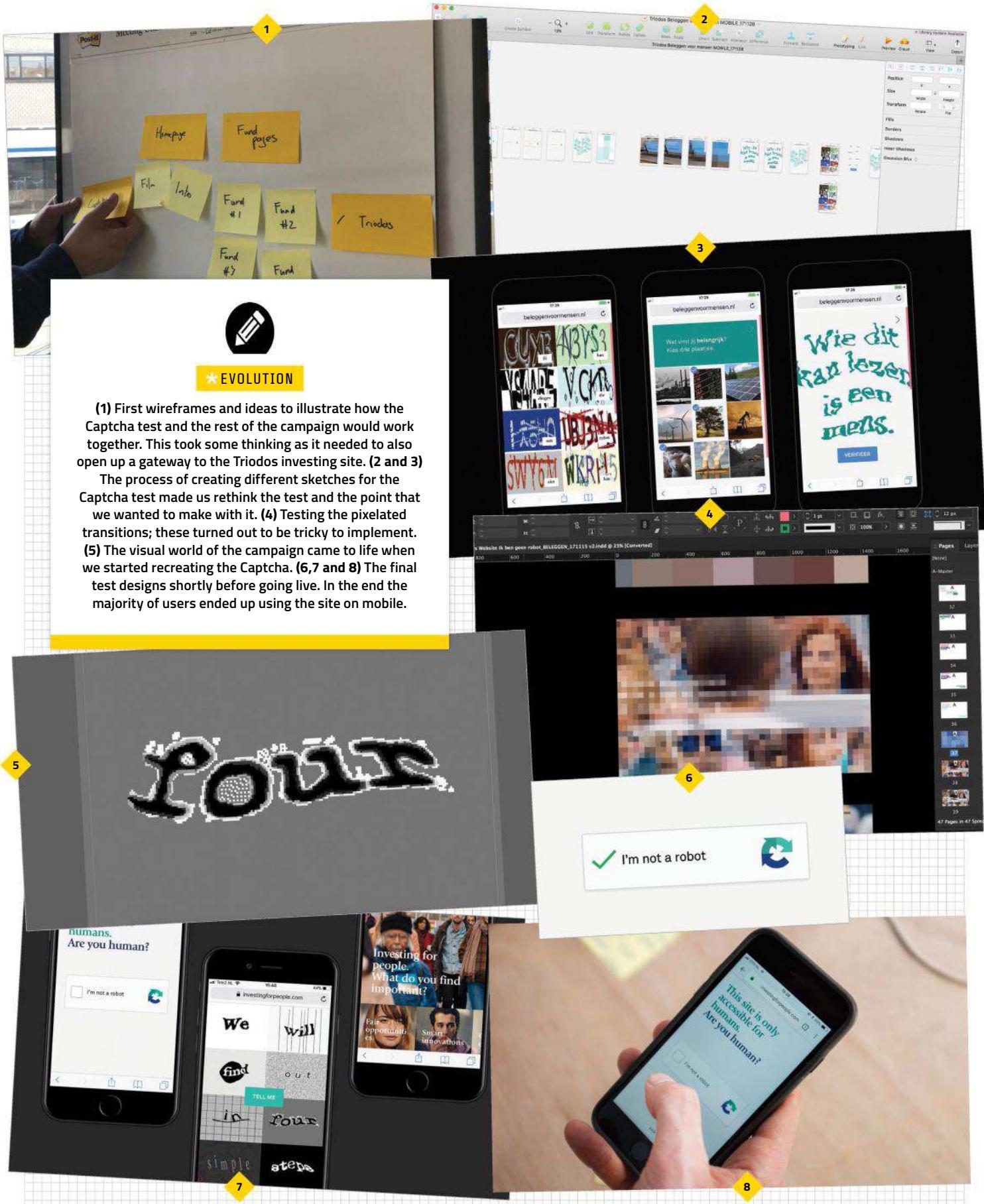
Steun met jouw belegging ondernemers in ontwikkelingslanden wereldwijd. >



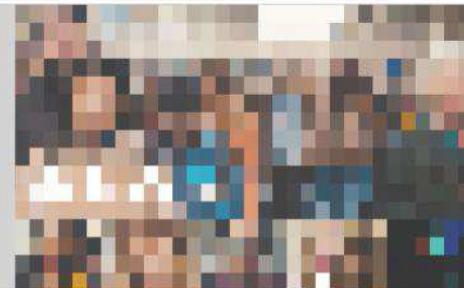
Key message Beyond the show-stealing Captcha, the site goes on to explain Triodos' investment funds

SHOWCASE

How we built



Congratulations.
You're human!



Pixel perfect The site's eye-catching pixel transition effect was achieved using canvas and custom WebGL shaders



Dual screen As well as the site, Dawn also created a TV ad for Investing for People

advertising in radio and TV, we thought the Captcha test would be a great way of getting people familiar with Triodos' view on investing and current changes in the investing world. It's a playful way to show just how important human traits are when making decisions. To execute it we relied upon our friend Jim Haakman, who's a great coder we often work with, and put him in a team with our writers and designer. For the Captcha test he later involved Jean Jacques.

There's no mention of Triodos Bank until you get through to the main page. Did the client need convincing?

JvdH: Of course, but they too felt that the point of the Captcha test would be lost or at least less clear [if the bank was mentioned immediately]. The test should really feel like one of those annoying online tests whilst making a very good and valid point in a playful way, not simply a funny extra for the site.

There's quite a bit going on in the main page. What are its major elements?

RH: On the main page moving footage from the TV commercial is used to

make the site less static. We opted to not simply use stills but keep it moving. Because the idea is 'Investing for people' we gave the funds a face: showing people for the different types of funds. We used the pixels transitions as a thread that links the tests and the main page and site. An extra design element that is really relevant and feels really robotic.

There wasn't a lot of content for the homepage, so the idea for the mobile and desktop design was that all the basic content would be visible on that page. Not in a scrollable way but using one big view and using a horizontal scroll field on mobile.

Talk us through some of the technologies running the site

JH: We actually built two separate websites. First there's the test: are you a robot or not? This is built on canvas with a combination of KonvaJS and React. The second is a simple HTML and CSS website that gives you all the information you now deserve since you're not a robot.

The complete website is then hosted on DigitalOcean and served to the world through the Cloudflare CDN.

The main page features an eye-catching blocky transition effect. How does that work?

JH: In order for this to work we built the entire website in canvas. Then we built custom WebGL shaders that transitioned a generated bitmap, to large pixels and back to the next screen.

Tell us about your testing process – were there any cross-platform issues?

JH: We always use BrowserStack for testing across platforms. The test is pretty linear so this was pretty easy to test. Of course, old versions of Internet Explorer are an issue, so we decided to only make the test visible to people with modern browsers.

How has the site been received?

JvdH: So far the response has been amazing. What surprised us most is that very few people skipped or bounced from the Captcha test. Of the people that entered the site, 80% also finished the Captcha test and thus saw the point we tried to make. On top of that, conversion on the Captcha-specific posts has been really good too. ■



TUNE UP YOUR DESIGN PROCESS

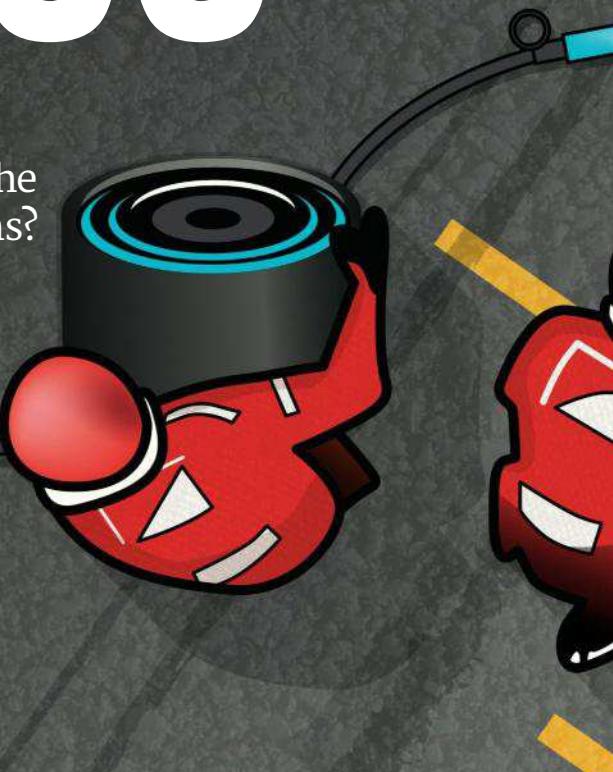
Automating your design process can ensure it continues to run smoothly as you scale. But is taking a pit stop to recalibrate your systems the best way for you to shave time off your designs?

 AUTHOR**TOM MAY**

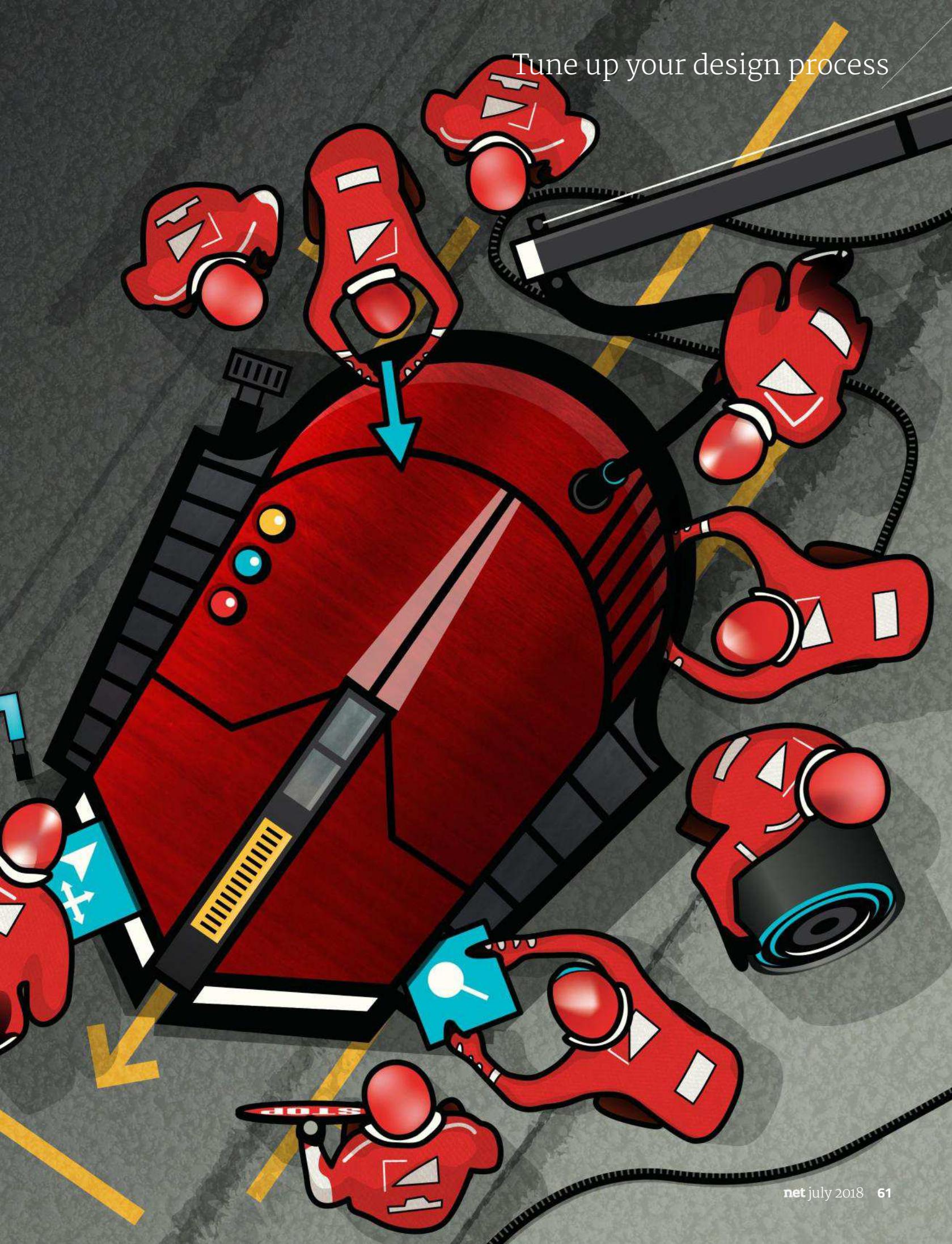
Based in Weston-super-Mare, Tom May is a freelance writer and editor with more than 20 years' experience in magazine journalism. He is currently editor of net's sister title Professional Photography.
t: @tom_may

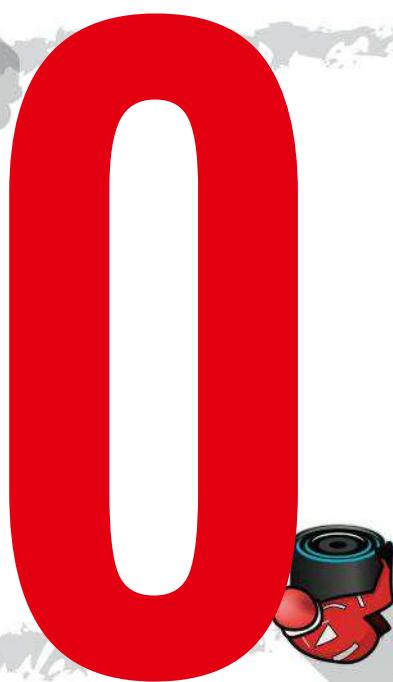
 ILLUSTRATOR**MARCUS FAINT**

Marcus (@MjFainty) is a graphic designer running MJ Faint Design Co. He also works as an art editor on a national film and TV publication.
w: www.mjfaintdesign.co



Tune up your design process





nce upon a time, the word ‘automation’ conjured mainly negative connotations in the mind of the professional web designer. It made you think of programmatic software that generated cheap but badly coded sites for those who couldn’t afford the services of a web designer. Or perhaps the sort of basic service you yourself would offer a cash-poor client, using a pre-built WordPress or Drupal template.

But today all that’s changing. The automation of web design is not just important to clients at the lower end of the food chain. It’s increasingly relevant to those at the upper end too.

That’s because in a world where the biggest companies are increasingly design-driven – think Airbnb, Uber or Deliveroo – the digital services needed to keep today’s global consumers happy now far outstrip the capabilities of the single designer or small team crafting individual, bespoke pages.

And as clients demand bigger and more complex solutions, there’s been a rise in the popularity of component libraries and design systems, bringing an element of automation into the design process and helping it scale.

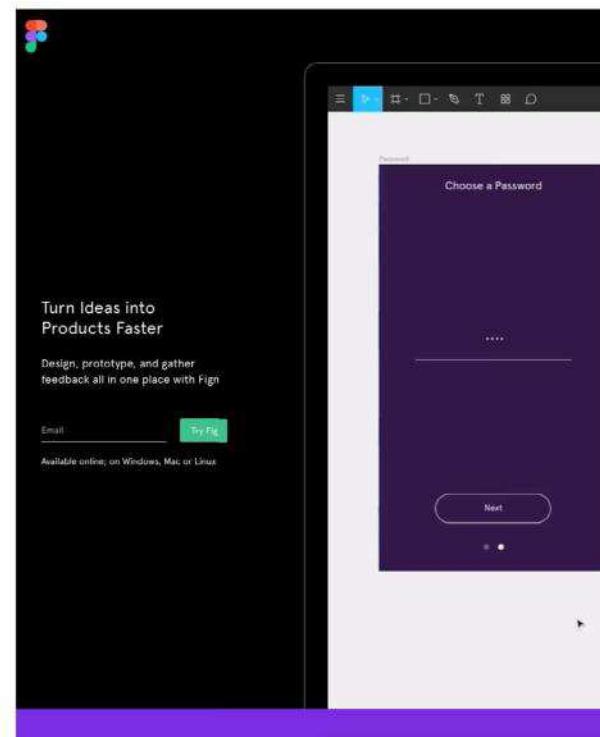
If you’re a small web shop working mainly for small businesses, this may not have impacted on you... yet. But with no way of knowing where your clients, your career or indeed society as a whole is going next, it’s still a trend we all need

to know about. So we’re examining where the automation train is heading and when might be a good time to jump on board.

Pattern libraries

The simplest form of automation in web design is the pattern library. Also known as the component library or pattern language, it’s essentially a collection of reusable UI elements that make up a website. These may include, for example, form inputs, buttons, spans, navigation bars, image sliders, related links and social-media features.

A pattern library defines what all these elements look like, along with how they function and also how they are coded. Some good examples to examine include those of MailChimp (<https://ux.mailchimp.com/patterns>), Lonely Planet (<http://rizzo.lonelyplanet.com/styleguide/ui-components>) and also A List Apart (<http://patterns.alistapart.com>).



“As clients demand more complex solutions, there’s been a rise in the popularity of design systems”

But just because pattern libraries are trendy doesn’t mean you should necessarily use them. “I’d say that if you only have one website and one set of components, a pattern library might be overkill,” says Andy Budd, co-founder and CEO of Brighton-based UX consultancy Clearleft. “If you’ve only got two or three designers, they talk to each other well and you keep all your documents in a nicely structured Sketch or Photoshop file, really you don’t need to have one.”

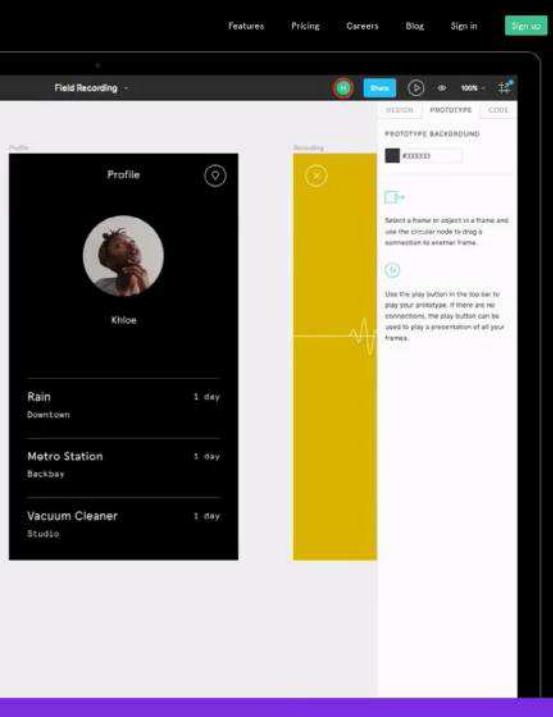
Cellyn Tan, digital product designer at London digital consultancy Red Badger, concurs. “We make use of both pattern libraries and design systems to varying degrees,” she says. “However, how far we’ll go in systemising and maintaining a user experience is really based on what the project’s priorities are. In a relatively

small product team, maintaining a set of design principles, consistent typographic hierarchy and colour schemes is manageable purely with well-organised files and conversations.”

For Daniel Smith, CEO of Bournemouth-based digital marketing agency Fireworx, striking this balance is about meeting the needs and expectations of clients. “With some companies we work for, everything is bespoke on their platforms and so automation doesn’t play a massive part; it’s very much a tailored solution,” he says. “I’ve always looked at it that you’ve got a suite of tools as an agency and what we want above all is to deliver the best outcome for a client.”

For some projects, though, creating a pattern library can provide powerful

Tune up your design process



Above Browser-based design tool Figma now provides a Read API, and a Write API will be on its way soon



Above The pattern library of popular web design blog A List Apart helps its designers provide consistency across the site

benefits. Removing the need to create elements from scratch, over and over again, means that the more your operations scale, the more consistency you can provide to users, the less repetitive your design work gets and the more productive – in theory, at least – your operation becomes.

That's certainly what digital agency Masters Allen has found since shifting to a more automated approach, says senior developer Tim Jarram. "We now keep a familiar code base across all our websites, one we can work with quickly and efficiently," he says. "And as a result of this, we've found that we have been able to work smarter and provide a clearer,

Use Sketch's nested symbols to your advantage

TAAVI KELLE
Designer, Potato
<https://p.ota.to/>

Potato London, part of the AKQA network, builds scalable web apps used by over a billion people a year. Designer Taavi Kelle shares a handy technique he uses in his work

Lately, I've been making the most of Sketch's nested symbols by relating their structure to the BEM (that's Block-Element-Modifier for non-codey folks) way of breaking down components in front-end code. This has allowed me to quickly design cross-platform applications and has enabled me to share certain parts of symbols across the different platforms.

Let's illustrate the process with a basic component: a button. You can create the base of a button – and the variations of it – as a symbol in Sketch (use the same sizing for all of them). Give them obvious names such as Generic/Building Blocks/Button Base Disabled, using the forward slashes to your advantage as Sketch will create a nested list from them. Don't use colours in the symbol names because if the person or company you are designing for changes their mind halfway through your design, you won't be left in a confusing situation. Instead, opt for using prefixes such as Primary Colour.

Create your button text using San Francisco (the stock iOS font) and create a symbol out of that, again giving it an obvious name and then create an equally sized symbol with Roboto (the stock Android font) and name it appropriately, for example Generic/Building Blocks/Android Button Label.

Then, here comes the fun: take your button base symbol and your button label symbol and combine them into a button, group the two, create another

Above Share parts of symbols across platforms with Sketch's nested symbols

Building Drupal sites at scale



Cohesion DX8 is a new low-code Drupal tool that enables you to build modular designs for enterprise at scale. CEO Drew Griffiths explains why he sees it as a potential game changer

Cohesion (www.cohesondx.com) is a bit like you'd imagine Squarespace and Wix might be if they were aimed at enterprise. In essence, it takes a low-code approach to allow a designer and UX team to build a completely bespoke Drupal 8 website with their own modular UI components, giving their end client an incredibly high degree of control.

What we're doing is empowering both digital and design agencies to build these effectively in-app design patterns. These patterns then become available to their clients post-build, so they can create pages with them, evolve them and change them. There's huge pressure for the end clients to be able to do this and this tool delivers it.

Take for example clients wanting to do A/B testing. Traditionally this would be an expensive exercise requiring significant design and developer resources. A simple example might be a homepage where you want to see whether four big buttons would be better at converting customers than two large calls to action. With DX8's design pattern approach the page editor can now simply access the agency-created design patterns, drag them into the page and set them so they can appear and disappear, based on any criteria. In this case it would be an A/B test but it could

be user behaviour, a campaign or in fact almost any available data source.

Because the tool creates high-quality code every time, it allows agencies to create unlimited variations of design patterns that the client can select from – for example, whether they want it to be multiple columns, interactive, have a background image and so on. The agency can also link multiple styles into the patterns to allow the editor to customise elements such as layout or formatting, so what they are given is not fixed.

It is also very easy for the agency to build new UI components on a DX8 site quickly. For example, if a site needed a completely new pattern, typically you'd be looking at two or three hours for the build, including all the CMS integration and making it available to the client.

We launched in March at DrupalCon in Nashville, as a monthly subscription service. Initially we are targeting Drupal agencies and are in the process of selectively onboarding because we don't want to expand too quickly. But in general, this system is suitable for any website where the organisation has a marketing department that will need to use the web as part of their digital marketing offering.

It's less appropriate for purely experiential sites – something like a Nike or Bacardi – where it's more about manually coding something that's super-funky. The more you are looking to manual code, the less reason there is to use it. But beyond that, Cohesion DX8 has got a very wide use-case approach.



Above DX8 enables clients to be able to test design variations quickly and easily

► more effective design and build process for our customers."

Design systems

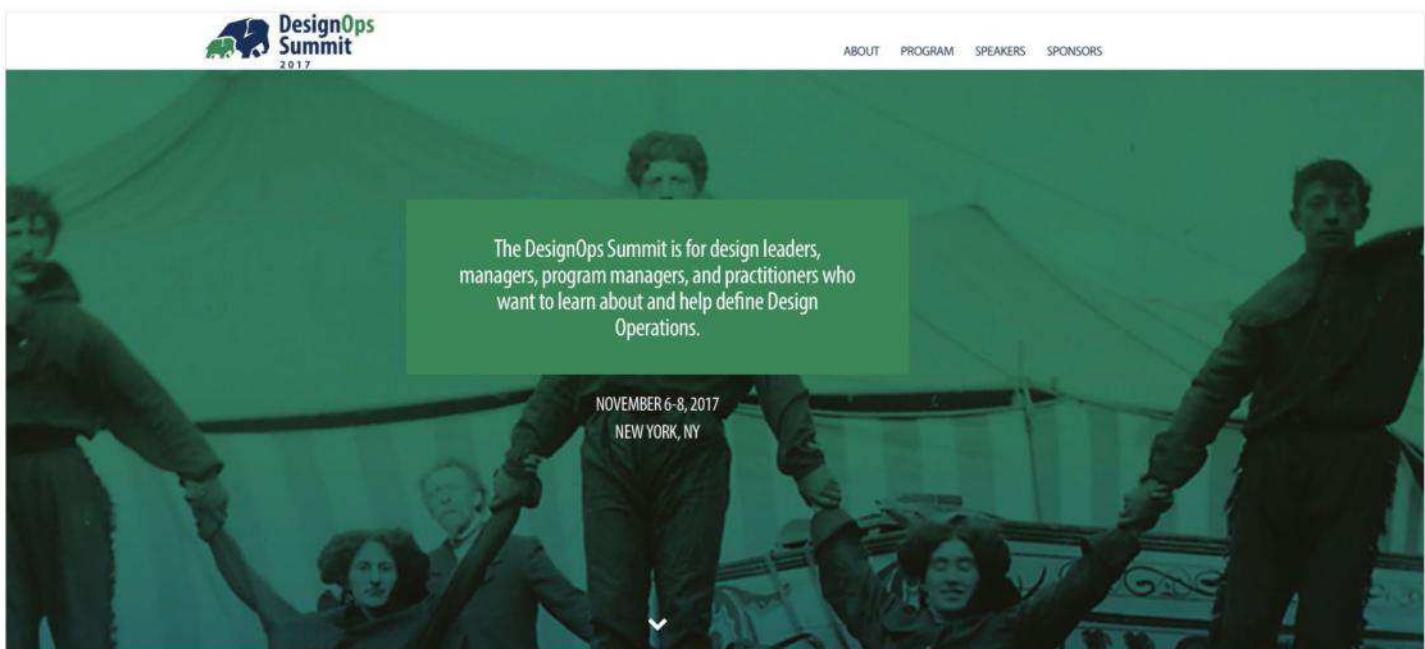
Although the term 'pattern library' is often used interchangeably with the terms 'design system' and 'style guide' there are important differences between them. In a nutshell, a style guide defines the basics of a user interface, such as colours and typography; the pattern library is a storage system for its components; and the design system explains how these two parts connect up and work together.

There's no hard and fast rule, though, as to what a design system must contain or do. "A design system is a bit like a brand," explains Craig Frost, design lead at Pusher, a specialist in real-time technologies based in London. "A brand isn't just a logo: it's a broader, more squishy thing. And I think a design system is a broad, squishy thing too. Whether you're designing a piece of software, an API, an interface, a piece of content or whatever, a design system allows you to figure out how you communicate your ideas and then solidify them in a way that makes them easy to teach to others."

Tooling up

However, creating your design system is only one step on the road to automating your web designs. The next is to find a tool to help you manage, curate and centralise these systems. Many teams create their own but you may just want to use an off-the-peg solution, such as Fractal (<https://clearleft.com/posts/fractal-v1-0>). This is a tool that Clearleft created for its own internal purposes, which it has since made available to the community as a free and open-source download. It not only enables you to build component libraries for your web projects but it also gives you the ability to create integrated documentation, plus a full-featured API to assist devs to then integrate these libraries into their tools and production builds.

"Fractal is that central source of truth that everyone around the organisation goes to; it's where all your documentation



Above Held in New York last November, DesignOps Summit 2017 was the first conference dedicated to showing design leaders how to create design capacity that keeps pace with change

“When you reach the scale of a global giant, you need something more. Step forward, DesignOps”

is,” explains Budd. “It’s where you’d say, for instance: ‘Here’s what a button looks like, here are five button styles and here is the code for each. And these are our three layouts.’ It’s that central storage space. For anyone who’s got a design system, you want something like that.”

How exactly you go about integrating your design system into your workflow will depend on the scale of the project and the technologies you’re using. But one thing’s for sure: there’s a great deal of innovation in this space right now and it certainly pays to look around for the best tool for the job.

There’s a lot of buzz, for example, about the React Sketch app released by Airbnb’s design team: an open-source library that enables you to write React components that render to Sketch documents. Designed for teams working at large

scale, you can learn more about the app in this blog post: <https://airbnb.design/painting-with-code/>.

Meanwhile, Frost is excited that browser-based design tool Figma has opened up a Read API, with a Write API in the works. “You can build some cool things with the Read API,” he says. “For example, if you have a set of icons in Figma, you can edit them there, build them out and then have them version controlled in GitHub. What we’re really excited about, though, is doing things the other way round, using the forthcoming Write API.”

Given how this will enable designers to update their design systems as things evolve during the development process, Frost’s enthusiasm is easy to understand. “In my experience, while design tools are useful for exploring loose ideas and getting where you need to go, they’re not

that good at maintaining that position,” he says. “It’s really easy for things to become out of date, change during the build process and for that not to loop back round to the design tool. So what grows over time is inconsistency and a breakdown in communication: all the things that eventually lead you to look back in a couple of years and wonder what went wrong.

“For that reason, we’re thrilled about the prospect of having our source of truth not being a design tool. To use the latter for what it’s best at – being a whiteboard for throwing around ideas – but to keep those solid ideas about that system and all the things that it embodies out there in code, in a place we can version-control, look at and build on.”

DesignOps

Component libraries, design systems and the tools aimed at implementing them into your workflow are all helping web designers to automate their processes. But when you reach the scale of a global giant, you need something more. Step forward, DesignOps.

“In the last two or three years in the UK and in the last five or six in the US, a lot of design teams have gone from being relatively small and under-resourced

FEATURES

Tune up your design process

The screenshot shows a sidebar menu on the left with icons for Buttons, Hero Banner, Month blocks, Preloader, Page Title, Pagination, Picture, POI List, POI Maps, Price Label, Slider, Social Buttons, Tiles, and Tags. The main area displays a large image of a sloth's face with the text "HERO BANNER" overlaid in white. Below the image, the text "This is a hero banner" is visible. At the bottom, there is some code:

```
= ui_component('hero_banner', properties: {as_below})
```

 and

```
title: "Hero banner",
```

.

Above Lonely Planet's pattern library defines a wide range UI components, from badges, buttons and breadcrumbs

▶ into quite big, powerful units," says Budd. "Five or six years ago when Jeff Veen and Doug Bowman were the first designers at Google, there was no need to worry about how to be effective and optimise performance. But jump forward to now and such companies have hundreds, even thousands of designers. So you need to think about how you utilise these skills."

That thinking is cohering around a new movement called DesignOps, put forward by the likes of Kristin Skinner, executive design management champion at Chase, and design coach Dave Malouf. Well, kind of new, that is.

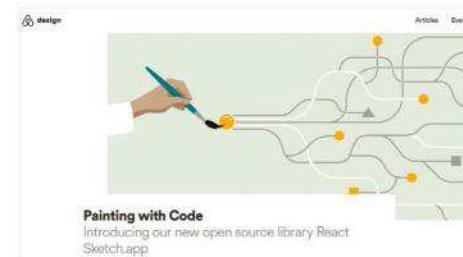
"DesignOps is the evolution of what we previously called design management," says Stu Collett, founder of Super User Studio, a digital product and service design consultancy based in London and Bath. "In a nutshell, it's about bringing optimisation or design thinking to an operational level. It facilitates cross-functional collaboration within an organisation and establishes a framework for working with efficiency and at pace."

You might say, then, that DesignOps is like a design system on steroids. Or as Collett puts it: "In the same way that UX bleeds into service design, design systems start to bleed holistically into design operations."

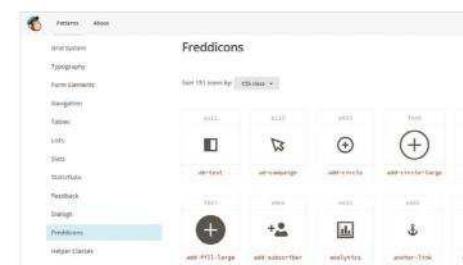
That starts to happen, Budd says, when you reach a certain size. "If you're a six-person team, you don't need DesignOps," he explains. "If you're a 40, 50 or 60-person team, that's probably when DesignOps starts being important. And if you've got a design team of about 250, I wouldn't be surprised if you wanted six, eight or 10 people in your DesignOps team, doing loads of different tasks."

In practice, he's found that DesignOps often comes into play when an organisation has got lots of junior and mid-level designers and they're all overwhelmed with work. "That's what we've seen happen with some tech companies in San Francisco," he explains. "And whatever happens in the States always happens in the UK three, four or five years later. So while DesignOps is still new to us Brits, it's definitely coming to our shores soon."

How soon it will be relevant to the company you work at or consult for depends largely on how ambitious they are, says Collett. "It's most relevant to large enterprises but we've also worked with startups who are focused on this kind of thinking from the onset," he says. "This is often due to aggressive growth plans and the relative uncertainty of their futures. Working with this kind



Above React Sketch.app is an open-source library from Airbnb bridging the gap between designers and engineers

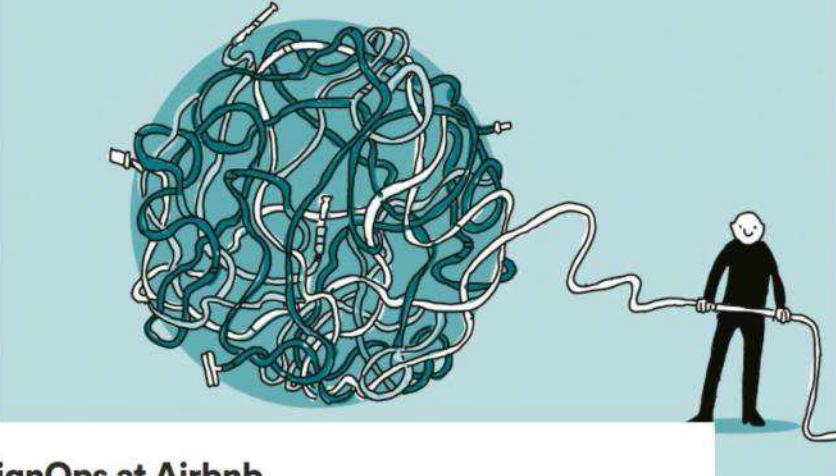


Above Pattern libraries, like this example from MailChimp, bring together reusable UI elements that make up a website

of rigor mitigates against creating a monster (from an ongoing maintenance perspective) and enables them to be responsive and scale consistently as they grow. For smaller teams, it's generally not so important; you can probably get away with creating a simple design repository and not overcooking it. But if your plan is to be a 200-person company in year three, it's very relevant."

So what does DesignOps consist of exactly? Firstly, like its namesake cousin, DevOps, there is a technical element to it. "It's partly about figuring out the tools and technologies you need to get designs from designers' minds into the hands of the user as quickly as possible," says Budd. "One way to do that is through these design systems, pattern languages and code libraries – and I think that's the thing that people get initially fixated on and fetishise. But that's not all that DesignOps is."

Where DesignOps differs from DevOps, he explains, is that it's also focused on the human, 'soft skills' you need to grow a design team. "It's about making sure you're promoting your design teams externally so people know what you're doing – so there's an element of comms. There's also an element of HR because you've got to make sure you've got a



DesignOps at Airbnb
How we manage effective design at scale

Above By building a DesignOps team, Airbnb has been able to streamline, as Adrian Cleave explains (<https://netm.ag/2HWmboR>)



“DesignOps is here to stay and as companies become bigger, only those who take it seriously will survive”



really good recruitment process. A lot of design leaders are having to hire very large numbers of people very quickly, so having a DesignOps person working with HR to ensure that both hiring and onboarding is smooth is very important.”

DesignOps also looks at internal processes, he adds. “It asks: when do you have meetings, what kind of meetings do you have? How do you structure your organisation, where do designers fit? Are designers part of the design team or are they part of product teams? Who looks after their growth? Who judges them on their abilities? How do you decide when you give that person a raise? How do you manage other people in the organisation and make sure that when new product ideas are created, there’s a good, robust system for managing new products? And that obviously touches into product management as well.”

Spelled out in this way, DesignOps might sound like a major commitment of time, effort and money that you might find a little overwhelming. And in truth, you wouldn’t be far wrong. “Many larger organisations struggle to establish effective DesignOps,” admits Collett. “It’s tough getting disparate functions or teams to share new ways of working, to establish its importance against BAU tasks of the time and converging this in a way that works for the core business.”

Tough or not, DesignOps is here to stay and as digital companies become bigger and more complex, only those who take it seriously will survive. “Larger organisations or ambitious startups ignore DesignOps at the risk of facing problems with resourcing, workflows and systems, all of which impact their ability to scale, [respond] to market demands and remain competitive,” he concludes. ■

Is modular design killing creativity?

It's all very well everyone streamlining their design processes with reusable components but is the modular approach taking the creativity out of web design?



Stu Collett has some sympathy with this idea. “This does resonate with me. I can understand why

the use of frameworks can feel limiting to a designer. However, even frameworks are open to interpretation and may be extended. Within the context of the wider UX or even service-design process, for example, we have the opportunity to understand the needs and goals driving use of a digital product. Understanding the desired ways in which an individual wishes to engage or interact with the product enables us to challenge the framework and find ways in which patterns may be used creatively.”



Andy Budd believes there’s room on the web for both modular and bespoke design; it’s all about what’s

most appropriate. “The people we generally work with are looking for a more IKEA-type solution: they are trying to get value in doing things big and getting economies of scale. As a result, you get really nice but quite simple design. At the other end of the scale you’ve got the Laurence Llewellyn-Bowen, which is flouncy, individualistic, unbounded creativity. That is something that can’t scale and never should. Neither approach is better; they’re just different approaches for different types of project.”



10 TIPS FOR BETTER TESTING

Matt Crouch reveals how to get the most from your testing strategy and ensure your sites are the best they can be

Web development is more complicated now than a few years ago. Browser features, front-end frameworks and best practices change almost monthly and there is always something to update. And with this comes risk. How can we be sure these changes won't have unintended side effects?

Testing is all about mitigating risk. If a user has trouble using a site, they are less likely to come back and more likely to jump over to a competitor. By checking every decision that gets made when developing a site, it reduces the chance that users will have a sub-par experience.

Clearly there is more to testing than just making sure a codebase is free of errors. There are steps to test right the way through the design process that can make sure everything that gets created is guided by a real user need.

Write lots of unit tests

1 Unstructured code is a precursor to bugs and issues further down the road. It not only makes it hard to understand and impossible to upgrade, it also makes it difficult to test. With so many pieces all directly relying on each other, tests must run on all of the code at once. This makes it difficult to see exactly what doesn't work when the time comes.

Each part of the application should be broken up into its own concern. For

AUTHOR

MATT CROUCH

Matt is a software engineer for Vidsy in London, where he helps bring creators and brands closer together. He works on the front-end products using a mix of React and TypeScript.

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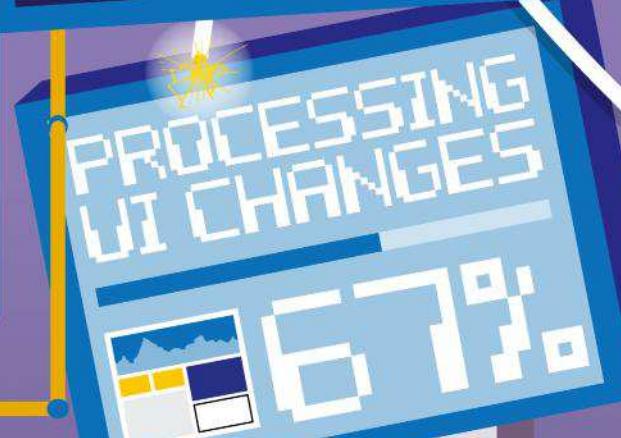
t: @mattcrouchuk

ILLUSTRATOR

NEO PHOENIX



BREAKING TEST TIME!



FEATURES

10 tips for better testing



► example, a login form can comprise database queries, authentication and routing in addition to styled inputs and buttons. Each one of these is a great candidate for having its own class, function or component.

The foundation of a solid codebase is a good set of unit tests. These should cover all code and be quick to run. Most unit tests and their frameworks share the same structure:

```
<pre>
describe("DateLocale", function() {
  test("provides the day in the correct language",
  function() {
    var date = new DateLocale("en");
    date.setDate(new Date(1525132800000));
    expect(date.getDay()).toBe("Tuesday");
  });
});
</pre>
```

A “describe” block denotes what piece of code is under test. Inside that are a number of tests that set up a scenario and compare our expected result with the actual result. If they don’t match, the test fails and we can investigate further.

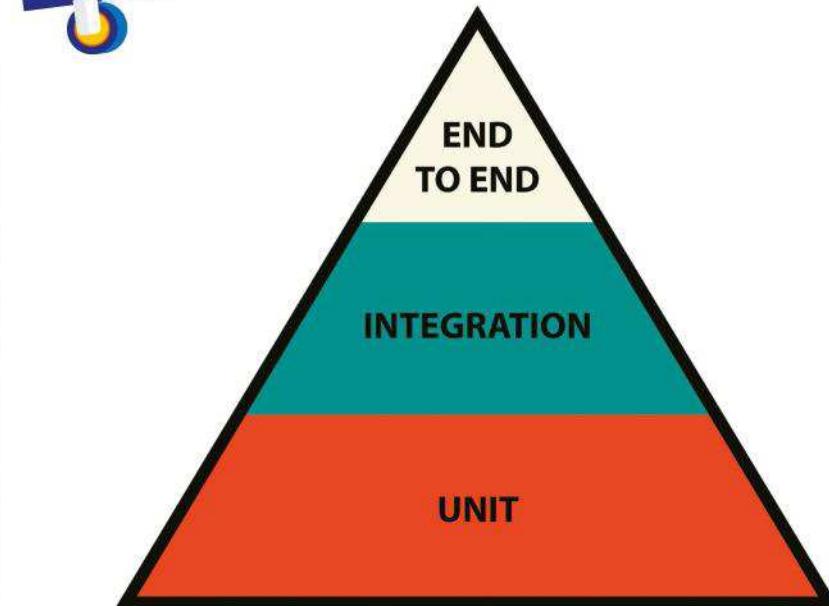
By creating and running unit tests as we change files, we can be sure that nothing has accidentally broken the expected functionality of each piece of code. These pieces can also be dropped into other projects where needed. As tests are already written for it, we can be sure that this particular unit is free of any issues right from the start.

There are plenty of tools to help write unit tests, such as Jest, Jasmine and AVA. The best fit will depend on the needs of each project, any frameworks involved and ultimately developer preference.

Use test doubles when required

2 While it may seem counter-productive, it can be easy to test more than originally intended. If a function depends on an external library, for example, any bugs that come from that library will fail other tests even if the code we have written is sound.

The solution to this is to add placeholders – or ‘test doubles’ – for this functionality that behave in the same



Above Have many unit tests but fewer integration and end-to-end tests to strike a balance between speed and effectiveness

```
Test Suites: 1 passed, 1 total
Tests:   0 passed, 0 total
Snapshots: 0 total
Time:  0.123s, estimated is
      ran all test suites related to changed files.
Match Usage: Press W to show more.
```

Above Unit tests are quick to run through the command line. Suites like Jest selectively run tests based on what changed

way but will always give us an expected result. The three main test doubles are ‘mocks’ ‘stubs’ and ‘spies’.

A mock is a class or object that simply holds the place of a real one. They have the same interface but will not provide any practical functionality.

A stub is similar to a mock but will respond with pre-programmed behaviour. These will be used as needed to simulate specific parts of an application while it’s being tested.

A spy is more focused on how the methods in that interface were called. These are often used to check when a function is running, how many times it ran and also what arguments were supplied when it did. This is so we know the right things are being controlled at the right time.

Libraries such as Sinon, Testdouble and Nock provide great, ready-made test doubles. Some suites such as Jasmine also provide their own doubles built-in.



Above Sinon has ready-to-use methods for faking common browser APIs such as setInterval and XMLHttpRequest

Check how the components work together

3 Once code is broken out into separate components, we then need to test that they can work together. If the authentication layer doesn’t understand what gets returned from the database, for example, nobody would be able to log in. These are known as ‘integration tests’. They check how one part of the application works with another. While unit tests are deliberately isolated from one another, integration tests encourage communication between these two parties.

As with unit tests, the goal of an integration test is to check the end result was the intended one. In our login example, that may be a check to see if the “last logged in” timestamp was updated in the database.

Since more is being dealt with at one time, integration tests are typically slower than unit tests. As such there



```

JS index.js
10
11   width: 768,
12   height: 1024,
13   deviceScaleFactor: 2,
14   isMobile: true,
15   hasTouch: true
16 }
17;
18
19(async () => {
20   const browser = await puppeteer.launch();
21   const page = await browser.newPage();
22   await page.goto("https://www.creativebloq.com/net-magazine");
23
24   for (var i = 0; i < viewports.length; i++) {
25     const viewport = viewports[i];
26
27     await page.setViewport(viewport);
28     await page.screenshot({
29       path: `screenshots/dimension-${i}-${viewport.width}x${viewport.height}.png`
30     });
31   }
32
33   await browser.close();
34 })();
35
36
37
38
39
40
41
42
43
44
        
```

matts-mbp-2:puppeteer-test matts node index.js
matts-mbp-2:puppeteer-test matts

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Ln 30, Col 61 Spaces: 2 UTF-8 LF JavaScript [off] Prettier: ✓

Above Puppeteer can control a headless version of Chrome as if it was a user. It can generate screenshots to visualise issues

Case study

How does Vidsy use tests to make sure all of its projects work best for both creators and brands?



Vidsy is a platform for global brands to create video content at scale. This means it touches various users and processes along the way from brief formation, content creation and deployment to various social channels. No changes can be made without being tested thoroughly throughout its life cycle.

As the product is used by an in-house team as well, feedback on existing features is readily available. This, combined with external user monitoring data from services such as Hotjar, inform the development of future features.

Both front- and back-end code is passed through CircleCI, which requires code to be of a certain standard. For all projects, everything must be properly formatted, documented and unit tested with 100% coverage.

Each change is pulled into code review by another member of the product team. This provides another pair of eyes to identify any clear issues with the code and makes sure everyone is kept up to date with the changes.

Before any update to a production site, changes must go through a series of QA tests that focus on testing edge cases and integrations with other parts of the application. Any issues are fed back to the development team and the process starts again.

For larger features, smaller milestones are met along the way to allow for rounds of alpha and beta testing. While alpha tests will go to a small number of staff to test internally, later beta tests work with real brands and briefs to get more accurate feedback.

“By creating and running unit tests as we change files, we can be sure that nothing has accidentally broken”

should be fewer of them and they should run less often. Ideally, these would run only after a feature has been completed to be sure nothing has changed.

The same suites used for unit tests can be used to write integration tests but they should be able to execute separately to keep things running quickly.

Follow the path of each user

4 The top level of automated technical testing is known as ‘end-to-end’ or ‘functional’ tests. As the names suggest, this level covers all actions a user can take from start to finish. They simulate real scenarios and how a user is likely to interact with the finished product.

The structure of these tests often mirrors user stories created as part of the development process. To extend an example from earlier, there may be a test to make sure a user can enter their username and password on a login form.

As they rely on the UI to run, they need to be updated as the interface changes. Long load times can also cause issues. If any action cannot be completed quickly enough, the test will fail, which will result in false positives.

These tests will also run slowly. The bottleneck tends to come from running the browser, which is not as fast as the command line but is necessary to emulate the right environment. As such these will run less frequently than integration tests – usually before pushing a set of changes into production.

Tools such as Selenium and Puppeteer can help with writing end-to-end tests. They enable browsers to be controlled through code to automate what would otherwise be a repetitive manual process.

Set performance budgets

5 Modern front-end development often involves creating bundles for each project with lots of heavy

FEATURES

10 tips for better testing



▶ assets. Without being careful, these can have a damaging impact on performance.

Webpack comes with a way to keep track of performance issues such as bundle and asset size. By tweaking the “performance” object in webpack.config.js, it can emit warnings when files grow too large and how best to tackle it. These can even throw errors that can stop a build succeeding to be sure end users aren’t negatively affected.

It is also important to test on a range of devices similar to those used by the visitors to the site. A mobile-first approach to design and development makes sure users on low-end devices aren’t left waiting for a page to render.

WebPagetest provides a comprehensive overview of the performance of a website alongside hints as to how it can be improved. Live services such as Pingdom can track the performance of a site with live users for real-world data.

Develop for accessibility

6 Every website should be readily accessible to everyone. While accessibility testing commonly refers to those with disabilities, changes made as a whole will benefit everybody by creating a more approachable, easy-to-navigate site.

There are tools that can automatically detect the most common issues, such as poor semantic markup or missing alt text on images. Lighthouse, for example, runs inside the Chrome developer tools and gives instant feedback on the accessibility of the page it analysed.

Automated tooling cannot detect everything – for example, it isn’t possible for a machine to know if the alternative text for an image is appropriate. There is no substitute for manual testing alongside users with various disabilities. Devices will be set up for that user’s unique needs and we will need to make sure they are catered for.

Work to the extremes

7 Edge cases are a common cause of issues – particularly the length and content of strings. By default, long words will stretch the container and cause flow issues on a page. But

The screenshot shows the Pingdom homepage with a yellow header. Below it, a section titled "Website Performance Monitoring" features a line graph and a green button labeled "START 14-DAY FREE TRIAL". To the right, there's a "Uptime Checks" dashboard with various status indicators. Below the dashboard, a sub-section says "No stone left unturned" with the text "Make informed decisions with extensive data from every part of your website". At the bottom, four service icons are shown: "Uptime Monitoring" (with a gear icon), "Real User Monitoring" (with a person icon), "Synthetic Interaction Testing" (with a laptop icon), and "Page Speed Monitoring" (with a speedometer icon).

Above Pingdom can also help monitor user flows throughout their visit, which can help to quantify how successful a change was

“Use real-world data as early in the process as possible to be sure the site can cope with every eventuality”

what happens if someone decides to use characters from a different alphabet or makes use of emoji?

Issues become more permanent when storing these strings in a database. Long strings may be truncated and encoding issues can end up distorting the message. All test data should include these checks.

Fuzz testing is an automated technique that bombards an interface with random input as a form of stress test. The aim of the test is to make sure no unexpected issues arise from an unexpected – but possible – set of user actions.

These extremes aren’t just limited to content. Those on slow connections, low-end devices and smaller screens shouldn’t be made to wait. Always aim for faster performance metrics, such as time to first paint, to cater for these users.

In short, almost all aspects of development are more varied than anticipated. Use real-world data as early in the process as possible to be sure the site can cope with every eventuality.

Keep an eye on regressions

8 As features are added or changed, tests will need to be re-run. It is important to prioritise those that are likely to be affected by that change. The test suite Jest is able to determine what has changed based on Git commits. It can then determine which tests to run first to give the fastest feedback.

Visual regression tools like PhantomCSS can detect when styles have changed. A similar concept exists in Jest for objects or UI components called snapshot tests. These capture the initial state of each test. When anything changes the test will fail until the change has been confirmed.

Test early, test often

9 When tight schedules determine releases, it is easy to let the developers create a product and have testers test the execution. In reality, this can lead to a lot of wasted development time.

10 tips for better testing

The screenshot shows the Lighthouse audit results for www.mattcrouch.net. The overall score is 90. The 'Accessibility' section highlights opportunities to improve the accessibility of the web app. It includes a table for 'Elements Have Discernible Names' showing two failing items related to links without descriptive text. The audit also covers other areas like 'Performance', 'SEO', and 'PWA'.

Above As part of its auditing process, Lighthouse tests a site on common accessibility practices and highlight what to improve

The screenshot shows a Webpack bundle analysis tool displaying a list of assets and their sizes. The assets include various CSS, JS, and image files. The 'Time' column indicates the estimated time to download each chunk. The total size of the bundles is listed at the bottom.

Above When generating bundles, Webpack can provide feedback on any chunks that will take a while to download

Getting in the habit of testing each new feature early means an idea can be checked to make sure it's heading in the right direction. By using paper prototypes and mockups, it is easy to test an idea with no code at all.

By regularly testing a feature as it gets developed, we can be sure it's hitting the needs of the user. If any small tweaks are required, they are easier to implement in smaller stages.

It's also important to get ideas tested on real users. Rounds of alpha and beta testing can highlight issues early enough to correct them with little overhead. Later rounds should involve targeted demographics that are related to the eventual end user.

Finally, keep these rounds as small as possible. A study by Nielsen found that five users is enough to get an idea of what works and what doesn't. If the element under test is kept small, the range of feedback gained will be enough to fuel the next round of testing.

Encourage a test culture

Tests can only be of benefit when used regularly. Everybody involved on a project has to be on board to help them be most effective.

Continuous integration (CI) tools automate as many checks as possible before any update lands in a codebase. These can run unit tests, check for coverage and identify common issues automatically and flag them if any issues arise. Code with any issues whatsoever cannot be added to the project.

People separate from the development of a feature can perform quality assurance (QA) tests, which can act as a final check to make sure all the required functionality is present and working.

If bugs do make it through the various checks, make sure there is a process in place to report them both internally and externally. These reports can form the basis of new tests in the future to make sure this issue never resurfaces. □

Resources



There is plenty to explore when it comes to testing websites and lots of resources to help along the way. Here are just a few of the best.

Fun Fun Function

<https://www.youtube.com/channel/UCO1cgjhGzsSYb1rsB4bFe4Q>

A weekly YouTube series created by ex-Spotify engineer Mattias Petter Johansson. In it he covers typical developer issues, with a focus on test-driven development. There are also playlists dedicated to topics such as unit testing and continuous integration.

Writing Testable Frontend JavaScript Part 1 - Anti-patterns and their fixes

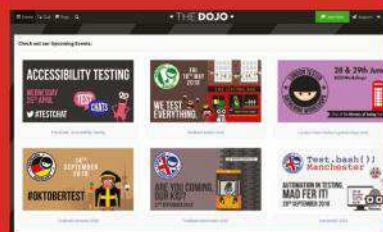
This is the first of a two-part introduction on how to write testable JavaScript UI code. The first article presents a simple application that contains several common anti-patterns and how these can be refactored to be more testable.

The complete refator is presented in the second article along with info on how to add a unit test suite and make use of mocha.

Writing Testable Frontend JavaScript

<https://shaneltomlinson.com/2013/testing-javascript-frontend-part-1-anti-patterns-and-fixes/>

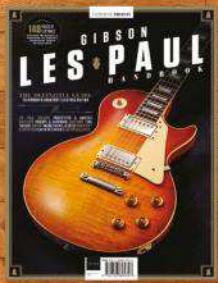
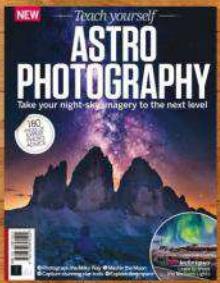
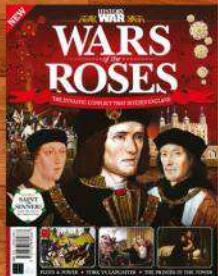
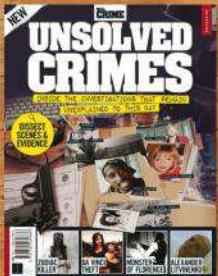
Shane Tomlinson is a developer at Mozilla. In this two-part series, he dives into what makes JavaScript inherently untestable and the steps that should be taken to avoid it. There are plenty of code examples to follow along and see what the benefits are.



Ministry of Testing

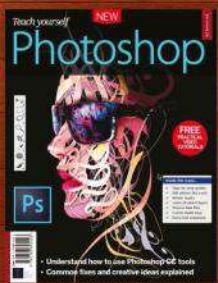
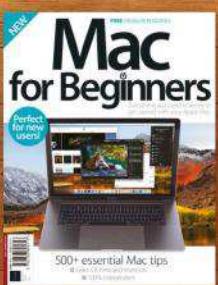
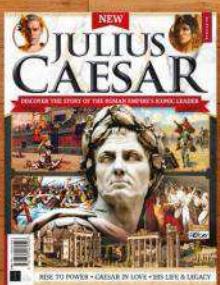
<https://www.ministryoftesting.com/>

A collection of news, talks and meetups across the world headed by Rosie Sherry. The main focus is to become better testers through sharing and discussion. Topics vary between how to convince a team to use CI to testing VR experiences.



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THIS MONTH FEATURING...

Advanced Node.js
★★★★★ By Samer Buna

This course will teach you the core Node.js concepts and API modules from simple utility modules all the way to streams and clusters.

[Start free trial now](#) [▶ Play course overview](#)

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ABOUT THE AUTHOR

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t: @samerbuna

job: Curator of jsComplete.com

areas of expertise:

JavaScript, Node.js, React.js, GraphQL

The screenshot shows a course page for 'Advanced Node.js' by Samer Buna. The course description states: 'This course will teach you the core Node.js concepts and API modules from simple utility modules all the way to streams and clusters.' Below the description are two buttons: 'Start free trial now' and 'Play course overview'. To the right of the course info is a video thumbnail of Samer Buna speaking. To the right of the video are three screenshots of the Mac OS X Activity Monitor. The first two screenshots show the process 'node' before and after running a script, with memory usage increasing from 434.8 MB to 8.7 MB. The third screenshot shows a detailed memory report for the 'node' process, listing various memory metrics like Physical Memory, Memory Used, App Memory, Cached Files, and Swap Used.

* NODE.JS STREAMS

LESSEN DATA DEMANDS USING NODE.JS STREAMS

Samer Buna explains how utilising Node.js streams can significantly lessen the strain placed on users' memory and offers advice on how to implement and consume them

> For the longest time, Node.js streams had a reputation of being hard to work with and even harder to understand. Over the years, developers created many packages with the sole purpose of making working with streams easier. Luckily, in recent versions of Node.js, the streams' API were improved and it became a lot easier to implement and consume streams in Node.js natively without any external libraries.

Let's look at an example demonstrating the difference streams can make in code when it comes to memory consumption.

We'll create a big file first:

```
const fs = require('fs');
const file = fs.createWriteStream('./big.file');
for(let i=0; i< 1e6; i++) {
  file.write('INSERT A BIG STRING HERE...');

}
file.end();
```

Look what was used to create that big file. A writable stream!

The `fs` module can be used to read from and write to files using a stream interface. In the example we've just looked at, we're writing 1 million lines with a loop to that `big.file` through a writable

stream. When I tested this script with a big string, running the script generated a file that was nearly a whopping 400MB.

Here's a simple Node web server designed to exclusively serve the generated `big.file`:

```
const fs = require('fs');
const server = require('http').createServer();
server.on('request', (req, res) => {
  fs.readFile('./big.file', (err, data) => {
    if (err) throw err;
    res.end(data);
  });
});
server.listen(8000);
```

When the server gets a request, it'll serve the big file using the asynchronous method, `fs.readFile`. But hey, it's not like we're blocking the event loop or anything. Everything is great, right? Right?

Well, let's see what happens when we run the server, connect to it and monitor the memory while doing so. When I ran the server, it started out with a normal amount of memory, 8.7MB. Then I connected to the server and consumption jumped to 434.8MB. We basically put the whole `big.file` content in memory

“We basically put the whole file in memory before we wrote it out to the response object. This is very inefficient”

before we wrote it out. This is very inefficient.

The HTTP response object (`res` in the code above) is also a writable stream. This means if we have a readable stream that represents the content of `big.file`, we can just pipe those two on each other and achieve mostly the same result without consuming ~400MB of memory.

Node's `fs` module can give us a readable stream for any file using the `createReadStream` method. We can pipe that to the response object:

```
const fs = require('fs');
const server = require('http').createServer();
server.on('request', (req, res) => {
  const src = fs.createReadStream('./big.file');
  src.pipe(res);
});
server.listen(8000);
```

Now when you connect to this server, a magical thing happens. The memory usage grows by about 25MB and that's it.

WHAT'S HAPPENING?

When a client asks for that big file, we stream it one chunk at a time, which means we don't buffer it in memory at all.

You can push this example to its limits. Regenerate the `big.file` with 5 million lines instead of just 1 million, which would take the file to well over 2GB, and that's actually bigger than the default buffer limit in Node.

If you try to serve that file using `fs.readFile`, you simply can't by default (although you can change the limits). But with `fs.createReadStream`, there is no problem at all streaming 2GB of data to the requester and, best of all, the process memory usage will roughly be the same.

STREAMS 101

There are four fundamental stream types in Node: readable, writable, duplex and transform streams.

- A readable stream is an abstraction for a source from which data can be consumed. An example of that is the `fs.createReadStream` method.
- A writable stream is an abstraction for a destination to which data can be written. An example of that is the `fs.createWriteStream` method.
- A duplex stream is both readable and writable. An example of that is a TCP socket.
- A transform stream is essentially a duplex stream that can be used to modify or transform the data at the same time it is written and read. An example of that is the `zlib.createGzip` stream, which compresses the data using gzip. You can think of a transform stream as a function where the input is the writable stream part and the output is the readable stream part. You might also sometimes hear transform streams referred to as ‘through streams’.

IMPLEMENT STREAMS

When we talk about streams in Node, there are two different main tasks:

- The task of implementing the streams.
- The task of consuming them.

So far, we've been talking about only consuming streams. Let's implement some! Stream implementers are usually the ones who require the `stream` module.

► IMPLEMENT A WRITABLE STREAM

To implement a writable stream, we need to use the `Writable` constructor from the `stream` module.

```
const { Writable } = require ('stream');
```

We can implement a writable stream in many ways. For example, we can extend the `Writable` constructor if we want:

```
class myWritableStream extends Writable {  
}
```

However, I prefer the simpler constructor approach. We just create an object from the `Writable` constructor and pass it a number of options. The only required option is a `write` function, which exposes the chunk of data to be written.

```
const { Writable } = require ('stream');  
const outStream = new Writable({  
  write(chunk, encoding, callback) {  
    console.log(chunk.toString());  
    callback();  
  }  
});  
process.stdin.pipe(outStream);
```

This write method takes three arguments.

- The chunk is usually a buffer unless we configure the stream differently.
- The encoding argument is needed in that case but we can usually ignore it.
- The callback is a function that we need to call after we're finished processing the data chunk. It's what signals whether the write was successful or not. To signal a failure, just call the callback with an error object.

In `outStream`, we simply `console.log` the chunk as a string and call the callback after that without an error to indicate success. This is a very simple and probably not so useful echo stream. It will echo back anything it receives.

To consume this stream, we can simply use it with `process.stdin`, which is a readable stream, so we can just pipe `process.stdin` into our `outStream`.

When we run the code above, anything we type into `process.stdin` will be echoed back using the `outStream` `console.log` line.

This is not a very useful stream to implement because it's actually already implemented and built-in. This is very much equivalent to `process.stdout`. We can just pipe `stdin` into `stdout` and we'll get the exact

same echo feature with this single line:

```
process.stdin.pipe(process.stdout);
```

IMPLEMENT A READABLE STREAM

To implement a readable stream, we require the `Readable` interface and construct an object from it:

```
const { Readable } = require ('stream');  
const inStream = new Readable({  
  read(size) {}  
});
```

There is a simple way to implement readable streams. We can just directly push the data that we want the consumers to consume.

```
const { Readable } = require ('stream');  
const inStream = new Readable({  
  read(size) {}  
});  
inStream.push('ABCDEFGHIJKLM');  
inStream.push('NOPQRSTUVWXYZ');  
inStream.push(null); // No more data  
inStream.pipe(process.stdout);
```

When we push a `null` object, that means we want to signal that the stream does not have any more data.

To consume this simple readable stream, we can simply pipe it into the writable stream `process.stdout`.

When we run the code above, we'll be reading all the data from `inStream` and echoing it to the standard out. Very simple but also not very efficient.

We're basically pushing all the data in the stream before piping it to `process.stdout`. It's much better to push data on demand, when a consumer asks for it. We can do that by implementing the `read()` method in a readable stream configuration:

```
const inStream = new Readable({  
  read(size) {  
    // there is a demand on the data...  
    // Someone wants to read it.  
  }  
});
```

When the `read` method is called on a readable stream, the implementation can push partial data to the queue. For example, we can push one letter at a time, starting with character `code 65` (which represents `A`), and increment the code on every push:

```
const inStream = new Readable({  
  read(size) {  
    this.push(  
      String.fromCharCode(65 + i)  
    );  
  }  
});
```

```

String.fromCharCode(this.currentCharCode++);
};

if (this.currentCharCode > 90) {
  this.push(null);
}

};

inStream.currentCharCode = 65;
inStream.pipe(process.stdout);

```

While the consumer is reading a readable stream, the `read` method will continue to fire and we'll push more letters. We need to stop this cycle somewhere; that's why I used an `if` statement to push `null` when the `currentCharCode` is greater than 90 (which represents Z). This code is equivalent to the simpler one we started with but now we're pushing data on demand when the consumer asks for it. You should always do that.

“Now we’re pushing data on demand when the consumer asks for it. You should always do that”

IMPLEMENTING DUPLEX/TRANSFORM STREAMS

With duplex streams, we can implement both readable and writable streams with the same object. It's as if we inherit from both interfaces. Here's an example duplex stream that combines the two writable and readable examples implemented before:

```

const { Duplex } = require ('stream');
const inoutStream = new Duplex({
  write(chunk, encoding, callback) {
    console.log(chunk.toString());
    callback();
  },
  read(size) {
    this.push(
      String.fromCharCode(this.currentCharCode++)
    );
    if (this.currentCharCode > 90) {
      this.push(null);
    }
  }
});
inoutStream.currentCharCode = 65;

```

★ DEFINING STREAMS

WHAT EXACTLY ARE STREAMS?

 Streams are collections of data – just like arrays or strings. The difference is that streams might not be available all at once and they don't have to fit in memory. This makes streams really powerful when working with large amounts of data or data that's coming from an external source one chunk at a time.

However, streams are not only about working with big data. They also give us the power of composability in our code. In the same way that we can compose powerful Linux commands by piping other smaller Linux commands, we can do exactly the same in Node with streams.

```

const grep = ... // A stream for the grep output
const wc = ... // A stream for the wc input
grep.pipe(wc)

```

You'll find that many of the built-in modules in Node implement the streaming interface:

Readable streams	Writable streams
HTTP response, on the client	HTTP requests, on the client
HTTP requests, on the server	HTTP responses, on the server
fs read streams	fs write streams
zlib streams	zlib streams
crypto streams	crypto streams
TCP sockets	TCP sockets
process.stdin	process.stdout, process.stderr

The list above has some examples for native Node objects that are also readable or writable streams. Some of these objects are both readable and writable streams, such as TCP sockets, zlib and crypto streams.

Notice that the objects are also closely related. While an HTTP response is a readable stream on the client, it's a writable stream on the server. This is because in the HTTP case, we basically read from one object (`http.IncomingMessage`) and write to the other (`http.ServerResponse`).

★ RESOURCES

ESSENTIAL READING

+ Here's a list of resources with detailed information about the topics covered in the tutorial and more core Node.js topics. Having a good understanding of these topics is strongly recommended before diving into creating real-world stream-based Node.js applications.

**Node.js Event-Driven Architecture**

<https://medium.freecodecamp.org/understanding-node-js-event-driven-architecture-223292fcbe2d>

An in-depth look at Node's most important internal design concept: its event-driven architecture.

Requiring modules in Node.js

<https://medium.freecodecamp.org/requiring-modules-in-node-js-everything-you-need-to-know-e7fb119be8>

Everything you need to know about the concept of requiring modules with a Node application.

**Advanced Node.js**

<https://www.pluralsight.com/courses/nodejs-advanced>

My Pluralsight course about the core Node.js concepts and API modules from utility modules all the way to streams and clusters.

Node.js Beyond the Basics

<https://jscomplete.com/master-node>

Master the Node.js runtime beyond the basic usage with topics like built-in modules, streams, child processes, the cluster module, scaling Node.js applications and more.

▶ **process.stdin**

```
.pipe(inoutStream)
.pipe(process.stdout);
```

By combining the methods, we can use this duplex stream to read the letters from A to Z and we can also use it for its echo feature. We pipe the readable `stdin` stream into this duplex stream to use the echo feature and we pipe the duplex stream itself into the writable `stdout` stream to see the letters A through Z.

It's important to understand that the readable and writable sides of a duplex stream operate completely independently from one another. This is merely a grouping of two features into an object.

A transform stream is the more interesting duplex stream because its output is computed from its input. For a transform stream, we don't have to implement the read or write methods; we only need to implement a transform method, which combines both of them. It has the signature of the write method and we can use it to push data as well. Here's a simple transform stream that echoes back

“What’s great about the pipe method, though, is that we can use it to compose our program piece by piece”

anything you type into it after transforming it to uppercase format:

```
const { Transform } = require('stream');
const upperCaseTr = new Transform({
  transform(chunk, encoding, callback) {
    this.push(
      chunk.toString().toUpperCase()
    );
    callback();
  }
});
process.stdin
  .pipe(upperCaseTr)
  .pipe(process.stdout);
```

In this transform stream, which we're consuming exactly like the previous duplex stream example, we only implemented a `transform()` method. In that method, we convert the chunk into its uppercase version and then we push that version as the readable part.

BUILT-IN TRANSFORM STREAMS

Node has a few very useful built-in transform streams such as the `zlib` and `crypto` streams. Here's an example that uses the `zlib.createGzip()` stream combined with the `fs` readable/writable streams to create a file-compression script:

```
const fs = require('fs');
const zlib = require('zlib');
const file = process.argv[2];
fs.createReadStream(file)
  .pipe(zlib.createGzip())
  .pipe(fs.createWriteStream(file + '.gz'));
```

You can use this script to gzip any file you pass as the argument. We're piping a readable stream for that file into the `zlib` built-in transform stream and then into a writable stream for the new gzipped file. Simple process.

The coolest thing about using pipes is that we can actually combine them with events if we need to. Say, for example, I want the user to see a progress indicator while the script is working and a 'Done' message once the script has been executed. Since the `pipe` method returns the destination stream, we can chain the registration of events handlers as well:

```
const fs = require('fs');
const zlib = require('zlib');
const file = process.argv[2];
fs.createReadStream(file)
  .pipe(zlib.createGzip())
  .on('data', () => process.stdout.write('.'))
  .pipe(fs.createWriteStream(file + '.zz'))
  .on('finish', () => console.log('Done'));
```

With the `pipe` method, we get to easily consume streams, but we can still further customise our interaction with those streams using events where they are needed.

What's great about the `pipe` method, though, is that we can use it to compose our program piece by piece, in a much more readable manner. For example, instead of listening to the `data` event above, we can simply create a transform stream that reports progress and replace the `.on()` call with another `.pipe()` call:

```
const fs = require('fs');
const zlib = require('zlib');
const file = process.argv[2];
const { Transform } = require('stream');
const reportProgress = new Transform({
  transform(chunk, encoding, callback) {
```

```
    process.stdout.write('.');
    callback(null, chunk);
  }
});
fs.createReadStream(file)
  .pipe(zlib.createGzip())
  .pipe(reportProgress)
  .pipe(fs.createWriteStream(file + '.zz'))
  .on('finish', () => console.log('Done'));
```

This `reportProgress` stream is a simple pass-through stream, but it reports the progress to standard out as well. Note how I used the second argument in the `callback()` function to push the data inside the `transform()` method. This is equivalent to pushing the data first.

The applications of combining streams are endless. For example, if we need to encrypt the file before or after we gzip it, all we need to do is pipe another transform stream in the exact order that we need it. We can use Node's `crypto` module for that:

```
const crypto = require('crypto');
// ...
fs.createReadStream(file)
  .pipe(zlib.createGzip())
  .pipe(crypto.createCipher('aes192', 'a_secret'))
  .pipe(reportProgress)
  .pipe(fs.createWriteStream(file + '.zz'))
  .on('finish', () => console.log('Done'));
```

The script above compresses and then encrypts the file it receives as an argument. Only those who have the secret will be able to use the outputted file. We can't unzip this file with the normal `unzip` utilities because it's encrypted.

To actually be able to unzip anything zipped with the script above, we need to use the opposite streams for `crypto` and `zlib` in a reverse order, which is relatively simple:

```
fs.createReadStream(file)
  .pipe(crypto.createDecipher('aes192', 'a_secret'))
  .pipe(zlib.createGunzip())
  .pipe(reportProgress)
  .pipe(fs.createWriteStream(file.slice(0, -3)))
  .on('finish', () => console.log('Done'));
```

Assuming that the file used is the compressed version, the code above will go on to create a read stream from that, pipe it into the `crypto createDecipher()` stream (using the same secret), pipe the output of that into the `zlib createGunzip()` stream, and then write things out back to a file without the extension part. ■



All the files you need for this tutorial can be found at
<https://netm.ag/2KmT2lh>



ABOUT THE AUTHOR

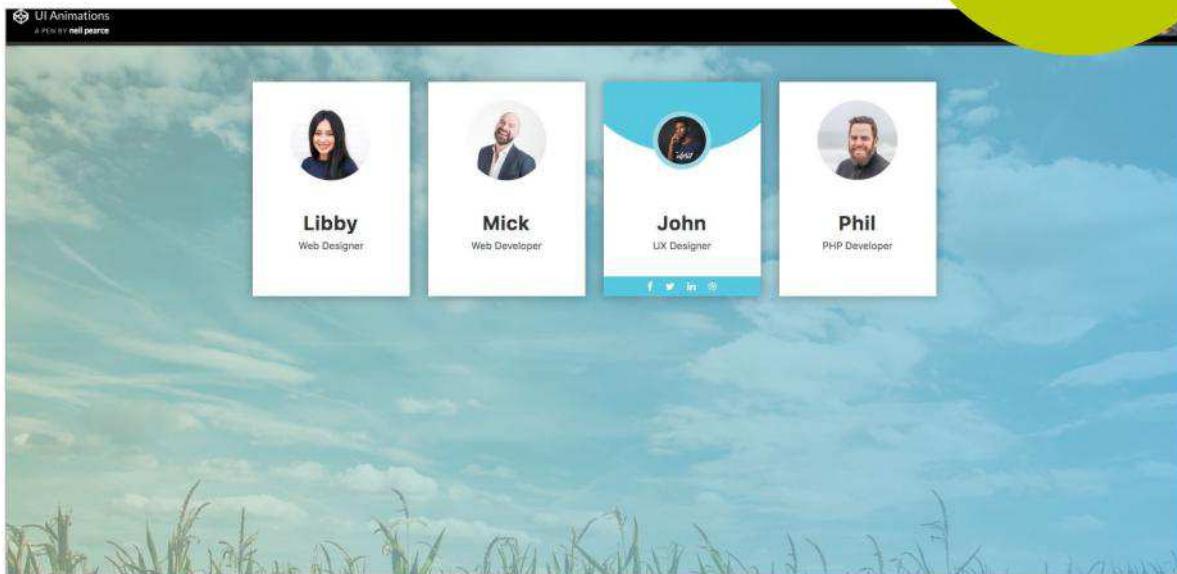
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JavaScript and Vue.js



* BOOTSTRAP 4, CSS3, SASS AND HTML

CREATE SLICK UI ANIMATIONS

Using Bootstrap 4, CSS3, Sass and HTML, Neil Pearce will show you how to create cool UI animations

 More and more frequently, designers and developers are acknowledging the importance of motion design in the context of user experience. Animation on the web is no longer a way to delight and wow the user but a functional tool that makes experiences easy, fun and memorable. Animation in the context of user interfaces is still a very new field. There aren't many resources out there that teach best practice or show common patterns of UI animation that we can follow. Most of the time, it's about experimentation and perhaps a bit of trial and error. All we really need to be aware of is how the user interacts with our UI animations and whether it makes sense to them. What we don't want to be doing is scaring them off.

So in this tutorial, we will create something that doesn't confuse, follows common patterns and is stylish. This will be a team profile section that you often see on company websites. The idea is to show a little more information on the team/staff member when each one is hovered over. Throughout the

tutorial we will be using CodePen, but of course you can use your own favourite editor and development environment instead.

GET SET UP

We begin by opening up CodePen and creating a new pen. We're going to be using Bootstrap 4 and Sass (.scss), so make sure that within the settings you include the Bootstrap CSS and JS as your resource links and also set the CSS to SCSS. Another resource link you will need to add is Font Awesome, which we will use for our social icons.

CONTAINERS, ROWS AND COLUMNS

Containers are what Bootstrap uses as its basic layout element and they are required when you're using the default grid system. Within containers we need to add in a row. Rows are wrappers for columns and we can specify the number of columns that we want out of a possible 12 and what the breakpoint will be. In our case, we want an element that has a

medium-sized breakpoint and fills three columns in width.

```
<div class="container">
  <div class="row">
    <div class="col-md-3">
      <!-- add image link and colour here
    </div>
  </div>
</div>
```

PROFILE IMAGE AND COLOUR

The first profile UI element we will start with will be for a female team member and she will be part of the blue team. The colour will be specified using a class called `blue` and the actual colour will eventually be defined using Sass variables, which we will do in a later step. Then we will need to add in a photo and give it a class called `photo`.

```
<div class="team blue">
  <div class="photo">
    
  </div>
</div>
```

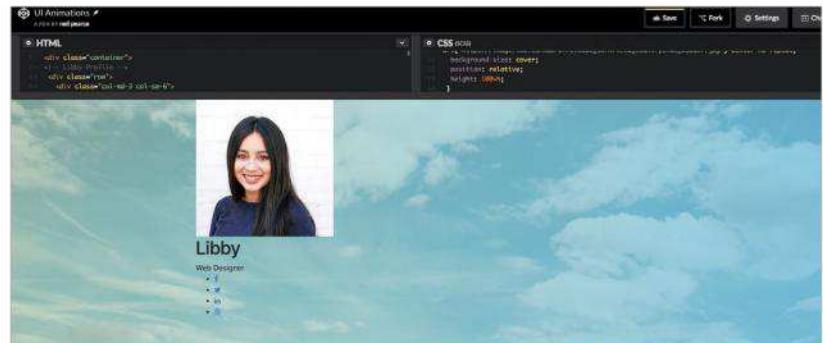
PROFILE NAME AND TITLE

The last bit of HTML to be added will be for the name, title and social icons, which will be added underneath the last `div` tag we just added in the last step. For the social icons, we will be using Font Awesome and these will be placed within an unordered list.

```
<div class="profile-txt">
  <h1 class="title">Libby</h1>
  <span class="position">Web Designer</span>
</div>
<ul class="social-icons">
  <li><a href="" class="fa fa-facebook"></a></li>
  <li><a href="" class="fa fa-twitter"></a></li>
  <li><a href="" class="fa fa-linkedin"></a></li>
  <li><a href="" class="fa fa-dribbble"></a></li>
</ul>
</div>
</div>
```

SASS VARIABLES

If you are following along using CodePen, then you will already have Sass installed and ready to go. You just need to click on the pen settings icon/button and choose SCSS as your CSS preprocessor. Then we can go ahead and add in some variables that will store all of our colours. We've used `rgba` as the colour



Above One final piece of HTML will add a name, title and social icons

values to allow us more meaningful control of all the colours' opacity.

```
$blueGradient: rgba(103, 188, 223, .8);
$lightGreen: rgba(188, 219, 183, .5);
$green: rgba(119, 180, 109, 0.5);
$green-border: rgba(171, 221, 164, 0.5);
$blue: rgba(80, 205, 227, 1);
$blue-border: rgba(147, 223, 236, 1);
```

BACKGROUND IMAGE

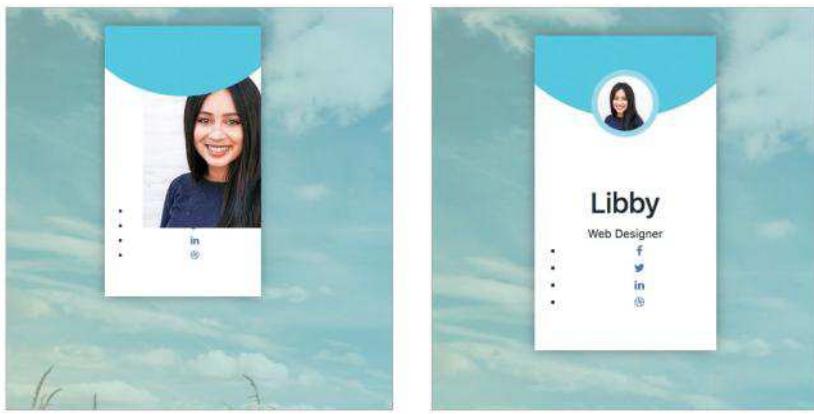
To make things look more appealing, we will place a nice background image on the body. Here we can use our first set of variables and give the background image a pleasing gradient overlay that goes from light green to blue. Then to make our background image fully responsive, we will set the view height to `100vh`.

```
body {
  background: linear-gradient(to right, $lightGreen,
  $blueGradient), url('https://image.ibb.co/mdDPU7/clouds_
  cornfield_countryside_158827.jpg') center no-repeat;
  background-size: cover;
  position: relative;
  height: 100vh;
}
```

PROFILE BACKGROUND AND IMAGE

Each team profile will be given the same styles and the class `team` will be used for this. The background will be white, all content centred and we need to make sure the position is set to relative. Then we can include the CSS for the profile image. For best results, make sure the original image you use has dimensions no bigger than 200px square. However, we will change the height and width of these within the `photo` CSS rule.

```
.team {
  padding: 30px 0 40px;
  margin-top: 60px;
```



Above We can control how much of the blue circle can be seen by setting a bottom percentage for its position

Above right When hovered over, a light blue border will be added to the photo

```
background: #fff;
text-align: center;
overflow: hidden;
position: relative;
cursor: pointer;
box-shadow: 0 0 25px 1px rgba(0,0,0,0.3);
.photo {
display: inline-block;
width: 130px;
height: 130px;
margin-bottom: 50px;
position: relative;
z-index: 1;
}
}
```

ADD THE ANIMATIONS

The first piece of animation we will add will be at the top of our profile element. The idea is that when we hover over the whole element, a blue circular shape will animate down. We can control how much of the blue we can see by specifying the position of this to have a bottom percentage. So play around with this percentage and you'll get a better idea of how this works. You never know: you might even discover a better effect!

```
.blue .photo:before {
content: "";
width: 100%;
height: 0px;
border-radius: 50%;
background: $blue;
position: absolute;
bottom: 130%;
right: 0;
left: 0;
transform: scale(3);
transition: all .3s linear 0s;
}
.team:hover .photo:before {
```

```
height: 100%;
```

ANIMATE THE TEAM PHOTO

The team photo is our focal point in this UI and is probably the most obvious element that you would expect to animate in some shape or form. The CSS we will add in this step will first turn the photo into a smaller circle, then when hovered over there will be a light blue border added to it and the photo will scale down together with the border. With the transitions added, we get a nice fluid animation.

```
.blue .pic:after {
content: "";
width: 100%;
height: 100%;
border-radius: 50%;
background: $blue;
position: absolute;
top: 0;
left: 0;
z-index: 1;
}
.team .photo img {
width: 100%;
height: auto;
border-radius: 50%;
transform: scale(1);
transition: all 0.9s ease 0s;
}
.blue:hover .photo img{
box-shadow: 0 0 0 14px $blue-border;
transform: scale(0.6);
```

PROFILE NAME AND POSITION

The profile name and position need a little bit of tidying up. These won't be animated but that shouldn't stop you from adding your own animation to these if you'd like. Perhaps scale them up slightly on hover, as you'll have enough space due to the resizing of the photo.

```
.profile-txt {
margin-bottom: 30px;
.title {
font-size: 2rem;
font-weight: 700;
color: #333;
letter-spacing: 1.5px;
text-transform: capitalize;
margin-bottom: 6px;
}
.position{
```

```
display: block;
font-size: 1rem;
color: #555;
}
}
```

SOCIAL ICONS

The social icons will first be positioned off the bottom of the page by -100px. Then when we hover over it, the bottom position will be set to zero and with a transition added, this will give us a nice smooth animation as it moves back up into view. The icons will be given their own hover state, setting their background to white and the icon to blue.

```
.blue .social-icons {
width: 100%;
list-style: none;
padding: 0;
margin: 0;
background: $blue;
position: absolute;
bottom: -100px;
left: 0;
transition: all 0.6s ease;
li {
display: inline-block;

a {
display: block;
padding: 8px;
font-size: 1rem;
color: #fff;
text-decoration: none;
transition: all 0.5s ease;
&:hover {
color: $blue;
background: #fff;
}
}
}
}

.team:hover .social-icons {
bottom: 0px;
}
```

THE GREEN TEAM MEMBER

To mix things up a bit, we can begin to add more members to our team. The colour we'll use for this next one will be green. But first go back into the HTML section/file and all we need to do is copy the `col-md-3` class – not the row – down to the last div tag under the social icons and paste it in. Once you have changed the blue class to green, we can finally add in all the CSS that will give us the same animation.

```
***** HTML *****/
<div class="team green">
<div class="photo">
![Libby](https://image.ibb.co/mpRLNS/mick_Ul.jpg)
</div>

***** CSS / Green border *****/
.green:hover .photo img{
box-shadow: 0 0 0 14px $green-border;
transform: scale(0.6);
}
.green .photo:before {
content: "";
width: 100%;
height: 0px;
border-radius: 50%;
background: $green;
position: absolute;
bottom: 135%;
right: 0;
left: 0;
transform: scale(3);
transition: all .3s linear 0s;
}
.green .social-icons {
width: 100%;
list-style: none;
padding: 0;
margin: 0;
background: $green;
position: absolute;
bottom: -100px;
left: 0;
transition: all 0.6s ease;
li {
display: inline-block;
a {
display: block;
padding: 8px;
font-size: 1rem;
color: #fff;
text-decoration: none;
transition: all 0.5s ease;
&:hover {
color: $green;
background: #fff;
}
}
}
}
```

And the beauty of this approach is that you can repeat as required for many different colour classes, enabling you to subtly theme your UI animations as is required. ■

CREATE POSEABLE FIGURES WITH ZBRUSH

Plus learn the secrets of hidden visual effects, the creation of a cyberpunk world and animating vehicles with iClone



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* STANDARDS

BEYOND THE BROWSER

Leon Brown on why you get more than you see when it comes to web standards

> The original aim of the world wide web was to serve as a platform for presenting content. Since its inception, it has evolved to become a platform for delivering all types of content, data and software applications. It is only logical to conclude that the web will continue to evolve as new technologies are embraced by industry and consumers.

While the web is primarily experienced inside the browser, the content you see only touches the surface of the web. Web 2.0 was a milestone in the development of web standards, which heralded user-generated content and a better ability to present it. The emerging wave of innovation for the web is based around data, enabling improved scope for functionality of internet-connected systems.

The usefulness of software systems, whether they exist on a server, in the web browser or as a native smartphone/desktop application, is dependent on the data they have access to. The type of user-generated content that formed the basis of the Web 2.0 enabled new types of software application to exist on the web

but was limited in terms of how this data could be used. The emergence of semantic web and microdata standards means data can be published in a way so software applications can understand their context.

The evolution of standards for user-generated content along with other standards based around software functionality is enabling the web to become a more intelligent, functional and convenient platform. Whether software is based on the web or merely dips into using web standards whenever required, software systems are beginning to access resources that were never previously an option.

One functionality standard that is already in popular use is OAuth, a standard for letting people use their account credentials for one web service to sign into another. This means that new users can access web service functionality without the hassle of needing to remember yet another set of login details. While the user sees this as functionality presented through the browser, the OAuth login is an event that happens between the server providing the web service and the server of the login profile service – typically Google, Facebook or Twitter.

A more serious issue of convenience is how people and organisations can be held to ransom by their data. This happens when software – web-based or native – is chosen to solve a problem but later becomes problematic or a bad deal. Users don't have much choice if they are locked into continued use of the software due to being unable to export their data for use with other systems/vendors that function better or offer a better deal. The SCORM data standard solves this problem for systems by enabling organisations to transfer their e-learning system configurations between systems that support the SCORM standard. Where there is political will, we are likely to see similar standards emerge for other types of systems.

Storage is being revolutionised by the use of web-based data, making services such as Google Drive possible. This type of feature benefits users and web application developers alike. While web application developers don't need to bear the cost of storing user data, users benefit from being able to use their data with multiple applications wherever there is support.

Finally, there is the Internet of Things, where devices make use of web-based data to control and extend functionality of devices like smarthome assistants such as Amazon's Alexa – all defined with XML and JSON formats used for web-based content. Given time, these too will become standards for defining smart-assistant functionality. ■

PROFILE
*

Developer and author of e-learning content at Nextpoint (nextpoint.co.uk), Leon makes complicated concepts easy to understand and fun to learn.



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★ GRAPHIC SHADERS

COLOUR AND LIGHT FX WITH GRAPHIC SHADERS

Richard Mattka focuses on generative colour animations and light effects in this fourth tutorial in an ongoing series

> Shaders enable a wide range of effects by working directly with the graphics hardware of devices. In previous articles, we learned what shaders are and created our first ones. We also learned about post-processing, making greyscale and sepia tones, water animation effects and blurs, all with just a few lines of code.

This tutorial will explore some very powerful generative effects that can be created with colour and intensity. They are excellent examples of how little code is required to create incredible effects using GLSL. We're just scratching the surface of what can be done but it will give you something practical you can use. My goal is to remove some of the mystery around shaders and get you inspired. I want to get you creating your own effects as soon as possible.

GENERATIVE COLOUR AND LIGHTS

Efficient, simple code loops, iterating over pixels demonstrate the power of GLSL. In previous tutorials we looked at colours and how easily gradients can be generated based on distances from a point. Beyond

linear or radial gradients, we can use a variety of functions to help us create shapes and patterns, such as modulo, fraction, floor, ceiling, min and max. These can effectively constrain the values passed through the function. For example, we will use Modulo (mod), which returns the remainder of the first value divided by the second. You can visualise this as a linear slope until it hits the limit and then it repeats. Combining shaping functions with sin, cos, tan can create easing visually and in motion.

COLOUR INTENSITY DISTANCE SHADER

In previous tutorials we produced some cool effects with images and colour. This first shader shows you how simple shaping functions and distances can create beautiful generative effects. Let's get started and make this effect.

In order to see our shader, we need to render it. As in previous articles we'll make use of a WebGL rendering tool, such as Shadertoy. It gives us a nice code window to practice in and a render window to see our work.



Above A simple red, glowing light, circular animation

To get started, open <https://www.shadertoy.com/new> in a browser that supports WebGL. You'll see a sample shader code all ready to go for you in the code window. Delete it, so we can write our own.

Type in this new code and press the black play icon at the bottom of the window. This will execute the shader code.

```
void mainImage( out vec4 fragColor, in vec2 fragCoord ) {
    vec2 uv = fragCoord.xy/iResolution.xy; //
    normalise
    vec2 p = (2. * uv - 1.); // centre
    p.x *= iResolution.x / iResolution.y; // correct
    aspect ratio
    vec3 col; // color
    float l = length(p); // distance
    float t = iTIME*.5; // adjust speed
    uv+=p/l*(sin(l - t));
    col.r = .05/length(mod(uv,1.0)-.5);
    fragColor=vec4(col/l,0.);
}
```

You should now see a series of red animating rings of light. The pattern feels organic, as it flows smoothly between states. This technique is inspired from a mathematical approach by Danguafer/Silexar (<https://www.shadertoy.com/view/XsXXDn>). It is not only simple but also elegant, essentially based on two lines of code.

So what's going on in the code? To start, we follow our usual approach of normalising, centring and adjusting for aspect ratio. First, we get the `fragCoord` value, then normalise them by dividing by the screen `iResolution`. We use a variable to hold the colour and call it `col`. We also keep track of the length of `p`, which is effectively a distance from centre. Then we calculate the relationship of the current pixel (`p`) as a percent of the overall length (`p/l`) then multiply that out by a factor using time (`t`) so we see it animate over time. ▶

★ SHADERS

WHAT ARE GRAPHIC SHADERS?



Shaders can be used to create beautiful generative effects optimised for performance

 If you missed previous articles or are new to graphic shaders, here is the quick primer.

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. We're going to focus on fragment shaders in these tutorials.

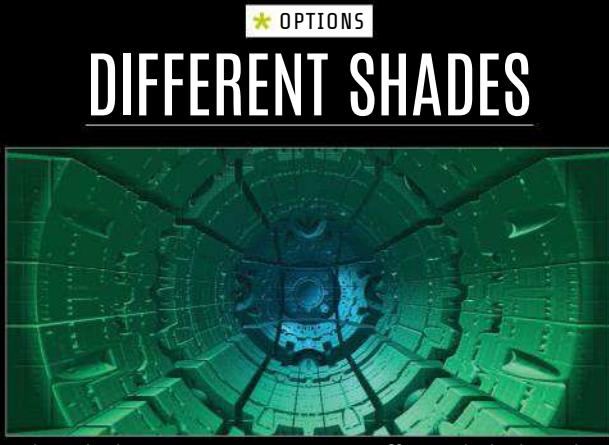
GLSL (OpenGL Shading Language) shaders compile and run on a wide range of platforms. You can apply what you learn to any environment that uses OpenGL, OpenGL ES or WebGL. This means you can use this knowledge for websites, three.js, iOS games, interactive installations, Unity, openFrameworks, Processing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

What is a fragment shader?

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.

What is a vertex shader?

Vertex shaders handle the processing of individual vertices. They take a vertex as an input and return one as an output in a 1:1 mapping. Because we won't be diving into manipulation of 2D or 3D primitives or geometry, we don't need to do anything with these to get started. Just know that it is the first step in the pipeline and for now is essentially giving us a canvas to colour.



Light and colour can interact to stunning affect with shader code

Shaping functions

Generative art with GLSL makes use of various functions to 'shape' your output. We used sin and cos (sine and cosine) in these examples along with mod (modulo). There are many other useful functions you can experiment with using the code we created. Some of these include:

```
fract(n): returns the fraction part of the number
min(0.0,n): returns the lesser of a and b
max(0.0,n): returns the greater of a and b
ceil(n): returns the nearest integer greater than or equal to the
number
floor(n): returns the nearest integer less than or equal to the
number
clamp(n,a,b): constrains the number between a and b
abs(n): returns the absolute value of number ( great for
removing signs )
```

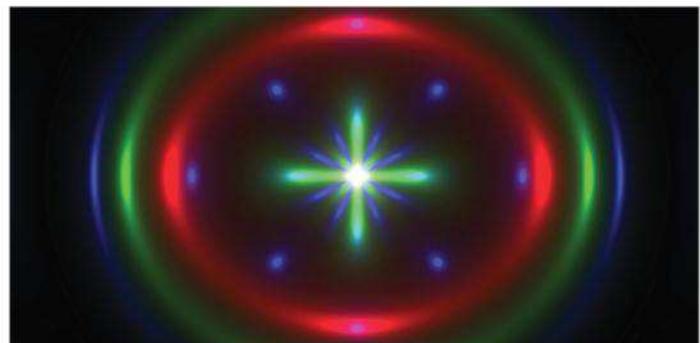
Uniforms

Each render tool will have its own little nuances, such as built-in uniforms (variables) passed to the fragment shader, for things like Time or Resolution. Shadertoy uses iTime, iResolution and iMouse, for example. These are super easy to port across other implementations such as three.js, Unity or even your own custom WebGL because most are standard and have only slight variations in name.

Normalised values

Often in shaders we work with normalised values. This means they range from 0.0 to 1.0. They can be more precise (more digits past the decimal), but they have this range. RGBA values are normalised. We also typically use screen resolution and fragment position to create normalised uv or position values. For example:

```
vec2 uv = fragCoord.xy / iResolution.xy;
```



- ▶ We are effectively using a principle of diminishing return as the distance increases. Light works in this way, as its intensity decreases over the distance from its source. This is often represented by the inverse square law in the form: `float lightness = 1.0/dist*dist`. We are using a variation of this concept in these two lines (second and third last lines) combined with the division again of `col` by `length(l)` in the last line. Effectively we have divided the colour by `l` twice or (`l*l`) where `l` is the distance.

COLOUR SEPARATION SHADER

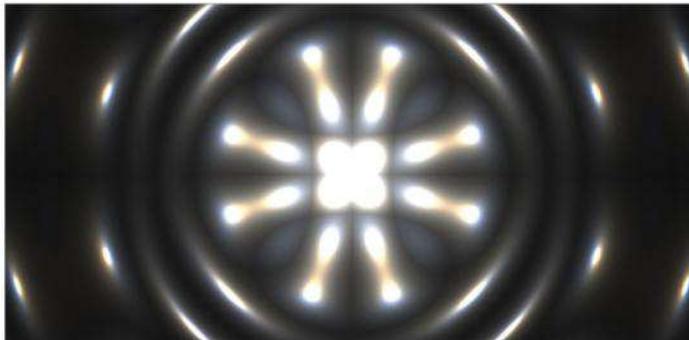
We applied the effect previously to the red "channel" of the `rgb` array using `col.r`. But, using a simple loop, we can apply the same effect to each of the colour channels, with a little separation to generate a really beautiful effect.

Give the code here a try:

```
void mainImage( out vec4 fragColor, in vec2 fragCoord ) {
    vec2 uv = fragCoord.xy/iResolution.xy; //
    normalise
    vec2 p = (2.*uv - 1.); // centre
    p.x *= iResolution.x / iResolution.y; // correct
    aspect ratio
    p*=.5;
    float d=.01; // intensity
    vec3 col; // colour
    float l = length(p);
    float t = iTime*.25; // adjust speed

    for(int i=0;i<=3;i++) {
        uv+=p/l*(sin(l - t));
        col[i]=d/length(mod(uv,1.0)-.5);
    }
    fragColor=vec4(col/l,0.);
```

You should now see a dynamic generative effect using all three colours. The colours are additive, which creates an interaction between the various lights and shapes. What is impressive is how little code is required to create an animation that can



play while constantly changing over time. The use of the `iTime` uniform enables the time to affect the animation changing continuously. Let it play for a while and you'll see how it works.

We added a variable for intensity, which you can adjust for overall light strength. We also set up a simple `for` loop to iterate over the colour channels. This created a little separation, on each iteration between the colours.

LIQUID METAL RINGS SHADER

The shader we made is colourful and dynamic and by adjusting values, you can see how easy it is to create your own variations. With a few tweaks we can desaturate this and create a more intentional pattern, like these metallic rings.

Try this new code out:

```
void mainImage( out vec4 fragColor, in vec2 fragCoord ) {
    vec2 uv = fragCoord.xy/iResolution.xy; // normalise
    vec2 p = (2. * uv - 1.); // centre
    p.x *= iResolution.x / iResolution.y; // correct aspect ratio
    p*=.2;
    float d=.01; // intensity
    vec3 col; // colour
    float l = length(p);
    float t = iTime*.25; // adjust speed
    for(int i=0;i<3;i++) {
        t+=.03;
        uv = p;
        l=length(p);
        uv+=p/l*(sin(t)-1.)*(sin(l*20.));
        col[i]=d/length(abs(mod(uv,1.0)-.5));
    }
    fragColor=vec4(col/l,0.);
}
```

You should see smooth, shaded rings, reflecting light to give the illusion of a metallic surface.

We updated our additive `uv` function to this: `p/l*(sin(t)-1.)*(sin(l*20.))`. This is a reworking of the

function to now use two `sin` functions and the `[20]` to intensify the effect of distance (`l`).

We can improve this further. By applying better colour separation and some lighting distances we can really make this animation stand out.

Here's how the new code looks:

```
void mainImage( out vec4 fragColor, in vec2 fragCoord ) {
    vec2 uv = fragCoord.xy/iResolution.xy; // normalise
    vec2 p = (2. * uv - 1.); // centre
    p.x *= iResolution.x / iResolution.y; // correct aspect ratio
    p*=.5; // distance
    vec3 col; // colour
    float speed = .1; // adjust glow speed
    float t = iTime*.3; // adjust z depth using t
    t+= 5000.; // offset
    float l=length(p)*t*.0015; // distance between rings
    uv+=p/l*((t*.001)+2.)*(tan(l*2.-t*speed));
    for(int i=0;i<3;i++) {
        col[i]=.2/length((mod(uv,1.5)-.5)); // ring pattern
        col[i]-=(.9 * float (i) * sin(t)); // shift color
    }
    fragColor=vec4(col/l,t);
}
```

Far left Colour separation and more dynamics in this mesmerising generative animation

Middle A metallic looking animation, desaturated and shaded

Above right A stabilised, colourised pattern of metallic rings

Now we have something that looks pretty cool. It has a realistic metallic smooth look, with lighting and an interesting pattern between the rings.

We set up another speed variable, which we can adjust easier outside the loop and added an offset to start it further ahead in time. We moved `uv` and distance calculations outside the loop in order to stabilise the shape, which means that only the colours and lighting fluctuate.

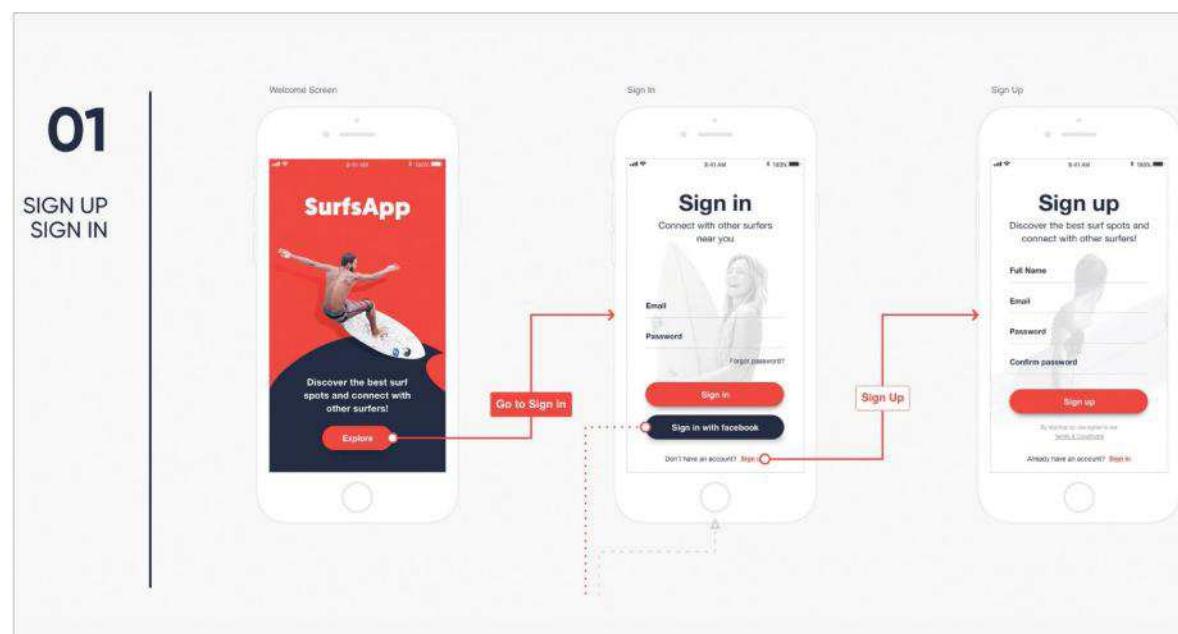
This could make a nice landing page concept or piece of standalone generative art. Set some music with it and it could work as an introduction to a project. So have fun experimenting with this one. **n**



ABOUT THE AUTHOR

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* OVERFLOW

CREATE PLAYABLE USER FLOWS WITH OVERFLOW

Daniel Schwarz introduces us to new user flow diagramming tool Overflow, built by the makers of Proto.io

> With so many new roles becoming the norm in today's design industry, an all-in-one screen design tool doesn't make sense for every designer. Product designers don't always execute high-fidelity prototypes themselves and those more focused on visual design don't necessarily prototype interactions either.

In this day and age, the various steps in the average design workflow are often shared between a team of designers. The consequence of that is a number of different tools designed to help create different deliverables.

Overflow (<https://overflow.io/>) helps macOS-based screen designers demonstrate and experiment with user flows by creating detailed diagrams that tell stories. Along with the ability to mock up alternative user flows and ways to 'go back' to previous screens, Overflow makes it overwhelmingly easy to describe what each step in the user flow aims to accomplish,

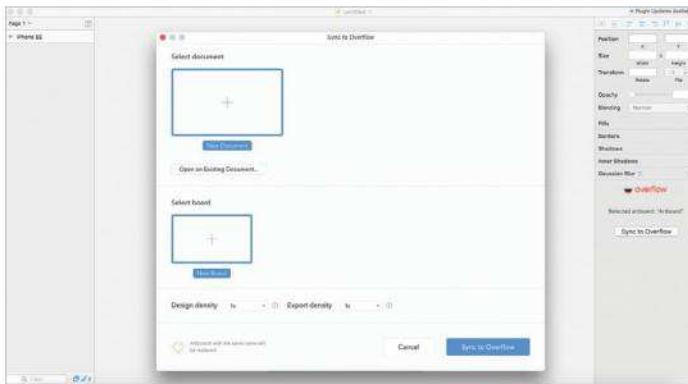
helping screen designers to discover stumbling blocks and areas of high friction quicker, as well as offering a simple way to show off interactive user flows in the cloud to stakeholders.

With Sketch, the only way to create detailed user-flow diagrams is to wrap all of the artboards in another artboard; even then there aren't any specific tools to create visually appealing user-flow diagrams. Overflow is a seamless extension of Sketch (other integrations are coming soon), meaning that the two will work harmoniously in sync and those wishing to try Overflow won't be sighing at the thought of learning yet another new design application.

Let's take a look at how it works.

IMPORT SCREENS FROM SKETCH

In possibly one of the easiest Sketch exporting workflows ever, select the artboards that you'd like



Above Export screens to Overflow with the Sync to Overflow button

to export to Overflow, then click the very accessible Sync to Overflow button on the right-hand side of the Sketch interface. A modal will appear that requires us to specify the document and board we'd like our designs to be exported to, as well as the density of the design (@1x, @2x, @3x and so on) and the density of the export.

Boards are like Sketch 'Pages' but for Overflow and they're useful for separating variations of the design (or different user flows altogether). This means that artboards can be exported multiple times to suit different scenarios, although beware that any artboards with the same name in the same board will be overwritten.

It's worth remembering that if the design changes in Sketch, it'll update in Overflow too, so there's some impressive activity behind the scenes that keeps the design in sync, making it easy to switch between Sketch and Overflow at will.

“Overflow makes it easy to describe what each step in the user flow aims to accomplish”

QUICK INTRODUCTION TO THE OVERFLOW CANVAS

In Overflow, the first thing you'll notice is the absence of a layer list. You'll see a Boards and Themes panel instead. This is where we'll add more boards and under the Themes tab is where we can switch to a dark diagramming theme.

Operations such as Arrange, Hide and Lock appear in the top-right corner when an object is selected, and the zoom buttons appear in the bottom-middle region of the canvas. We'll explore the rest of the interface as we go.



Above Show off impressive user-flow diagrams using device frames

*** SPEED UP THE WORKFLOW**

KEYBOARD SHORTCUTS

+ All modern-day design tools have keyboard shortcuts to help speed up our workflow. Overflow is no exception to that.

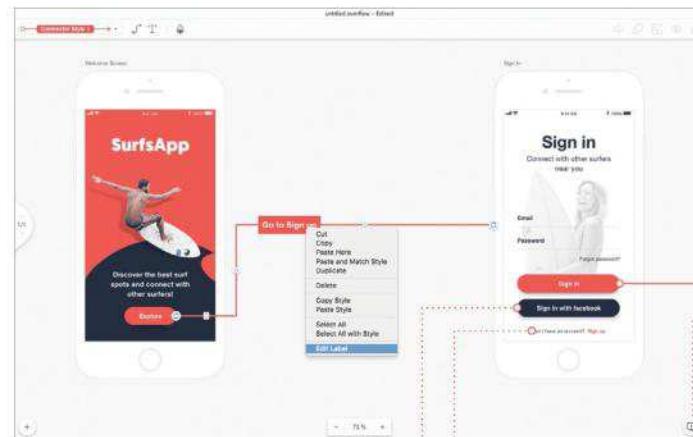
Here's a list of the shortcuts available:

- File**
 - New (⌘N)
 - Open (⌘O)
 - Close (⌘W)
 - Save (⌘S)
 - Save As (⇧⌘S)
 - Rename (⌘R)
- Edit**
 - Undo (⌘Z)
 - Redo (⇧⌘Z)
 - Cut (⌘X)
 - Copy (⌘C)
 - Duplicate (⌘D)
 - Paste (⌘V)
 - Delete Selection (⌫)
 - Select All (⌘A)
 - Select Screens (⌘O)
 - Select Connectors (⌘C)
 - Select Images (⌘I)
- Insert**
 - Rectangle (R)
 - Oval (O)
 - Diamond (D)
 - Text (T)
 - Image (I)
 - New Board (⇧⌘B)
- View**
 - Zoom In (⌘+)
 - Zoom Out (⌘-)
 - Actual size (⌘0)
 - Fit Canvas (⌘1)
 - Selection (⌘2)
 - Show Grid (⌘G)
 - Show Navigator Map (N)
 - Show Interface (⌘.)
- Presentation & Share**
 - Present (⌘←)
 - Share Presentation (⌘S)

No keyboard shortcuts currently exist for Arrange tools.



Above Customise every detail, including the screen border and label



Above Style connectors and connector labels to your liking

BEST PRACTICES FOR CREATING USER FLOWS

+ First and foremost, keep things simple. While Overflow enables us to tidy our screens and connectors, the core aim of user-flow diagramming is to carefully explain the users' journey as they explore our app or website. This is undoubtedly harder to do when the diagram is poorly communicated.

As mentioned earlier, consider creating a legend and three to four different connector styles that depict the different ways a user might flow from one screen to the next. We could use different connector types for alternative user flows, steps backward and even micro-interactions that occur on the same screen (for example, an interaction area that results in an action).

Create extra boards ($\text{Shift} + \text{B}$) to isolate specific user flows that might require further explanation or even alternative approaches that might be somewhat or drastically different from the original concept. Another interesting use of boards is to export different versions of the design, compare iterations and track overall improvement of the design.

Make use of Present mode (especially when viewing the screens in isolation) to view the prototype in the eyes of the user. Ask yourself: are there steps in the user flow that can be eliminated to reduce friction? Are there any interaction areas that might be too small or somewhat obscure? Are there any ways that we can improve the user experience overall?

EXPERT TIP

CHANGE THE STYLE OF DEVICE MOCKUPS

In addition to the 'dark theme' mentioned earlier, we can also change how our user-flow diagrams look right down to the very last detail. If we wanted, we could impress stakeholders with a branded deliverable, starting with the background. To change the background, right-click on the canvas and choose Background Colour. As with Sketch, all colours can be added to the swatch so that they're fairly easy to reuse later.

Once we select a screen (or an object within a screen), we'll be able to change how that screen is mocked up using the tools in the top-left corner (these tools replace what would be the Inspector in Sketch). Some of the device settings include:

- Device frame
- Device orientation
- Device skin (on/off)
- Device colour
- Device border
- Mask content to device (ie cut off any below-the-fold content)

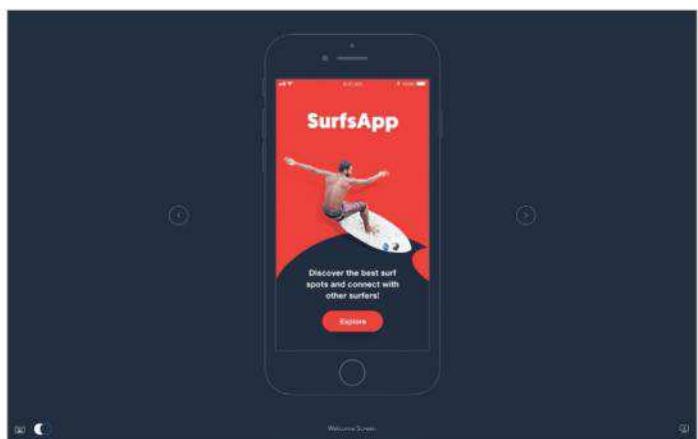
We can also change the visual style of the screens' label – and, if device skins are turned off, the border style of the screen – using the Basic Screen Properties and Text Label Properties respectively. To maintain consistency, select the Screen Styles dropdown and save these settings for later reuse.

DIAGRAMMING AND DEMONSTRATING USER FLOWS

Next, we'll need to demonstrate the user flow and how the different screens might link up. If you've used Adobe XD before or Sketch's recently added prototyping features, then you're in luck – this step will feel familiar.



Above Create a legend to help describe what each connector style means



Above Press return to view the screens without diagram elements

Start by hovering over an interaction area and dragging one of the four pink handles until it snaps to another screen, effectively creating a user flow (we can drop these connectors on any side of the screen, wherever feels most natural).

Right-click on the connector and select Edit Label to add a label describing the objective of the user flow/link between the two screens, for example “Go to sign up”. You’ll also notice that the connector itself has some draggable handles – these are to help rearrange the connectors once the user flow diagram becomes more convoluted and they start to overlap.

As you can see, we have complete control of how the diagram looks.

DESIGNING CONNECTOR STYLES

As with the device mockups, these connectors can be styled as well. This is especially useful when combined with a legend used to describe what each connector means, for example “Alternative user flow” or “Way back”. Be aware that we’ll need to create these legends manually in either Sketch or Overflow though.

Aside from all the standard styling options that you’d typically expect from a design tool, other options specifically tailored to the visual style of connectors include:

- **Leading (for labels)**
- **Padding (for labels)**
- **Radius (for labels)**
- **Start point (for lines)**
- **End point (for lines)**
- **Line style (for lines)**

Connector styles, like screen styles, can be saved and reused by clicking the drop-down box and selecting + New Style.

“We can change how our user-flow diagrams look right down to the very last detail”

PRESENTING DIAGRAMS AND OVERFLOW CLOUD WITH OTHERS

While we can hit the preview button/icon in the bottom-right corner to enter the Present mode, the real magic happens when we share this with our team and stakeholders because they’ll receive the same experience that we do, only in the browser. Present mode truly is an excellent no-frills feature designed to help teammates, stakeholders and even ourselves to gain a holistic overview of exactly how easy it is to use the product.

To get the presentation underway, navigate to Share>Share Presentation (or use the keyboard shortcut, S) to grab the share shortlink. If you are dealing with something sensitive, you can also specify Password Settings if extra privacy is needed.

While looking at what is now essentially a low-budget prototype, use the left, right, up, and down arrows to navigate between the screens or click the interaction areas to navigate in the same way as a real user would. Hold to highlight the interaction areas when needed. Press to view the screens in isolation (without the user-flow diagram elements), rather than all at once. This view is more synonymous with the way traditional prototyping tools display screens and is better for usability testing. Holding Shift to highlight the interaction areas will work in isolation mode as well and, naturally, elements not displayed in a device frame will be excluded from this mode. ■

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Suzy Bean

* EXPERT TIP

CLOUD TECH TIP...

If you're going to fully utilise cloud technology, before deciding on a service provider ask whether monitoring comes as standard and whether management is included in the price. A fully managed cloud can make your business fly; an underutilised cloud will be a waste of money.



Netcetera provides hosting from one of the most energy-efficient datacentres in Europe, all powered by green energy. It offers everything from reliable low-cost hosting for a single site right through to complex cloud racks and managed IT solutions. One of its most popular products is its Managed Cloud, designed to help SMBs get the most from their website, on their own cloud server. Server monitoring comes as standard for Netcetera's Cloud and Dedicated server clients – something it believes should be included in the price of the hosting it provides.

Offering reliable website hosting, dedicated servers, colocation and cloud solutions, Netcetera has a large portfolio of green, zero-carbon solutions for businesses of all sizes. Customers can choose from its fully managed cloud servers, Linux and Windows for SMBs and a fully managed cloud solution for WordPress websites, to help them fully utilise cloud technology without any hassle. And with server monitoring as standard and a full migration service available, Netcetera has made the switch to better hosting really easy.

CONTACT

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WHAT NETCETERA OFFERS

- **Managed hosting:** a full range of solutions for a cost-effective, reliable, secure host
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- **Cloud hosting:** Linux, Windows, hybrid and private cloud solutions with support and scalability features
- **Data centre co-location:** from quad-core up to smart servers with quick set up, and all fully customisable

1&1 INTERNET

1&1 Internet is a leading hosting provider that enables businesses, developers and IT professionals to succeed online. With a comprehensive range of high-performance and affordable internet products, 1&1 offers everything from simple domain registration to advanced ecommerce packages.

0333 336 5509

WWW.1AND1.CO.UK



The screenshot shows a secure connection with SSL included. It features a blue background with a yellow sidebar containing security details like 'SSL Certificate included' and 'Certified data centres'. A prominent 'SSL INCLUDED' badge is visible. Below the sidebar, there's a search bar and a 'Check' button.

TIDYHOSTS

Tidyhosts boasts a feature-rich selection of services from shared web hosting, WordPress hosting, hosted exchange, virtual servers and streaming. Tidyhosts' passion and drive has gained it a highly reliable and trusted reputation from its customers, making it the number one choice for hosting services.

0560 367 4610

WWW.TIDYHOSTS.COM



The screenshot displays the 'HOSTED EXCHANGE' section of the tidyhosts website. It highlights features such as 'Up to 10 OFF', 'Up to 1000 users', and '24x7 Support'. It also mentions 'Cloud Business Email' and 'Hosted Exchange' with a price of £2.79 per user per month. A 'GET STARTED NOW!' button is visible.

HEART INTERNET

As one of the UK's leading web hosting authorities, Heart Internet focuses on designers, developers and technically adept businesses. It builds on its four tenets – speed, reliability, support and security – to create award-winning solutions for over 500,000 customers.

+44 (0) 330 660 0255

WWW.HEARTINTERNET.UK



The screenshot shows the main homepage of Heart Internet. It features a search bar at the top, followed by a navigation menu with links to 'Domain Names', 'Web Hosting', 'Reseller Hosting', 'Servers', 'Marketing Tools', and 'More'. Below the menu, there's a large image of a person working on a computer, with the text 'Your websites deserve great web hosting' overlaid.

THENAMES

TheNames.co.uk offers great value cPanel web hosting, SSL certificates, business email, WordPress hosting, Cloud, VPS and dedicated servers. Part of a hosting brand that started in 1999, it is well established, UK-based, independent and its mission is simple: ensure your web presence "just works".

0370 321 2027

WWW.THENAMES.CO.UK



The screenshot shows the homepage of TheNames. It features a header with the 'TheNames' logo and a navigation menu. Below the header, there's a section titled 'Get your Domain Name' with the subtext 'Create your Online Identity in Moments'. A search bar for 'YourWebsite.co.uk' and a green 'GO' button are also present.

CATALYST2

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0800 107 7979

SALES@CATALYST2.COM



The screenshot shows the homepage of catalyst2. It features a header with the 'catalyst2' logo and a navigation menu. Below the header, there's a promotional message: 'We will provide a service that is worry free giving you complete peace of mind' with a 'GET IN TOUCH!' button. A laptop icon with three 'Z' symbols on its screen is also shown.

ADVERTISE HERE!

Would you like to promote your hosting business and services to our audience of professional web designers and developers? If so, please call or email Chris as below.

REASONS TO ADVERTISE

- **Reach professionals:** 75% of readers are working in or seeking work in the web industry
- **Variety of projects:** future projects include mobile apps, web apps and CMS-driven sites
- **Home workers:** 51% have a personal website under development

CONTACT

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* ACCESSIBILITY

ACCESSIBILITY IS NOT AN AFTERTHOUGHT

James Hall tells us why accessibility should be considered at every step along the design and development journey

Due to the number of constraints to consider when building a website, many developers and designers neglect user accessibility. But by ignoring user compatibility or just adding it as an afterthought, you are robbing your client by not giving them a full service. People using screen readers, speech navigation, keyboard navigation, one-handed keyboards or those with a learning disability (which affects web navigation), make up 20% of internet customers – are there any business owners that would be happy about losing 20% of the market for no valid reason?

So it's important to think about accessibility from the off, getting your design and wireframe accessibility checked before anything else. This can be done alone; however seeking expert advice ensures you are doing things right the first time. HeX Productions is now partnered with Shaw Trust Accessibility Services, a full-suite web accessibility testing centre that signs off everything we do. It employs several testers who all have accessibility challenges. This is an incredibly valuable part of the process as it happens before any development has

taken place – wireframes can be changed a lot easier than a half-finished development project.

Getting the wireframes tested is the first step, checking for flow, usability and a logical customer journey. It's important to stick to the plans that are signed off during the initial build. Once you've undertaken the initial build, you get this tested to ensure people with accessibility issues can navigate and use the site.

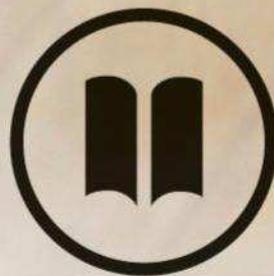
After testing and auditing the initial build, you can add all the content and images to the site. Don't forget that content has its own accessibility rules. And once your content is there, test again.

Bringing a website to fruition while ensuring accessibility is accounted for is an accomplishment – but it's not a finished job. It's all about going to workshops and meetups to ensure you stay on top of accessible web design and don't get left behind when it comes to meeting the standards. Accessibility standards do change, so training and scheduling a monthly audit will benefit you in the long run. And if in doubt, take it back to the testing stage and make sure that it works for real-life accessibility testers. ■

PROFILE * James Hall is creative director of HeX Productions (www.horlix.com), which is working on becoming an accessibility accredited web agency – advocating change in the industry.

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