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v_0.1

internet health report

Welcome to Mozilla's new open source initiative to document and explain what's happening to the health of the Internet.

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moz://a V_0.1

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How do we measure Internet health?

Welcome to Mozilla's new open source initiative to document and explain what's happening to the health of the Internet. Combining research from multiple sources, we collect data on five key topics and offer a brief overview of each.

The Internet is an ecosystem. A living entity that billions of people depend on for knowledge, livelihood, self-expression, love.... The health of this system relies on – and influences – everyone it touches. Signs of poor health in any part impacts the whole. We're all connected.

How healthy is our Internet? How might we understand and diagnose it? We believe this is a timely and necessary conversation, and we hope you'll join in.

Our individual actions shape the health of the Internet ecosystem. Only by recognizing where the system is healthy can we take positive steps to make it stronger. Only by understanding where it's at risk can we avoid actions that weaken it.

This prototype – a snapshot of a moment in time in the life of the Internet – identifies five health markers that we believe are worth paying attention to and offers an initial prognosis for each.

What's next? We invite you as a part of this ecosystem to offer your feedback on our approach. How might the format be improved? Are we asking the right questions? Who is missing from this conversation?

Together, we'll strengthen this living document into an annual report on Internet health. In the months ahead, we'll facilitate a gathering of community to collaborate on ideas, research, and ways to measure. This will influence version 1.0 of the report, to be released in late 2017.

We hope that it will inspire worldwide action toward an internet that grows healthier as it grows.

Solana Larsen is the editor of this report. You can email her directly (internethealth@mozillafoundation.org) with your thoughts and suggestions.

Roadmap

January:	Release v0.1 of Internet Health Report (prototype)
February to March:	Gather feedback on prototype and ideas for v1.0; Summarize feedback and other resources in new blog
April to June:	Decide on metrics to revisit every year as a minimum Collaborate with partners to identify research questions
July to September:	Collaboratively shape next version of the report with key allies
October to December:	Launch v1.0 of Internet Health Report

About Mozilla

Mozilla's mission is to ensure the Internet is a global public resource, open and accessible to all. We're a global community of technologists, thinkers and builders working together to keep the Internet alive and accessible, so people worldwide can be informed contributors and creators of the Web.

Credits: This report (v0.1) was created with input from across Mozilla and feedback from friends. It was translated by Global Voices and Mozilla's L10n translators. Nice & Serious designed and built the website. Data was compiled by A Bit of Data.

See full credits here.

Calling all citizens of the Internet

A letter from the Mozilla Foundation's executive director, Mark Surman, on the fight for a healthier Internet.

When I first fell in love with the Internet in the mid-1990s, it was very much a commons that belonged to everyone: a place where anyone online could publish or make anything. They could do so without asking permission from a publisher, a banker or a government. It was a revelation. And it made me — and countless millions of others — very happy.

Since then, the Internet has only grown as a platform for our collective creativity, invention and self expression. There will be five billion of us on the Internet by 2020. And vast swaths of it will remain as open and decentralized as they were in the early days. At least, that's my hope.

Yet when Facebook's Mark Zuckerberg shows up on the cover of The Economist depicted as a Roman emperor, I wonder: is the Internet being divided up into a few great empires monopolizing everyday activities like search, talking to friends or shopping? Can it remain truly open and decentralized?

Facebook's Mark Zuckerberg as a Roman emperor on the cover of The Economist
(April 9-15, 2016)

Similarly, when I read about hackers turning millions of home webcams and video recorders into a botnet army, I wonder whether this precious public resource can remain safe, secure and dependable? Can it survive?

These questions are even more critical now that we move into an age where the Internet starts to wrap around us, quite literally.

Think about it: we are increasingly surrounded by connected devices meant to 'help' with every aspect of our lives — eating, walking, driving, growing food, finding a parking spot, having sex, building a widget, having a baby (or not), running a city. This so-called Internet of Things will include 20.8 billion devices by 2020, all collecting and collating data constantly.

The Internet of Things, autonomous systems, artificial intelligence: these innovations will no doubt bring good to our lives and society. However, they will also create a world where we we no longer simply 'use a computer,' we live inside it.

This changes the stakes. The Internet is now our environment. How it works — and whether it's healthy — has a direct impact on our happiness, our privacy, our pocketbooks, our economies and democracies.

This is why I wake up every day thinking about the health of the Internet. It's also why I'm so focused on getting more people to think of it as an issue that affects all of us.

Environmentalists in the 1960s faced the same problem. Few people knew that the health of the planet was at risk. They built a global movement that helped the public understand nerdy topics like the ozone layer and renewable energy, eventually changing laws and sparking a swath of industries committed to green business. They made the environment a mainstream issue.

We need a similar movement for the health of the Internet. We need to help people understand what's at risk and what they can do.

We have started work on The Internet Health Report at Mozilla for exactly this reason. It is an open source project to document and explain what's happening to this valuable public resource. We're hoping that you will share, critique and hack what we've started to make it better.

The good news is we can impact the health of the Internet. It's designed that way. We can build new parts and teach people to get the most out of what's there. We can point out what's wrong and make it better. If we do this kind of work together, I believe we can expand and fuel the movement to keep the Internet much healthier for the future.

How open is it?

“Open” means that anyone can publish or invent online without asking for permission, and that the technologies used to run the Web are transparent and understandable.

Overview

So much of the goodness that flows from the Internet is thanks to the fact that it is an open system: free for anyone anywhere to learn and build on.

The technical building blocks that help make this possible – core Web standards like HTML or JavaScript – are like Legos for humanity – anyone can pick them up and make something. It’s easy to forget that in previous communication eras you would have needed a costly printing press or an official broadcast license. Platforms like Wikipedia, Facebook or WordPress would never have gotten off the ground.

The big question now is: will the openness of the Internet last or wither? Policy threats in areas like copyright are multiplying. And new technologies, like machine learning or the Internet of Things, are not based on the same model of open standards as the World Wide Web.

So many great inventions keep coming out of garages, basements and dorm rooms — new social media platforms, music, memes, and political movements that make history – but there is a risk that the openness we have grown accustomed to could diminish over time.

Healthy

It’s healthy that anyone can create a website, and that all sites are treated equally by the Internet. Over 1.1 billion websites now exist and more appear by the second.

Creative practices of sharing, remixing and forwarding content online are growing. The open copyright licensing organization Creative Commons estimates there are now 1 billion CC-licensed works online that encourage reuse including texts, photos, and music.

Open ideals of the Internet are making inroads in new places: from managing organizations to creating movements and running governments. More and more public information about budgets and statistics is being shared online in open formats, even in countries where free speech is limited. And many local and national governments – including in India, the United Kingdom and United States – now have open source software policies to cut costs and make reuse of software between departments easier.

Open source software forms a major part of the building blocks of the Web (software like Linux and Apache runs on most of the world’s Internet servers) as well as a core part of the technology strategies of major corporations like Google, Facebook and Amazon.

Unhealthy

Policywise, the Internet is constantly dodging bullets, both in individual countries and internationally. In Europe this year, the Web is at mercy of lawmakers who will consider whether linking to news articles without permission should be a copyright infringement.

Some copyright laws are merely outdated for today’s digital life. Others are created in direct contrast to open ideals. Intellectual property frameworks negotiated behind closed doors as part of international trade agreements, like The Transatlantic Trade and Investment Partnership (TTIP) may have detrimental effects on openness, privacy and data standards worldwide.

In their battle against online piracy, major publishers and rightsholders of movies, books and music in Europe and the United States use Digital Rights Management (DRM) software to limit people’s abilities to copy or alter copyrighted material in Web browsers. Regrettably, DRM is a closed system that could have security vulnerabilities, and it can restrict your freedom to make lawful use of the content you purchase, for instance by viewing on the device of your choice.

Are you an innovator? Beware of “patent trolls”. These are companies that sue legitimate businesses for outrageous sums based on dubious patents. Especially in the US, Europe and Russia they strike fear in technology and software makers. By ending patent wars, and seeking reform, we could help more innovations prosper rather than hinder their development.

How open is it?

Prognosis

Open innovation on the Internet is threatened by bad policies, the devaluation of common standards, and the fragmentation of the global Internet.

Billions of new devices are connecting to the Internet in homes, cities, public and private spaces, but proprietary software is usually prioritized over open standards and interoperability, leading to fragmentation, higher development costs and security risks for the Internet of Things.

We need to push for open source practices, transparency and standards for all new Internet technologies, including virtual reality, artificial intelligence and machine learning (including training data) – not least to ensure that they also function properly on the Web.

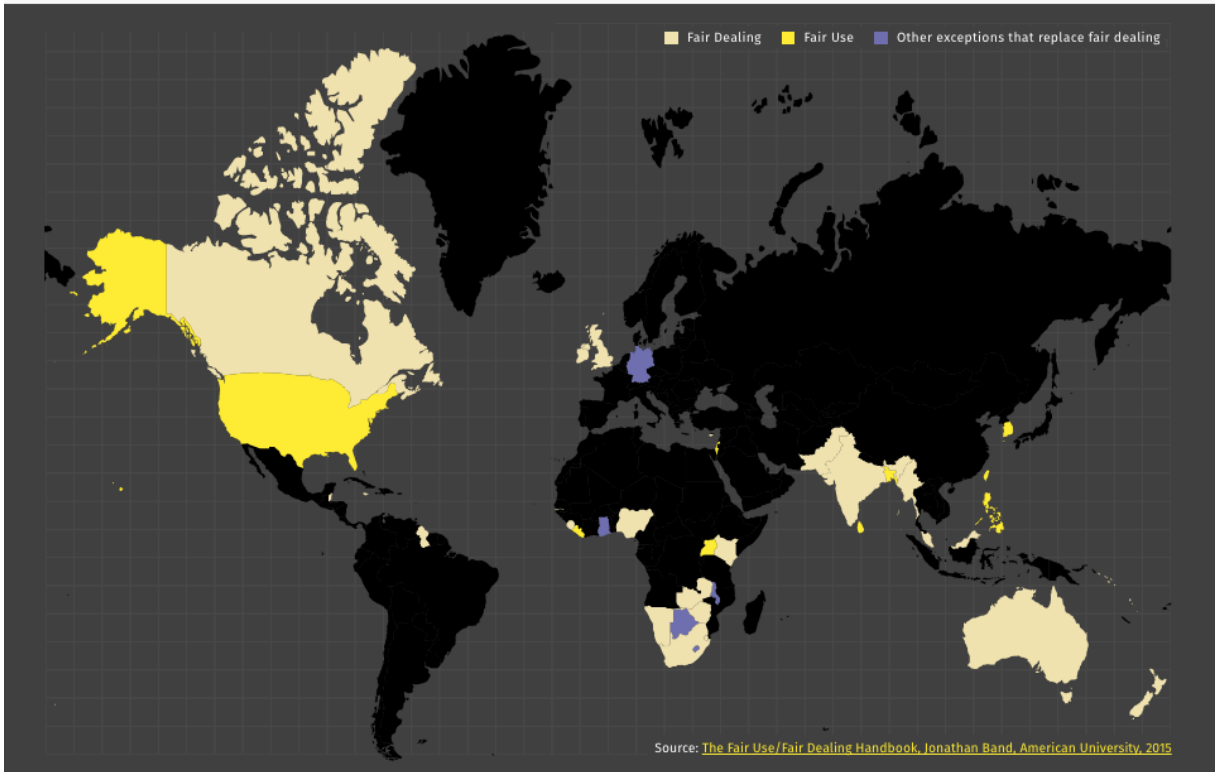
We need more people, governments and companies to build openness into their thinking and practice, or we will gradually see it erode. And we need more people to acknowledge, that: 'Yes, openness is to thank for all the major achievements we ascribe to the Internet today.'

Data visuals

Sharing for good cause

Two-thirds of the world have no "fair use" or "fair dealing" copyright provisions.

Intellectual property laws stifle creativity and innovation if they are too restrictive about sharing and remixing – particularly for educational and non-profit use, which would be permitted under "fair use". **We need to reform laws** that are outdated, and support the growth of licensing alternatives like the **Creative Commons**.

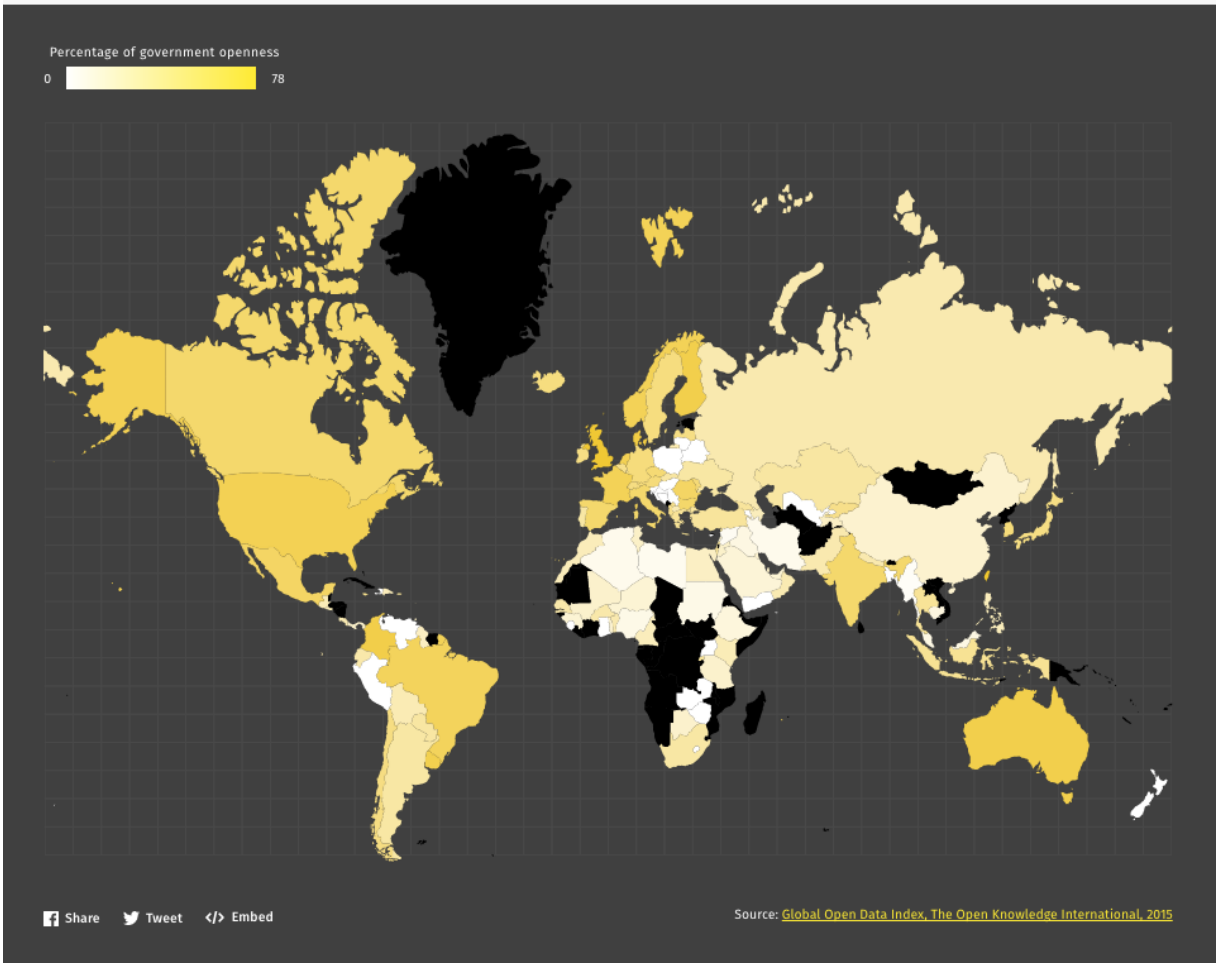


How open is it?

Transparency through freedom of information

More governments are making data publicly available on the Internet every year.

Budgets, election results and census data can offer valuable insights to citizens, policy-makers and journalists. How data is released, can be just as important as what data is released. Once people have the **right to know**, more good innovations follow.



Who is welcome online?

Everyone deserves equal opportunity to access the Internet, and to use it to improve their lives and societies.

Overview

The strength of the open Internet is the ability of its users to shape the Web itself and thereby shape society. Like society, the Internet grows stronger with every new voice.

But there are many barriers that prevent the full diversity of the world from being reflected online. More than half of the world is still without Internet, and even people who do have access may be limited by factors like high cost, unreliable connections or censorship.

Language is also barrier, since Web content is predominantly in English, even though people who don't speak English outnumber those who do.

There are other ways technology is skewed to reflect the unconscious biases of their creators thanks to years of inattention to diversity. Take for instance, how algorithms can perpetuate racial stereotypes in targeted advertising, or how languages like Hindi, Urdu, and Bangla are difficult to type on a standard computer keyboard.

Healthy

Today, over three billion people are online. There are now more Internet users in emerging economies than in developed economies, which is a big step towards increasing the diversity of voices online. That's worth celebrating. Mobile phones have put the Internet within reach of more young people, women and rural areas than ever before. Universal Internet access in Least Developed Countries by 2020 is one of the United Nation's new Sustainable Development Goals. Countless policies need to change to get billions of people online in four years, but the fact that Internet access now registers broadly as crucial to development, or as a human right in some contexts, is progress.

The free, crowdsourced online encyclopedia Wikipedia continues to be a free, fountain of knowledge to the tune of 16 billion pageviews a month in 284 languages.

Dynamic technology and innovation hubs communities in developing countries are expanding to develop online services and businesses that meet local needs.

Unhealthy

Despite great progress in Internet adoption worldwide, access is not equally distributed. People living in wealthier countries have far greater access, and it is well documented that Internet adoption is slower for women than men almost everywhere in the world. Lack of skills and awareness of why the Internet is valuable is one of the principle reasons people don't get online.

At worst, the Internet can reinforce and exacerbate existing inequities, divisions and discriminatory practices—and may even introduce new threats. Online harassment is a growing plague. Women in particular are targets across a range of platforms, as are minorities everywhere. This inevitably leads to mistrust and retreat from the Web – which in turn depletes diversity online and harms the health of the Internet overall.

Several governments are trigger-happy about temporarily switching off all or parts of the Internet with reasoning ranging from national security, to cheating on school exams, but ultimately threatening human rights and causing significant economic losses. In 2016, there were 51 intentional Internet shutdowns in 18 countries, according to AccessNow.

Prognosis

The obstacles in the way of making the Internet accessible and welcoming for all are numerous, and won't be overcome by waiting. It will take sustained action. As more people come online, we need corporations, governments and civil society to work together to develop better broadband policies, and new business models for equitable access.

We also need new practices and incentives for local content creation and visibility, and ways in which users them-

Who is welcome online?

selves can play a stronger role in contributing to the Web, in whatever language, format or medium that is most locally relevant.

And in response to the trolls, mobs and haters who undermine respectful civil discourse online, we need a combination of community action and technological solutions. Hatred, racism and bigotry can stomped out online at least as well as offline, maybe better.

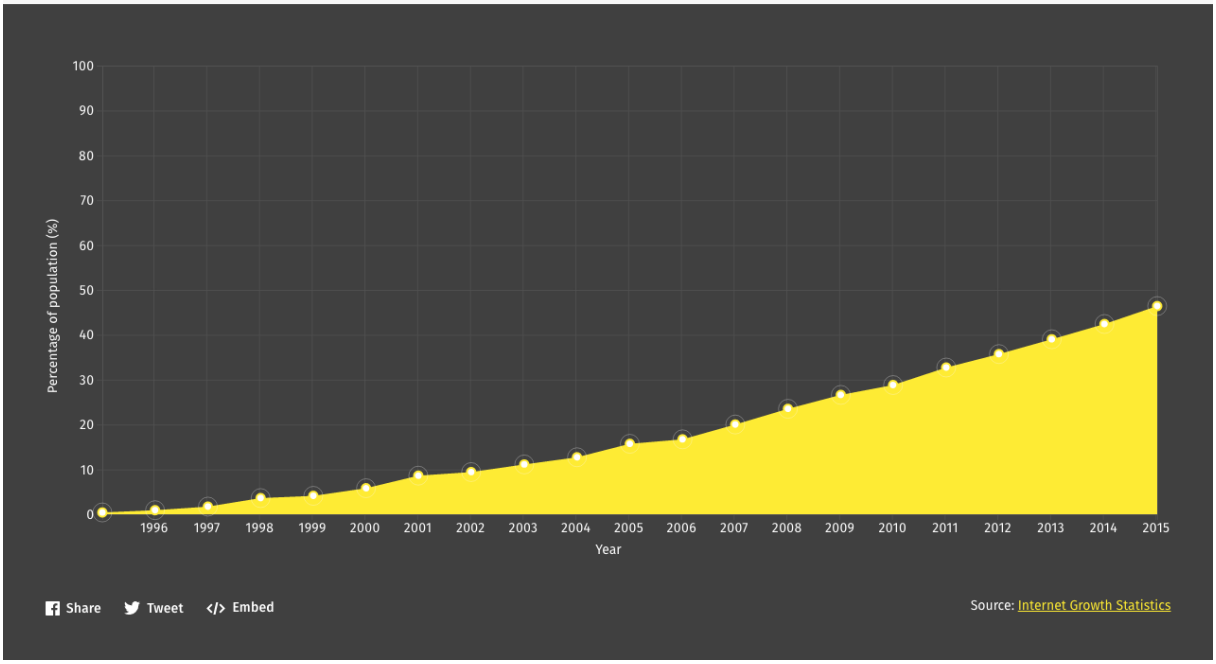
The goal of digital inclusion presupposes that being connected is positive. We all bear responsibility for ensuring this is true for everyone.

Data visuals

Number of people online

More than 50% of the world is still offline.

3.3 billion people are online. That's a lot, but we need more policies to bring rich and poor online affordably and in meaningful ways. People who **only have mobile Web access**, can't as easily do things like write essays, apply for jobs, or other things that can **influence economic growth**.

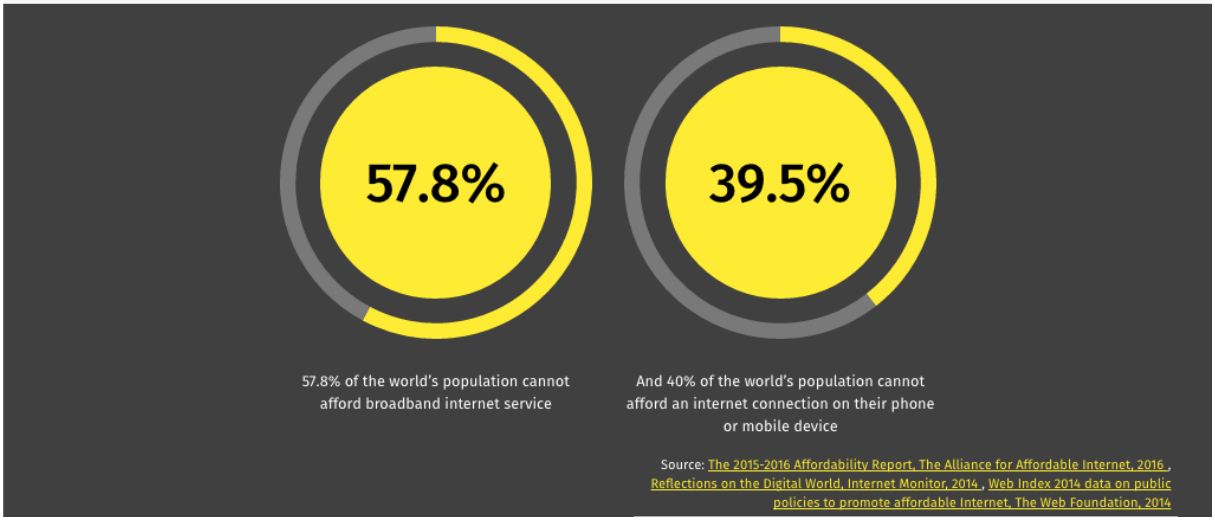


Who is welcome online?

Number of people who can afford to go online

58% of people in the world can't afford an Internet connection.

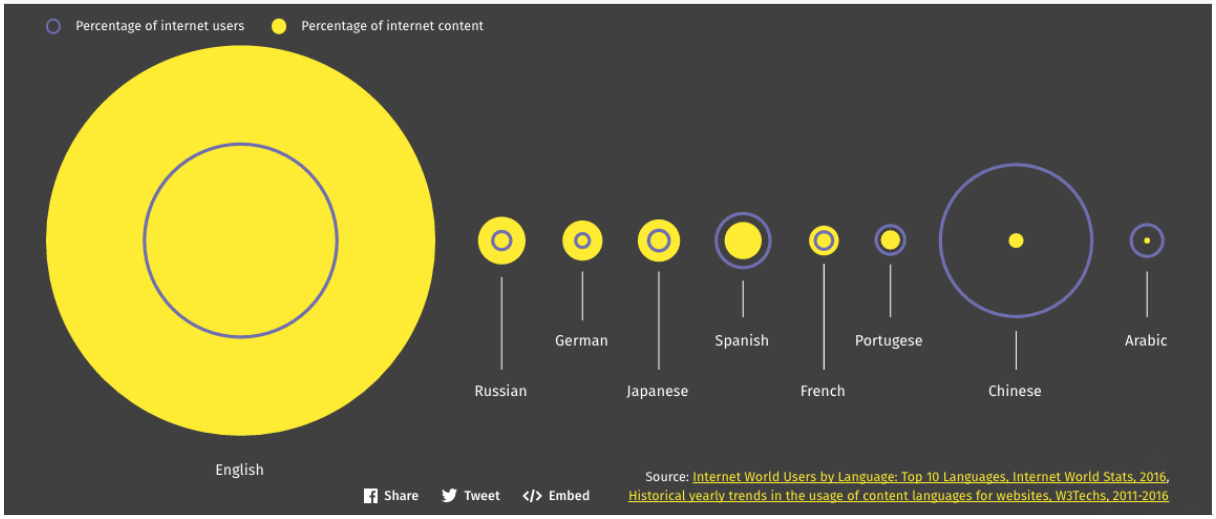
"Affordable" is widely agreed to be less than 5% of GDP per capita for entry level broadband services, but even that is a steep price for the slow and unreliable Internet in many countries. Also, the lowest percentages of women online are in countries **where mobile Internet costs the most**.



Internet users by language vs. content

Chinese is the second biggest language on the Internet in terms of users, but only 2% of Web content is in Chinese.

Only some of the top 9 languages for Web content (English, Russian, German, Japanese, Spanish, French, Portuguese, Italian, Chinese) correlate with the number of users. Most languages on the Web are underrepresented.

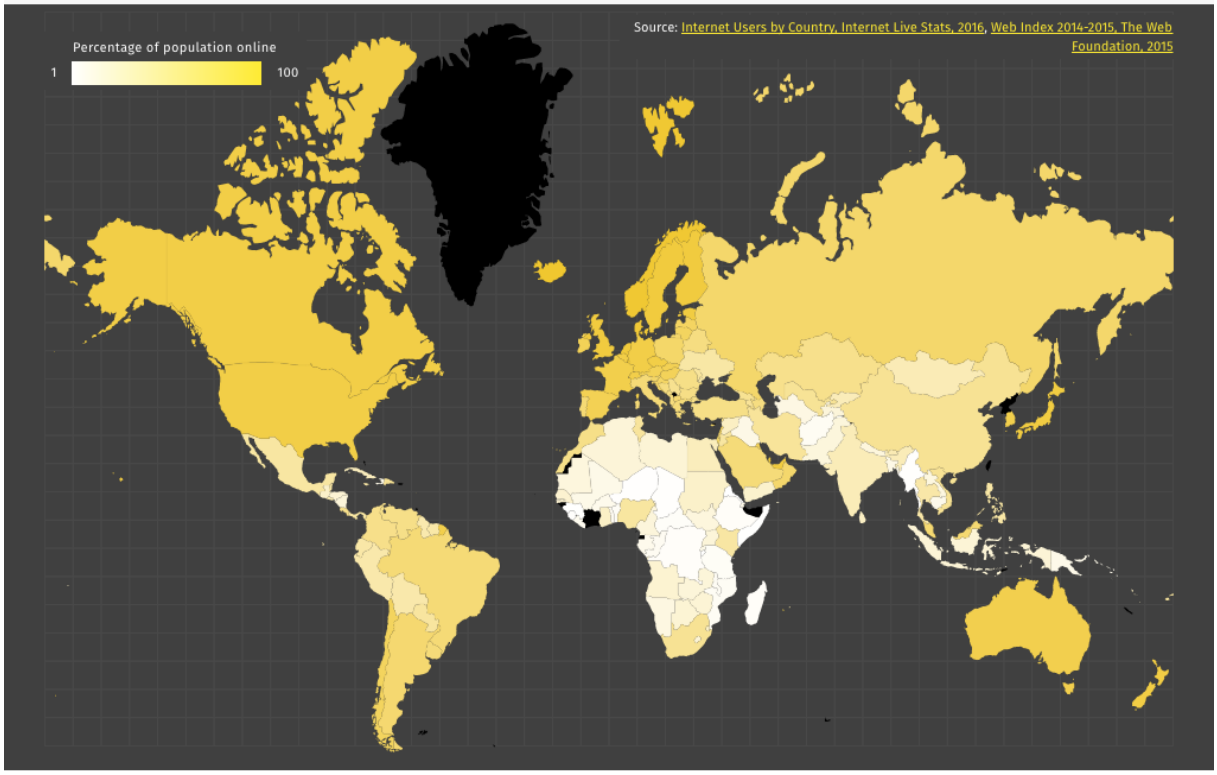


Who is welcome online?

Internet penetration rate

Big digital divides persist, especially in the least wealthy countries.

Internet access is skyrocketing in some regions, but poor, rural and marginalized populations are **least likely to benefit**. Unless policies change fast, **only 16% of people** in least developed countries will be online by 2020.

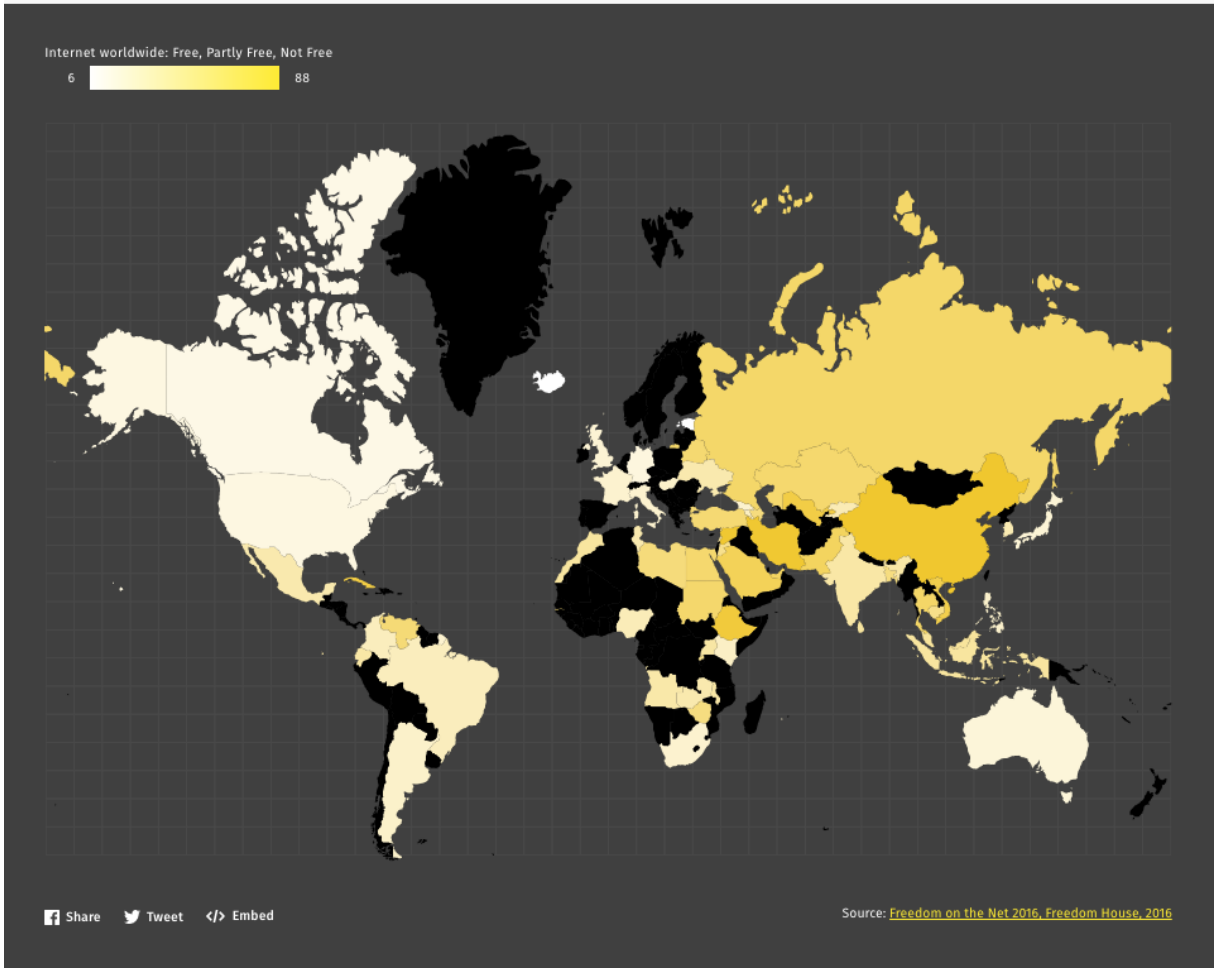


Who is welcome online?

Internet freedom

Censorship is alive on the Internet.

Internet freedom is in decline for the sixth consecutive year, according to democracy watchdog Freedom House in the US. Their 2016 report ranks the majority of 65 countries studied as either “not free” or only “partly free”.

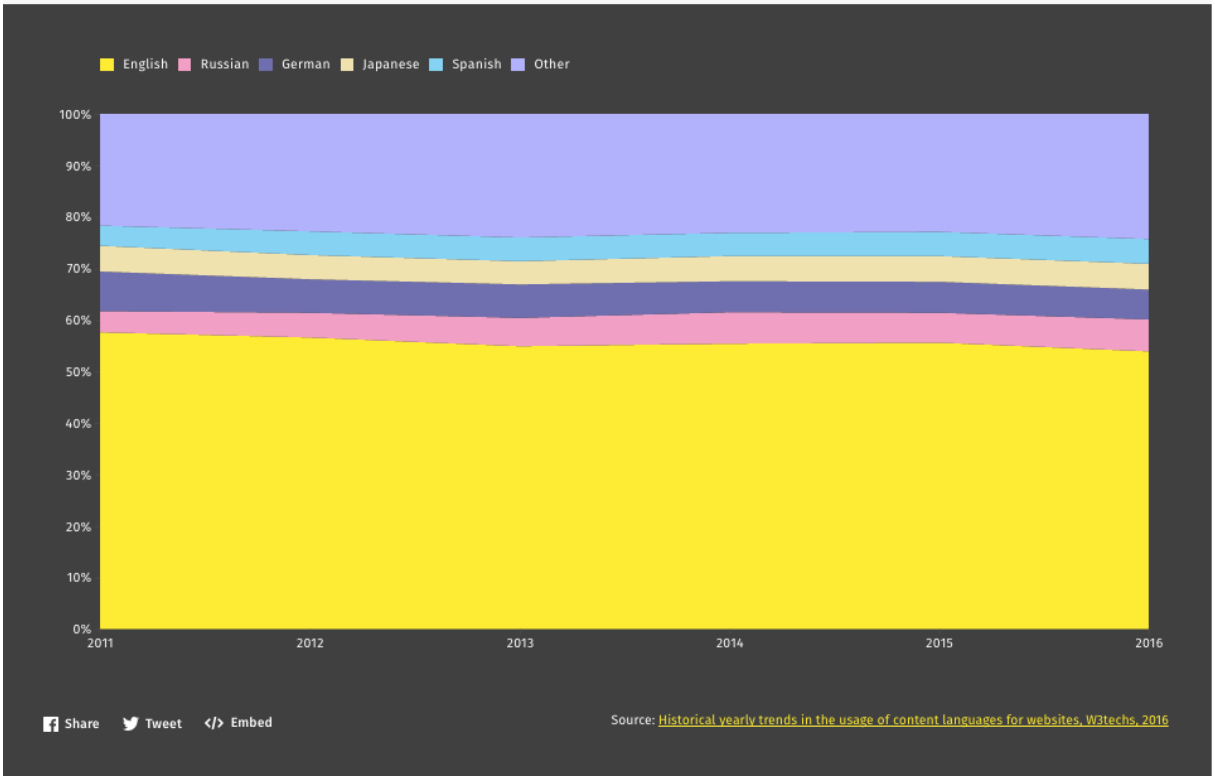


Who is welcome online?

Online dominance of English

52% of all websites are in English, even though only 25% of the global population understands English.

The percentage of content in English decreases only slowly now, but used to be as high as **75% of all webpages in 1998**. When people can read, experience and create content in their own language, Internet health improves.



Who controls the Internet?

Decentralization means the Internet is controlled by many. It's millions of devices linked together in an open network. No one actor can own it, control it, or switch it off for everyone.

Overview

The Internet and the World Wide Web remain the biggest decentralized communication system humanity has ever seen. This was very much a part of the design: the inventors of the Web wished for all people to be able to create and access information.

But the benefits of a decentralized Internet are eroding. When we concentrate our online activity on just a few social networks and messaging apps – as billions of us do – it narrows our experience of the Web to one where we are pointed only at content that appeals to our likes in search results and social media streams. Here, we are consumers rather than creators.

The Internet remains decentralized, but the things we do on it every day are controlled by just a handful of global technology giants. These companies are starting to look more and more like monopolies of the past. Given the importance of the Internet in our lives, this is not healthy.

Healthy

The Web is thriving beyond the "walled gardens" of social media. Over 1 billion websites exist as a result of the decentralized domain name system (DNS) that catalogues all Web addresses. Around 27% of these websites are powered by WordPress, an open source content management system that is free and easy to use, even without coding skills.

A core principle of the Internet is that all content online should be treated the same. This is known as "net neutrality". For profit motives, many telcos would prefer to charge different prices and offer different speeds for different types of content, which prevents users from freely choosing their online experience. So it's healthy for the Internet that laws to protect net neutrality have surfaced in many countries, including India, the US and EU.

At the governance level, it's worth noting that the US government gave up control of the Internet's Domain Name System (DNS) in 2016. They officially handed this oversight role to the non-profit, ICANN, which represents non-profits and governments around the world. The handover was mostly a formality, but it represents a global commitment to a decentralized Web.

Technologically, a new generation of software developers are dreaming up applications that build and reward decentralization. An example is peer-to-peer computer networks that employ "blockchains" –– the stuff that powers the cryptocurrency Bitcoin – for transactions of money, goods and services. And maybe someday, an Internet that doesn't require Web servers.

Unhealthy

A small handful of companies – including Facebook, Google, Apple, Tencent, AliBaba and Amazon – dominate the global Internet sector. While these companies provide hugely valuable services to billions of people, they are also consolidating control over human communication and wealth at a level never before seen in history.

Think of smartphones, where just two companies, Google (Android) and Apple (iOS), dominate the market. Everything from the phone's operating system, to what applications can be purchased in their app stores, are ultimately controlled by these two companies. And speaking of apps – the global app economy is centered in just a few high-income countries (95% of the value is from just 10 countries) with emerging economies accounting for only 1% of app value.

Internet acquisitions by the tech giants feed consolidation. Facebook for instance, controls most of the messaging market in almost every country except China since acquiring WhatsApp and Instagram in addition to their own Facebook Messenger.

In China, WeChat is the dominant player. It is used for messaging by more than 90% of mobile Internet users in major cities. WeChat is also used for dating, banking, ordering taxis, shopping and more. It is a daunting degree of centralization, where the app takes the place of mostly anything you would do on the decentralized Web. This kind of seamless experience is also desired by other app developers. It's not healthy for the Internet. It destroys competition, and gives one company intimate knowledge of the movements and likes of all its users. Not concerned? Even where online freedom appears to exist [nod to Edward Snowden] many tech companies would gladly respond to government requests for private information.

Who controls the Internet?

Prognosis

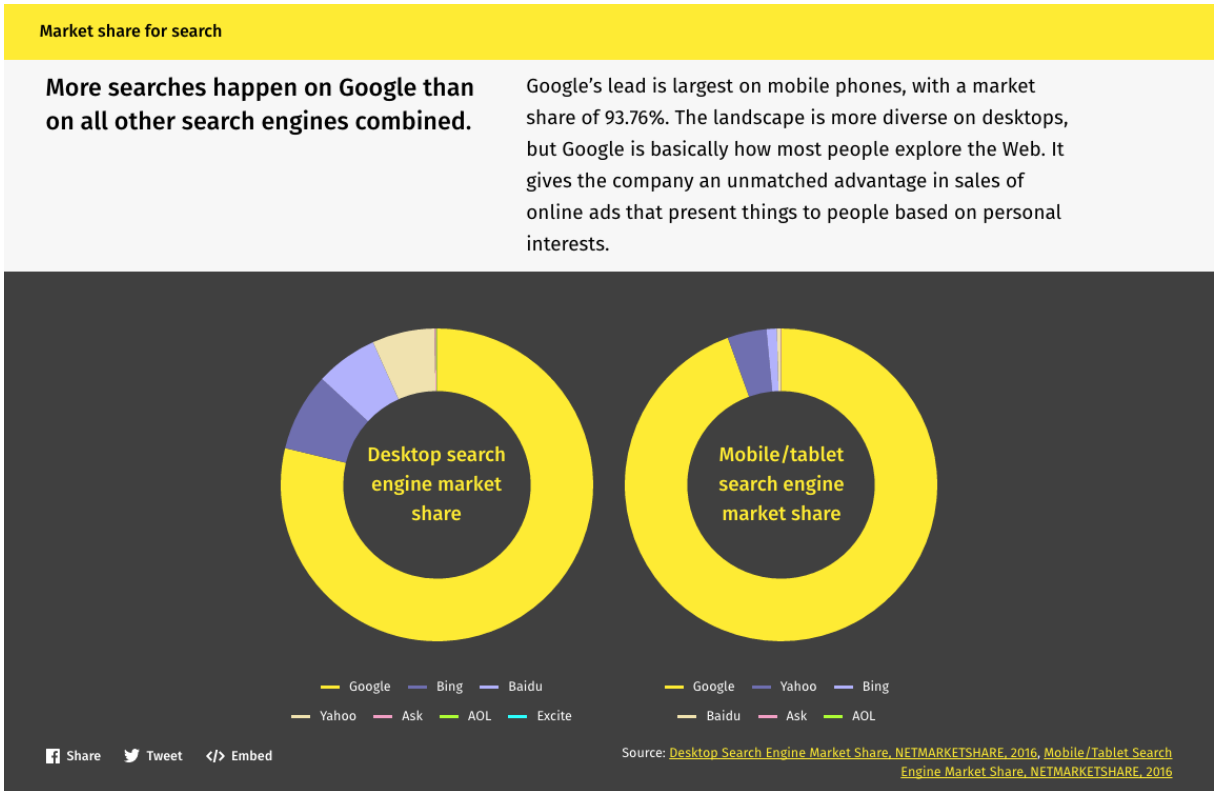
The decentralized Web is thriving by some measures, but we are heading towards a future of vertically integrated silos controlled by a few large players.

For a healthier Internet, we need to find ways to reinforce decentralization. We need healthy competition for entrepreneurs to thrive and for users to have meaningful choices. But competition policies and legal structures of yesterday are ill equipped to handle all of the dynamics of today. Some of the more effective solutions may be technical.
Today, we don't expect one kind of video chat software to interoperate with another. This would only be possible if all the software in this category adhered to the same open standards. There could be rules or best practices to govern standards that would support more diverse markets. New innovators would be able to write software that works with what everyone already has.

Deciding that users should be able to move their personal data freely from one online platform to another is another example of something that would give everyone more agency and choice.

Decentralization is key to ensuring that the Internet remains a public resource that is healthy and available to all of us – and that it is not controlled by a tiny handful of governments and companies. If we can do this, there is good likelihood that the Internet remains a force for human freedom and creativity. If not, the future will likely be more dystopian.

Data visuals

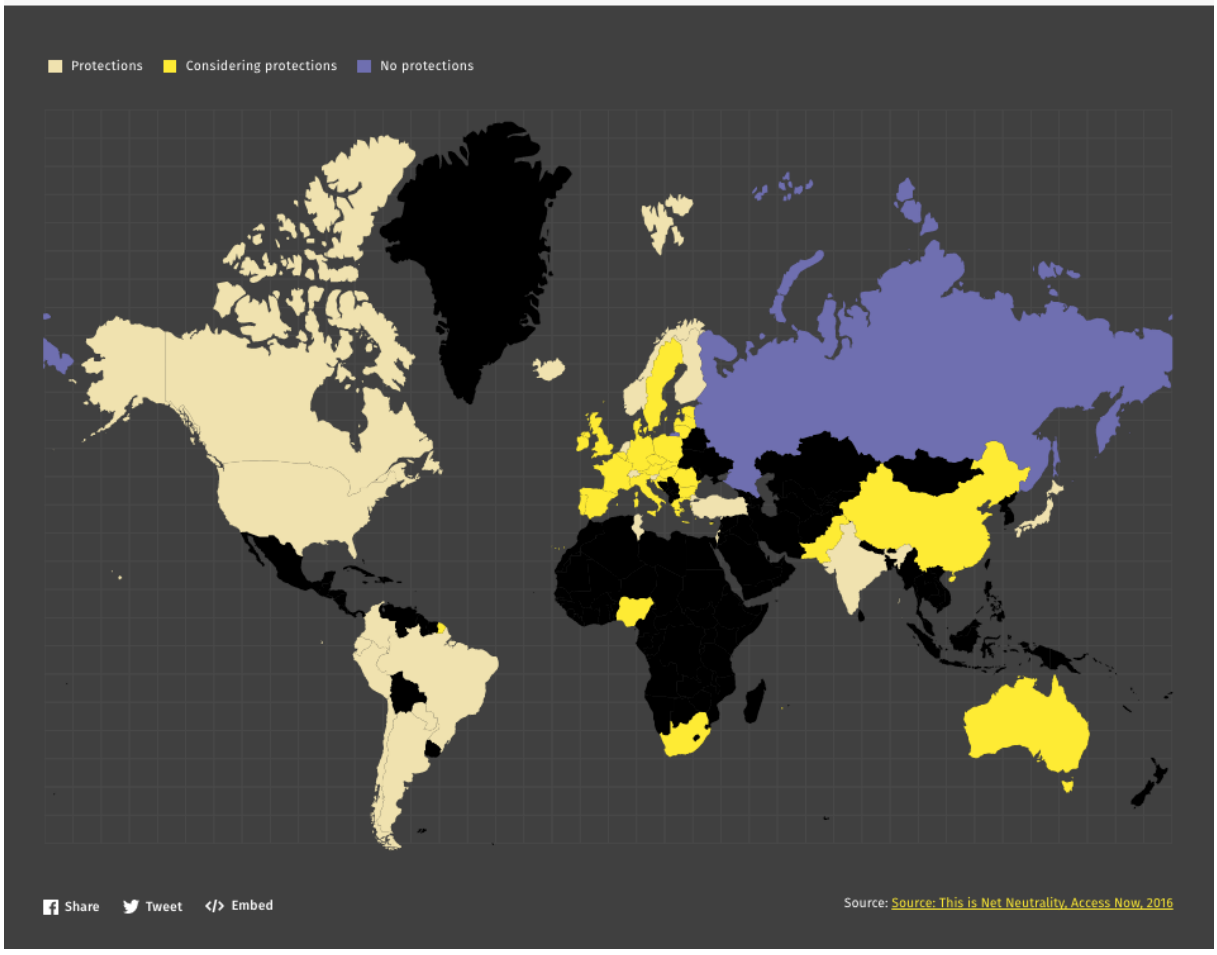


Who controls the Internet?

Equal access to online content

"Net neutrality" laws are on the rise worldwide.

Net neutrality is the principle that every website is shown on equal terms to others. When Internet providers can restrict or favor access to certain sites or apps (for instance by making them pay) it can mean less choice for users and tough times for small websites. Laws to protect the open Web are needed.

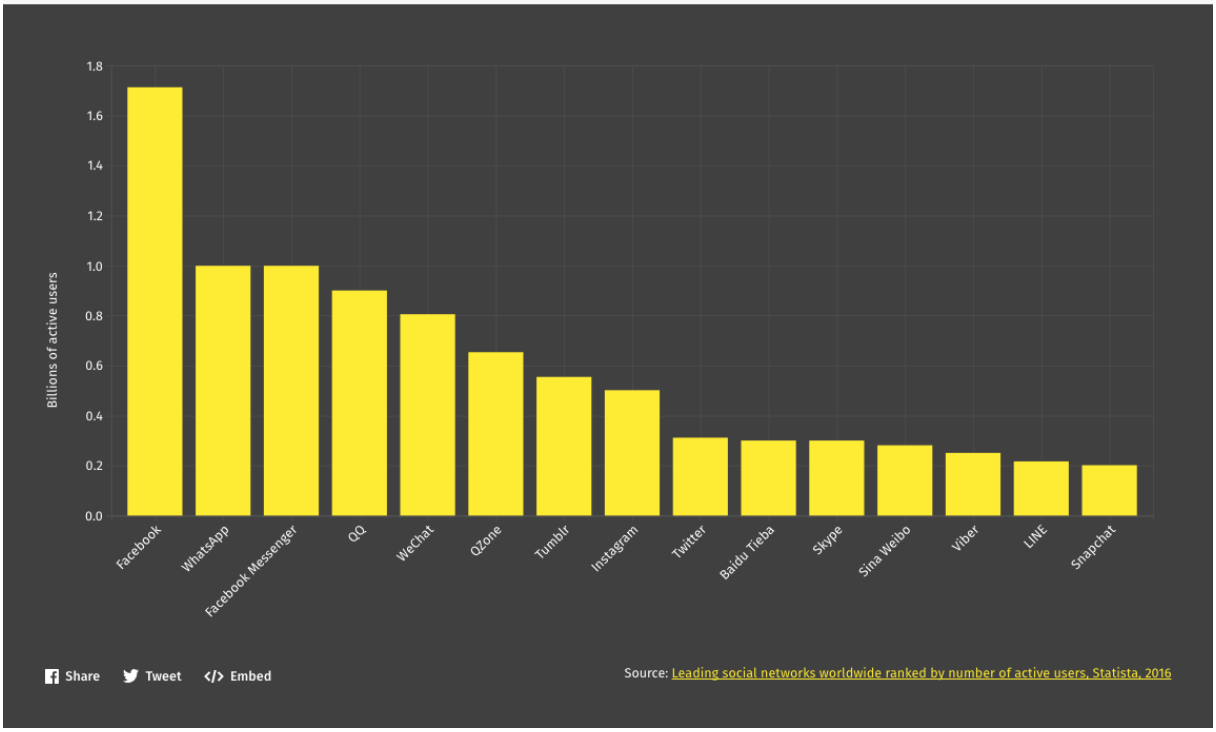


Who controls the Internet?

Concentration of ownership

Facebook has the most active users of any social network: 1.7 billion worldwide.

Networks like Facebook, WhatsApp and WeChat serve important social functions that people value highly. But they are largely closed gardens, controlled by a handful of companies that have outsize influence over what people see and do online.



Who controls the Internet?

Market share of browsers

Google Chrome dominates the browser market.

On desktop computers 62% use Chrome, followed by 15% using Firefox. On mobiles, Google Chrome and Apple's Safari are leading. The browser is the central gateway to the Web, so it matters that there is competition and that there are options built around values like choice and transparency.

Is it safe and secure?

The safety and security of the Internet impacts us all. We should be able to understand what is happening to our data, and have the ability to control how it is used.

Overview

From the phones in our pockets to the biometric databases that identify us to government officials, our personal stake in digital security is growing. You can have 'nothing to hide' and still not want to be targeted by aggressive advertisers or snoopers.

Our Web browsing is tracked and logged, online cameras are ubiquitous in cities, and we are welcoming more Internet connected devices into our homes. We have gained endless daily conveniences and 'free' services from these innovations, but the data they generate is crunched, archived and repurposed for marketing and surveillance. We face risks now that were unimaginable only a decade ago, and many companies and governments are acquiring and using data in ways that do not have people's best interests at heart. Unfortunately, those we trust to handle our data sometimes fail us.

Better security – and more choice – is the antidote for a decline in trust of online services. We need to push for more lean data practices, meaning that less personal data is shared and logged in the first place.

Healthy

Public awareness about privacy being under threat in the digital sphere appears to be growing, and this is a helpful precursor to pushing for better rights and services. Lawmakers in many countries are engaging positively with online privacy issues, especially in Europe.

Hundreds of millions of people are taking charge of their personal Web experience by installing ad-blockers. One of the top three stated reasons for blocking ads is security, given that ads can be a channel for malware. This presents challenges for publishers, but also creates a strong incentive for the industry to make online ads better.

More messaging apps, including WhatsApp, now offer end-to-end encryption, meaning that conversations are protected from eavesdroppers, including the service provider.

Web traffic encryption is rising too. One factor is the launch of Let's Encrypt, a new certificate authority that makes it easy and free to add HTTPS to any website. This helps protect the privacy of users, and offers some guarantee they are not looking at spoof pages. Also driving adoption, search engines and browsers are now subtly rewarding HTTPS websites.

Unknown to most, Internet communication will be more private, and possibly also faster, due to an upcoming new version of the cryptographic protocol called Transport Layer Security (TLS 1.3) that is used to secure all communications between Web browsers and servers.

Unhealthy

In 2013, US whistleblower Edward Snowden opened the world's eyes to the full extent of government sanctioned, global digital mass surveillance, even in democratic countries. There is more public scrutiny of surveillance laws than before, but it hasn't stopped greater snooping powers from being proposed in Britain, Pakistan, France and several other countries.

As cars, refrigerators, toys and all manner of devices connect to the Internet, the risks for both surveillance and malicious hacks are growing. In November 2016, a malware program called Mirai mobilized 100,000 connected devices, including webcams and baby monitors, in a distributed denial-of-service attack (DDOS) that briefly took down parts of the Internet. The owners of those compromised devices may never know (or care) what happened, and cheap and insecure devices will continue to be manufactured, unless safety standards, rules and accountability measures take hold.

Data breaches can lay bare the passwords of millions of people when the information is posted online or sold to the highest bidder. Unfortunately, breaches can go undiscovered for years, even when as many as 1 billion accounts are

Is it safe and secure?

compromised. Which means... you may never learn the source of that identity theft that led your credit score to plunge. Ransomware that hijacks computers and demands immediate payment to avert deletion, has grown into a multi-million dollar criminal industry with victims ranging from regular users to hospitals, schools, businesses, and one day perhaps critical infrastructure. Just one false click in an email purporting to be legitimate, can be enough to cause real damage.

Prognosis

The Internet depends on the security and trust of its users to function in a healthy way. Will the safety and privacy measures developed for software, networks and devices match the threats? We need to push governments and software makers to ensure that they do.

Through everyday interaction we are generating lifelong digital footprints across a range of corporate and government databases. At the personal level, we should take safety precautions with username and passwords until we have a better form of authentication.

Above all, we should be more critical about what information we share voluntarily. Will the online dating profile you posted 6 years ago ever get deleted? How long do the online ads you view track you? Even if you'd like to know the privacy conditions of online platforms, they are usually not written i s.

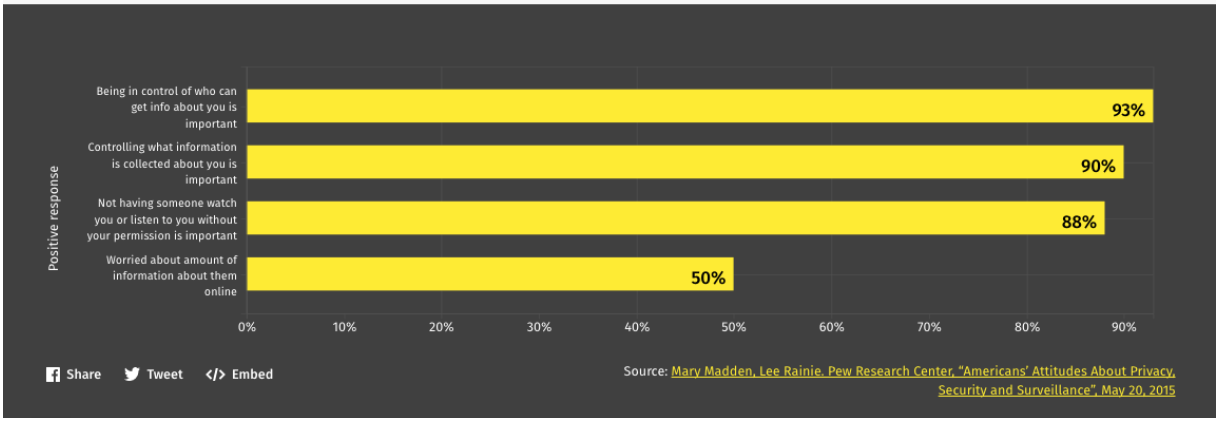
Technology can be a real source of freedom and empowerment, but it can also be a tool of authoritarian control. No matter where in the world, we need to rein in the ability of officials and corporations to archive every movement and uttered word, for today and the future.

Data visuals

Attitudes about online privacy

People want to control what information they share, but can't.

Digital systems share our personal preferences over the Internet with... we don't really know. US Research shows online privacy is "very important" to people, even when they lack skills to protect themselves. Perceptions vary elsewhere, but if we can leverage public opinion to improve privacy rights, there's hope.

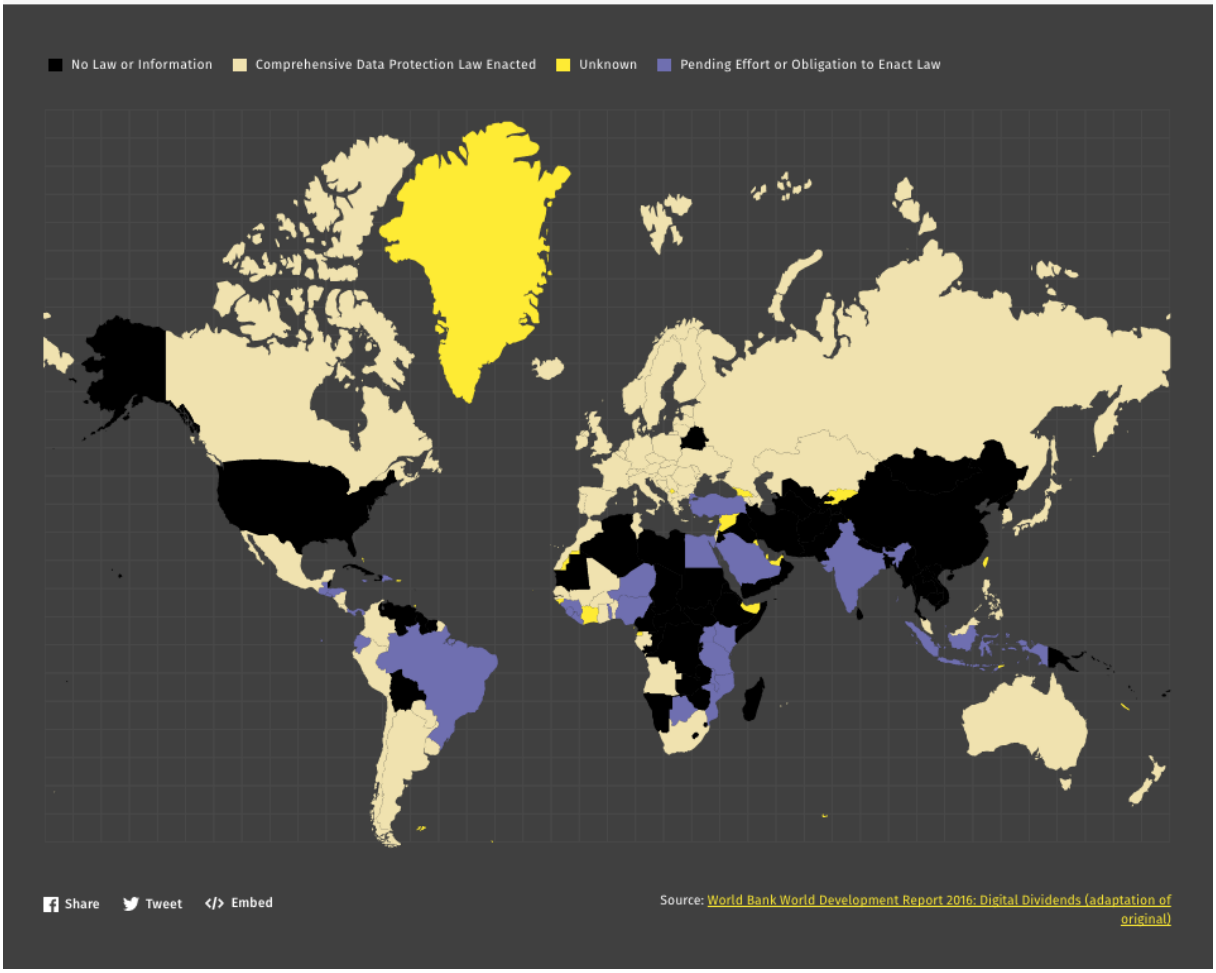


Is it safe and secure?

Laws to protect personal data

Close to a third of the world's population still have no data protection rights.

Around half of all countries, including most of Asia, Africa and the United States have no comprehensive laws to define privacy rights or rules for fair handling of personal data. The European Union has strong protections, and national laws in many other countries are forthcoming.

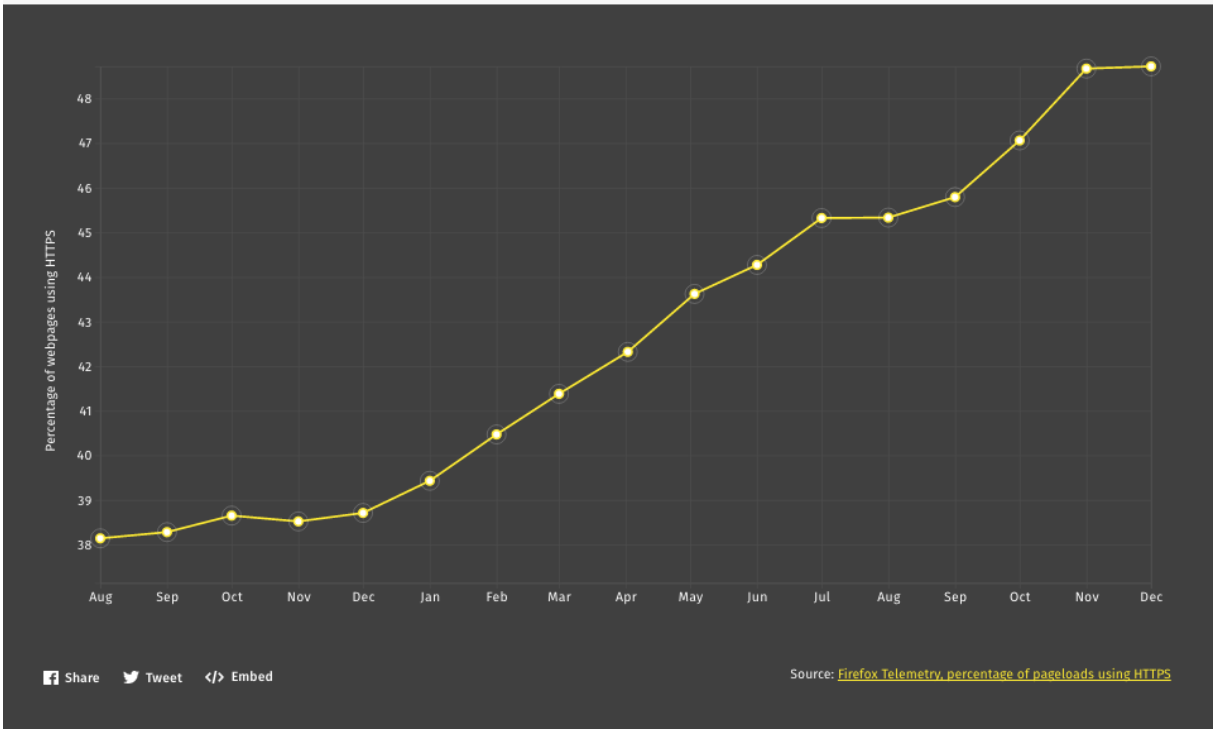


Is it safe and secure?

HTTPS rising

Many more websites now encrypt Web traffic with HTTPS.

The padlock in your browser's address bar is seeing more action as nearly 50% of webpages now offer secure connections (compared with around 40% at the start of 2016). HTTPS is no longer limited to just banking and shopping. All Web browsing should be encrypted.

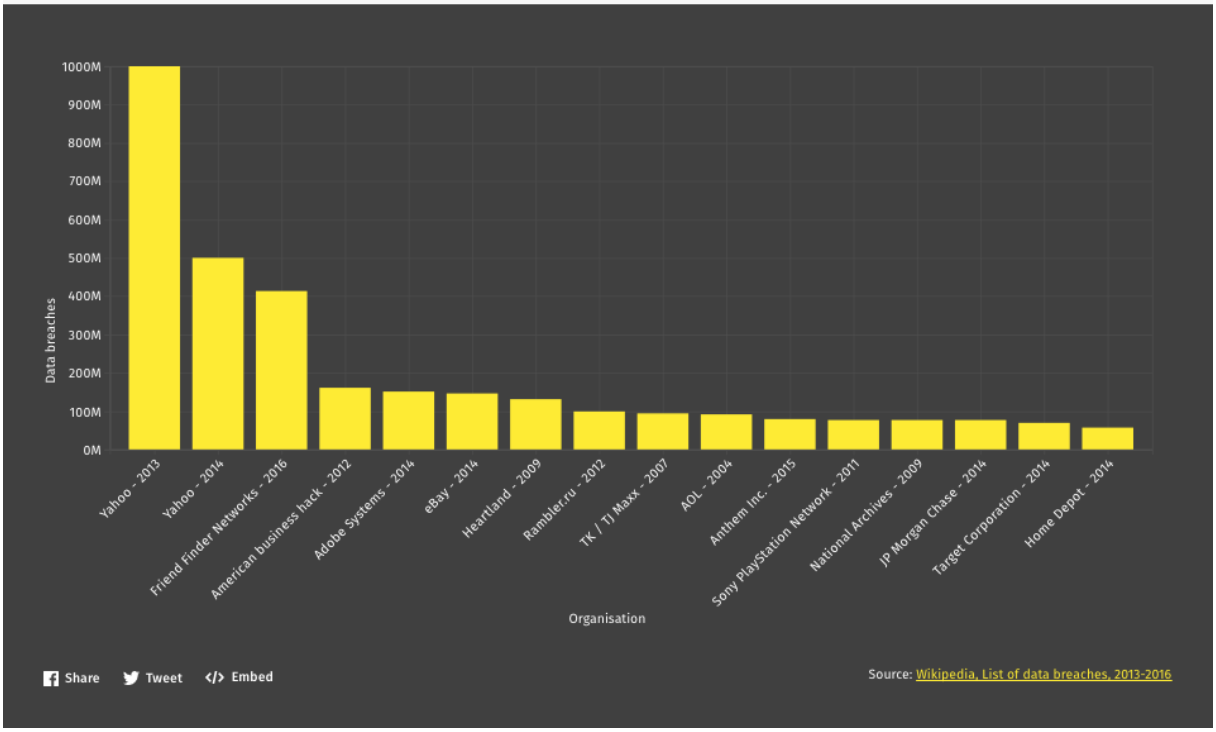


Is it safe and secure?

Increased online vulnerability

Breaches affected hundreds of millions of accounts in 2013-2016.

When data is stolen, sometimes no one knows until logins, passwords and other personal information show up **for sale online**. Breaches are getting bigger and more frequent. Do we have a security epidemic on our hands? In December 2016, Yahoo reported the biggest breach in history: 1 billion accounts.

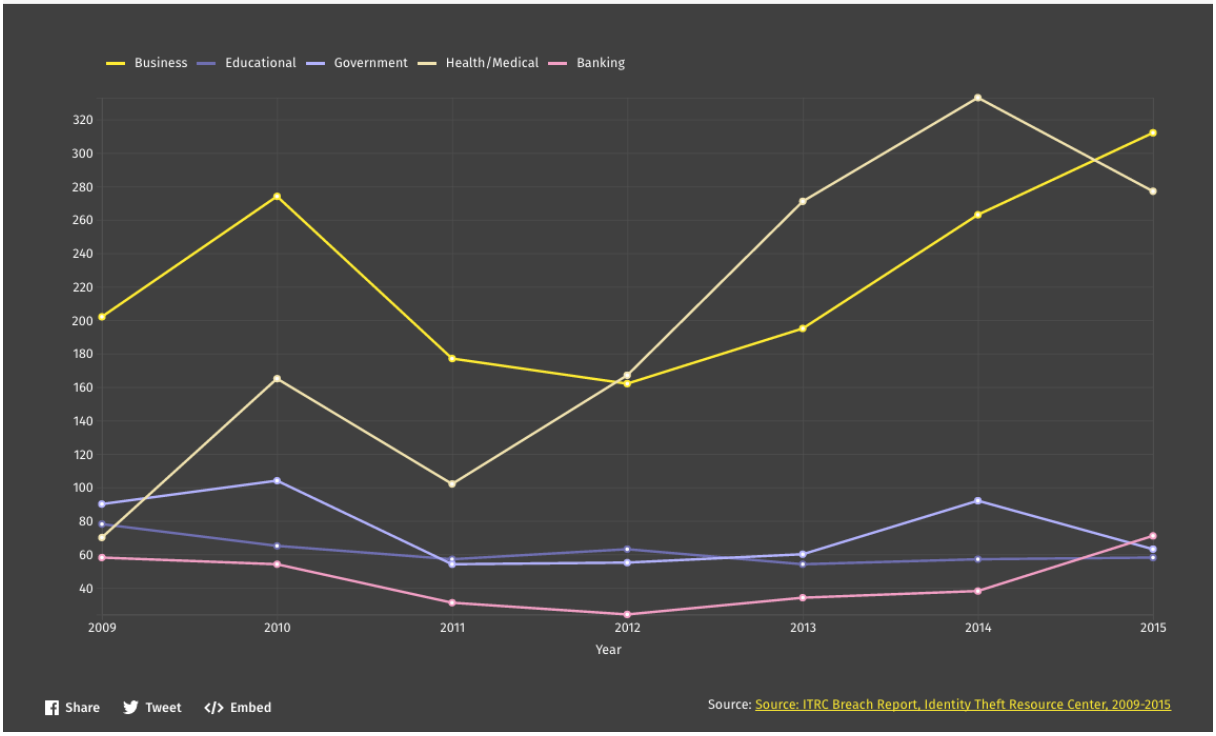


Is it safe and secure?

Data breaches in different sectors

Breaches in the health and medical sector have skyrocketed in the past 3 years.

If the US numbers are anything to go by, we can see the risk of new sectors adopting more technology without always having the **necessary security experience or budgets**. There are great opportunities for better healthcare management thanks to the Internet, but also huge personal risks on a global scale. Who weighs the pros and cons?



Who can succeed online?

We need everyone to have the skills to read, write and participate in the digital world, so more people can move beyond consuming to actually creating, shaping and defending the Web.

Overview

Technology is easier to use today than it was 20 year ago, and this has made the Internet far more accessible to people around the world of all ages. But the simplification of tools and software also makes it less necessary to understand how the Internet works. In other words, today you can have more digital skills, without much of a clue about what the Web is or where content comes from. This lack of understanding is a hidden crisis of the digital era.
The concept of universal Web literacy (that everyone should be able to read, write and participate online) has emerged in response. In order for people to understand how to shape the Web – or even how to keep themselves safe online, or make a living with the Internet – we need to make sure everyone has the skills they need for healthy Internet citizenship.

Healthy

Worldwide, there is great focus on bringing Internet skills into the school classroom. Education policies and curricu-lums are shifting to recognize that digital skills are crucial to economic development. There is even a trend towards integrating coding into the core curriculum across most of Europe. Increasing the number of young adults with Internet skills is a United Nations Sustainable Development Goal, and the UN now tracks schools with computers and Internet.

Also promising is how many informal educators are driving innovation in Web literacy and coding education around the world.

Examples include everything from EU Code Week and The New York Public Library Techconnect, to free online options such as Codeacademy and many others.

There is also a boom in diversity programs aimed at underrepresented communities in the tech industry. Programs focused on women are the most common—including Girls Develop It in the US, Ladies Learning Code in Canada, Akira Chixs in Kenya, TechLadies in Singapore and the online Women's Coding Collective, just to name a few.

Unhealthy

Most people still don't really understand how the Internet works at a basic level.Often when "digital skills" is empha-sized in public policy, the focus is on training people to become better at using their computers or even to learn basic coding, not on deeper Web literacy skills that prepare people to thrive and adapt in a connected world.
For example, without knowledge of how to verify sources online, both young and old minds become fertile grounds for fake news and rumors with detrimental effects for society.

There is an assumption that people living in the global South who are coming online for the first time via mobile, will naturally develop the Web literacy skills needed to change their economies simply by means of access. But there is little evidence to support this fact.

Even young people who grew up with access to the Internet don't automatically develop strong Web literacy skills. Studies show that many young people in the US and the UK cannot distinguish promotional content from news articles or ads from search results.

Web literacy skills, including but not limited to coding, will become more important to the jobs of tomorrow. This is true all around the world. As such, we are likely to see socio-economic divides grow between those with Web literacy skills and those without. And as usual, women, rural and marginalized populations, currently stand last in line to benefit in any way.

Prognosis

If we don't act, we will end up with an Internet where most people remain passive, online consumers rather than active participants and creators. We should resist the deepening of divides between the few who know how the technology works, and a majority who do not.

Who can succeed online?

We need everyone to recognize that Web literacy is more than coding. Governments, educators and parents need to be champions for Web literacy, and foster creative opportunities for young people to develop these skills. Technology companies should also be thinking of more ways to include Web literacy and learning into how people engage with their products.

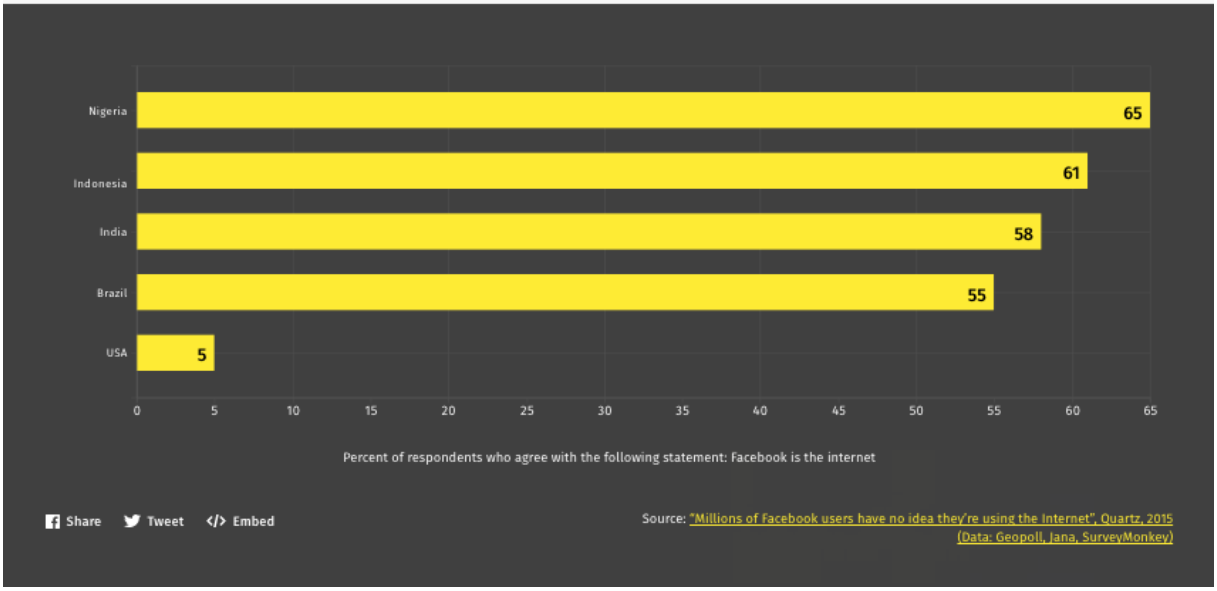
Web literacy has become a 4th foundational skill next to reading, writing and arithmetic. We have made great strides towards universal Web literacy in the last 20 years, but we need even deeper commitments to ensure our skills match up to the greater role the Internet plays in our lives.

Data visuals

Misconceptions

Many people think Facebook is the Internet.

A small-scale survey in five countries showed that many Facebook users either don't know the app is on the Internet, or have no idea there is an Internet beyond Facebook. Without Web literacy, we cannot expect people to understand what the Internet can do for them, or why they should care.

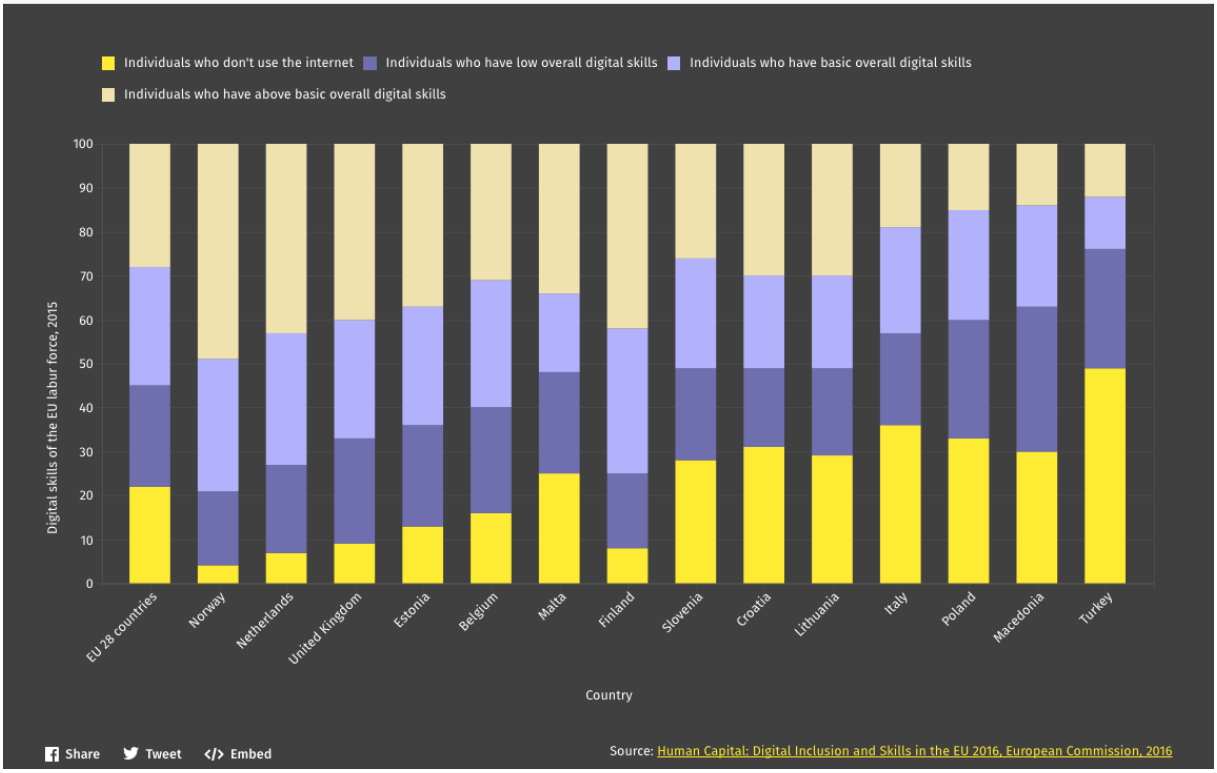


Who can succeed online?

Internet skills gap

37% of Europe's workforce have insufficient digital skills, 13% have none at all.

European employers in most sectors now demand some knowledge of the Web. The European Union has invested in training over 2 million people since 2013 to bridge the digital skills gap. Worldwide, we need more policies to educate, from childhood to adulthood, so no one is left behind.

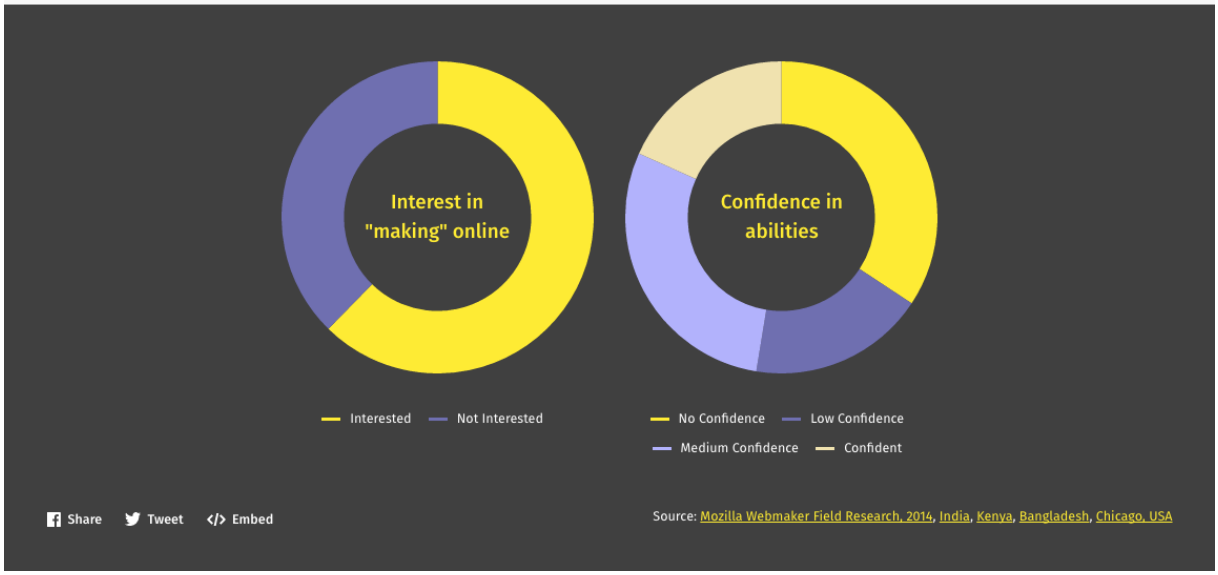


Who can succeed online?

Web making skills

People are interested in “making” online but often lack confidence.

Mozilla asked 300 people in India, Bangladesh, Kenya and the US about their digital skills. 62% said they were interested in “making” online, but 53% had little or no confidence in their abilities. By teaching literacy, we can boost people’s confidence to take full advantage of the Web.



Inside an Internet shutdown

A WhatsApp chat with Ugandan journalist Ruth Aine Tindyebwa about censorship online.

By Kevin Zawacki

One day in February of 2016, Ugandan journalist and blogger Ruth Aine Tindyebwa woke up ready to cover her country's election. Included on the ballot: Yoweri Museveni, an incumbent who has held the presidential office for decades.

But reporting on the election process quickly proved difficult. Tindyebwa was dismayed to learn her most valuable communication tools, social media, were blocked.

Tindyebwa and millions of other Ugandans found themselves in the center of a government-ordered social media shutdown: a 72-hour period from February 18 to 21, during which channels like Twitter, Facebook and WhatsApp were shuttered.

Tindyebwa's experience is no longer a rarity worldwide. According to Internet rights organization, AccessNow, in the first 10 months of 2016, there were 51 intentional Internet shutdowns in 18 countries, including Brazil, India and Turkey.

To continue her work, Tindyebwa — alongside other activists and citizens — used VPNs (virtual private networks) and other tools to circumvent the shutdown.

Mozilla's Kevin Zawacki chatted with Tindyebwa about her experience (on WhatsApp, of course) in the summer of 2016 after seeing her speak at the re:publica conference in Germany on African Elections and Social Media Shutdowns.

Kevin: So in February of 2016, you were planning to cover the Ugandan elections, and reporting the news on social media. Is that right?
Ruth Aine: Yes.
Ruth Aine: I had been keenly following the campaigns online because all candidates had effectively made use of social media. So was definitely looking forward to having online coverage of the elections.
Kevin: What happened next?
Ruth Aine: What happened is that we woke up to no access to social media. Depending on the network – the block started about midnight of the Voting Day.
Kevin: Did the social media shutdown come as a surprise? And which sites were blocked?
Ruth Aine: Yes it did. We had anticipated a messages and voice block, but not social media.
Ruth Aine: WhatsApp, Facebook, and Twitter were blocked mainly
Kevin: So it was impossible for the average citizen to talk about the election on Facebook or Twitter?
Ruth Aine: If they did not have access to VPN, yes. But considering the Twitter demographic [in Uganda] – many got access.
Ruth Aine: So those affected were mainly people like my parents who are not on Twitter, but use WhatsApp.
Kevin: Do you think the Internet shutdown affected the outcome of the election?
Ruth Aine: No. I don't think so. The reasons as to why the election results were as they were was due to the Electoral Commission and its inefficiency.
Ruth Aine: The population online is about 12 million. But those on Twitter are about 400,000 active accounts. Facebook has 1.8 million active accounts. That's roughly 2.5 million people on social media.
Kevin: How did people find ways to maneuver around the shutdown?
Ruth Aine: We all downloaded VPNs.
Ruth Aine: I got a call from a friend that morning and he told me what to download.

Ruth Aine Tindyebwa

Inside an Internet shutdown

Ruth Aine: Others were using TOR. TunnelBear was a popular one too.
Kevin: What happened after the shutdown? Are there laws now that make it more likely to happen again? Less likely?
Ruth Aine: So, a law was tabled before the 9th Parliament. That law gives power to the Uganda Communications Commission to switch off the networks whenever they deem necessary. The 9th Parliament barely discussed it. It has not yet been brought up in the 10th Parliament.
Ruth Aine: Also, we had another shutdown during the Swearing In Ceremony, which means the shutdowns are going to be a popular feature.
Kevin: Is there a movement in Uganda to change the law and keep the Internet open?
Ruth Aine: In my opinion, we have not had a sufficient conversation on the way forward. Both times the shutdowns have been overridden by events. We end up talking about everything else but the shutdown. There is an expression of anger and disgust at first, but then quickly life goes on.
Ruth Aine: And I think therein lies the problem. There are a couple of civil society organisations doing advocacy, but we can do more.
Kevin: What might make a difference? More news stories? More advocacy work?
Ruth Aine: I honestly don't know. But more conversation, more engagement is needed. Because the government still doesn't understand the role and use of the Internet. If they did, then they would not consider it as an enemy to shut down. Also, they too need the Internet. Case in point – during the shutdowns the government Twitter accounts were also active. That means that government officials were using VPNs.
Kevin: Ruth, thank you for sharing your story.
Ruth Aine: You are welcome.

[Interview conducted August 10, 2016. Edited and condensed for clarity.]

Your selfie at the Eiffel Tower

The European Union's copyright framework often clashes with the way we live online

By Kevin Zawacki

Most visitors to Paris know which sight to seek out first: the Eiffel Tower at night, shimmering top to bottom in a dazzling light display.

But far fewer tourists know this: if you snap a photo of the light display and share it online, you're technically violating copyright law in France.

The European Union's copyright framework — written in the early 2000s — protects certain high-profile architecture and artwork under copyright. On that list? France's signature landmark.

When the current copyright framework was enacted, written letters and SMS were the primary forms of communication, says Dimitar Dimitrov, the Wikimedia Foundation's ambassador in Brussels. But no longer: "Now we send pictures," he says. When visiting a new city, tourists opt for an Instagram post rather than a postcard.

Image from Mozilla's 2016 campaign Change Copyright.
Background photo by juanedc (cc-by)

"But not every country has a public environment exception so we can freely take pictures and share them," Dimitrov notes.

As a result, innocuous content — like a selfie with the Eiffel Tower, or Denmark's Little Mermaid statue — becomes a violation. And open Internet supporters like Dimitrov bristle.

"This prohibits us from freely communicating," he says. "It's crazy that our daily communications are impaired by copyright."

The EU's copyright framework affects more than vacation photos, Dimitrov says — it can also disrupt innovation and the flow of knowledge. Often, scientific research under copyright can't be linked to from Wikipedia. And researchers can be prohibited from text and data mining processes that would otherwise enable progress.

So Dimitrov and a coalition of like-minded academics, technology professionals and activists, including Mozilla, are fighting for reform: modern copyright law that dovetails with how we live online.

"We need to make copyright law technology-proof and future-proof," Dimitrov says. "We need to ensure copyright doesn't clash with everyday reality."

When the Internet doesn't speak your language

Translation from English to local languages is one way of supporting the Web in becoming as diverse as can be. By Kevin Zawacki

For a first-time Internet user, learning the Web means mastering a handful of core skills: browsers, search engines, content creation.

For Web users who aren't proficient in English, there's a necessary step that precedes clicking, searching and creating. First, learn some English. Then learn the Web.

The Internet spans all corners of the globe, but its content isn't nearly as diverse as its reach. While only a quarter of the globe speaks English natively, 54 percent of the world's websites are in English.

An equally startling statistic: while more than 1 billion individuals speak Chinese, only around 2 percent of Web content is in Chinese.

Heather Bailey speaking about localization at MozFest in London, United Kingdom, 2015.

The driving force behind this English-centric Web is largely economic. Across the world, content creators target the largest and most lucrative markets, which are located in North America and Western Europe. But the implications go far beyond economics, influencing and transforming Internet users' cultures, behaviors and perceptions.

Few have greater insight than Heather and Dwayne Bailey, the wife-husband team behind Translate.org.za, a non-profit "champion of local languages in the digital world."

Translate runs training, events and software localization. The Baileys' quest to localize the Web began over a decade ago in Cape Town, South Africa, when the duo experienced first-hand how difficult it was for their Xhosa-speaking friends to negotiate online life.

When the Internet doesn't speak your language

The Baileys note that non-English speakers on the Web are resourceful. "People are adapting to English," Heather Bailey says. What results is a hybrid-language approach that draws on and blends local languages and English.

The examples are fascinating: in Zimbabwe, a Shona speaker might grasp WhatsApp's English interface, but send messages in Shona. In the Arabic-speaking world, Twitter and SMS users will employ transliteration, converting Arabic script into the Latin alphabet. And on a South African news website, an article can be authored in English — but the comments below unfold in Afrikaans, Xhosa and Zulu.

"People make do," Heather explains. "I think it's amazing."

Despite these canny approaches, the Baileys note that there are harmful consequences. When Heather recently spoke with a Kenyan friend, she inquired about his efforts to localize English content into Swahili. His response: why bother?

Once users have a handle on the English Web, there's little motivation to go back and localize, Dwayne says.

English-language content are cultural mores that can clash with, or undermine, local cultures, the Baileys note. For example: English doesn't account for gendered nouns. "That makes it difficult to translate — which then starts influencing the [local] language," Dwayne says.

Despite challenges, the Baileys are optimistic about creating a more inclusive Web. Heather is quick to share a motto: "Why should people need to learn English before they learn how to use the Internet?"

The Baileys note a couple of localization best practices can make an outsized impact. "The biggest thing that makes a difference is if you have someone who owns their language… and has good technical skills," Heather says. A passionate and talented speaker can build a localization team and make a tremendous difference.

Localization should be as painless as possible. "It's about making it easy for people with very low technical skills to localize," Dwayne explains.

This means using intuitive platforms and practices. Like Web-based tools rather than software, or hiding the complexity of file formats.

"We need to de-geek the space and challenge assumptions," Dwayne says. "Making the process of localization easier is the biggest thing we can do."

People powered phones within range

Mobile phones are now buzzing in 30 rural and indigenous communities in Oaxaca, Mexico.
By Grace Dobush

Mobile phones are now buzzing in 30 rural and indigenous communities in Oaxaca, Mexico. Previously outside of cellular range, the communities teamed up with Rhizomatica, a small non-profit with a big goal: to put people in control of their own cellular networks that operate over the Internet.

Since 2013, Rhizomatica has helped install 17 cellular towers in Mexico's south with funds raised by community members themselves (around $7,500 per tower), creating networks that now serve around 3,000 daily users in remote places.

About 370 million people live in parts of the world without mobile phone coverage. Even when signals are within range, the price of voice and data are well beyond what is affordable to more than 2 billion people worldwide, according to the International Telecommunications Union.

In Mexico, Rhizomatica determined the technical requirements, and helped form an association with community leaders called *Telecomunicaciones Indígenas Comunitarias* (TIC) to provide technical and legal assistance to communities that want to get connected.

TIC successfully lobbied the Mexican government for permission to use a slice of the radio spectrum for social good, becoming the first community telecommunications service to receive a social concession, essentially a license, from the Mexican government.

"The legislation is among the most forward-thinking in the world," Rhizomatica founder Peter Bloom says. His organization was able to convince the regulatory authorities of the necessity of decentralized community networks because there are about 50,000 towns without cell coverage in Mexico, mostly rural and poor, so the reigning telecoms didn't have a big financial incentive to improve coverage.

Since connecting to an existing carrier could cost millions of dollars, Bloom imagined a cellular network that could be owned by the communities themselves. And that's what they built: the base station that gives your phone a cell signal is attached to a computer that runs software emulating mobile telephony. Software-defined radio is what makes the entire process affordable — broadcasting that used to require expensive hardware is now possible on any computer.

A Rhizomatica antenna in Alotepec, Oaxaca, Mexico, 2015. Shared by Onion on Wikimedia Commons (CC-BY 3.0)

Monthly usage fees for the networks — usually about $2 per person — cover the cost of the Internet connection and electricity as well as for someone in the community to maintain the network, and about 35 percent of the charges go back to TIC for technical and regulatory support.

Decentralized solutions to problems are nothing new to poor communities in Mexico. The federal government has long neglected local road and communication infrastructure, so residents are used to doing things themselves. "The communities here are very autonomous-minded," says Bloom.

The name Rhizomatica comes from "rhizome," a biological term referring to plants whose root systems are distributed and interconnected rather than centralized with a high risk of failure. And that's the exact ethos they apply to their work.

Next up, Rhizomatica is working with people in Nicaragua, Colombia and Brazil to transfer knowledge and lobby for more favorable legal and regulatory environments there, too. "We want to engage politically, so the ecosystem of the Internet and our digital lives can be more under the control of people who are just coming online," Bloom says.

Giving artists control of their music

CASH Music is a non-profit alternative to the major online distributors
By Grace Dobush

Making a living as a musician has always been tough. For many artists, the Internet represents an opportunity to seize control of their businesses on their own terms, challenging both old and new music monopolies that dominate the sale and distribution of music.

The digital revolution turned the music industry on its head, but now streaming services are consolidating power. Spotify has a worldwide lead on subscribers and is looking to buy Soundcloud. Apple's acquisition of Beats last year to make Apple Music puts them in competition. And Amazon recently launched Amazon Music Unlimited. When monopolies control what music is available to listen to, and pay artists thousandths of a cent per play, how can a musician make a living?

Non-profit CASH Music in the United States has developed a suite of free online tools for artists to market and sell their own music and communicate with their fans. In short: to take control of their careers.

CASH Music executive director Maggie Vail was vice president at cult alt-rock label Kill Rock Stars, before joining CASH founder Jesse von Doom. "The most important part of any musician's business is the relationship between themselves and their fans," Vail says.

Vail believes that an artist's online home should be totally under their own control. And that's exactly what CASH is making possible through the use of open-source tools they've developed specifically for musicians and creatives. Users of the service include internationally renowned artists such as Lenny Kravitz, Andrew Bird, Metric and the Lumineers.

CASH Music's Maggie Vail and Jesse von Doom.
Photo by Taryn Mazza

When legendary hip hop trio De La Soul used the crowdfunding website Kickstarter to fund its new album, there was no tool for them to digitally deliver the album to backers or track it on the music sales tracker SoundScan. So CASH built it. De La Soul's "And the Anonymous Nobody" landed at No. 1 on the rap charts in August 2016, and soon the delivery tool will be rolled out to all users.

As a former touring musician herself, Vail approaches her work from a pro-artist perspective, and cautions users that corporations don't always have the best interests of musicians at heart. Vail anticipates that control of streaming music will be further consolidated in the future, and worries what will happen if corporations control even more of what we listen to.

Being a non-profit is CASH's guiding principle: their software will always be free for artists. With just three and a half full-time staffers, CASH has about 12,000 active platform users. To date, the project has been primarily funded by von Doom's Shuttleworth Foundation Fellowship.

"It's a slow boil, but we've been able to grow sustainably," Vail says.

Building a better blockchain

A new generation of software developers are expanding the scope for an Internet powered by users.
By Grace Dobush

Imagine banking systems, social networks and even public organizations that are completely autonomous, transparent and without individual ownership. No one lender could create a mortgage crisis. No government could shut down a service.

This dream is part of what motivates a new generation of software developers who are building on the success of the cryptocurrency Bitcoin to create broader applications for the underlying technology.

Bitcoin is based on the computing concept of the "blockchain."Blockchains are databases on peer-to-peer computer networks (where machines pool together their powers) made of time-stamped entries called "blocks" that are encrypted and unchangeable, and describe transactions such as money transfers. No one person or system holds the entire ledger of transactions, and no one can falsify a transaction, because everyone in the network helps validate and run the database. In short: ownership is decentralized, and security is bolstered.

In 2013, a young programmer and writer, Vitalik Buterin, wondered if blockchain technology could be used for all sorts of online applications, not just cryptocurrencies or money transfers. He was neither the first nor the last to consider how to do this, but he helped come up with one of the most important non-currency uses of blockchains. Buterin's project, Ethereum, was launched in 2015 under the stewardship of the Ethereum Foundation, a Swiss non-profit organization, to explore the greater possibilities of decentralized computing power.

Vitalik Buterin, the inventor of Ethereum at an event in Toronto, Canada (April 2014).
Photo by Duncan Rawlinson (CC BY-NC 2.0)

Ethereum created the cryptocurrency, "ether", which is now the second-most valuable after Bitcoin, and also facilitates the development of decentralized applications (dapps) that can be used for all kinds of automated transactions between people, or even objects, without an intermediary. For instance, a rental apartment door that unlocks itself when you pay.

These transactions are carried out by "smart contracts" that execute commands according to rules that are written and disseminated on the Ethereum blockchain.

One company building ambitious dapps is ConsenSys, founded by Joseph Lubin, an early contributor to Ethereum. In addition to concepts for decentralized banking and finance, ConsenSys is working on a decentralized identification system called uPort that could give people verifiable proof of identity even in the absence of a government document.

"uPort is asking, how can the most disenfranchised people among us benefit from these technologies?" says Rebecca Mirigov, head of communications for ConsenSys. "uPort could be incredibly useful in the case of the refugee crisis to be able to verify identity. There's a lot of possibility for us to give people agency who have been disenfranchised by geopolitics."

Despite lofty promises of absolute security, one of the hallmark Ethereum projects, The Decentralized Autonomous Organization, a crowdfunding platform that raised more than $150 million, was hijacked in June 2016, the result of a poorly written smart contract.

Enthusiasts insist such attacks fortify Ethereum's defenses, which is evidenced by high level research and suggestions on how to prevent them in the future.

As the Internet has evolved in the past three decades, just a handful of corporations including Amazon, Google and Facebook have become the main hubs for content, commerce and interaction. Decentralized applications could one day be a challenge to the concentration of information online, for the sake of "a more globally accessible, more free and more trustworthy Internet," as the Ethereum Foundation describes their own mission.

Let's Encrypt: Making the Web safer

Behind an easy new tool is a big ambition to encrypt the entire Web's traffic.
By Grace Dobush

Josh Aas, founder of the non-profit Let's Encrypt, imagined an Internet where every site uses HTTPS, better protecting users from sneaky malware, invasive marketing and surveillance. Since launching in December 2015, around 24 million websites are now safer to use. These secure, encrypted connections are the norm for banking and e-commerce, but were previously not considered necessary for other websites and could cost up to hundreds of dollars a year.

Aas, an engineer and technology strategist, created the Internet Security Research Group (ISRG) to launch Let's Encrypt. His goal was to lower the technical and financial barriers of access to security technology, with support from major tech players including Mozilla, Cisco, Google Chrome and Facebook. Let's Encrypt has now made it possible for a website to obtain and maintain the requisite HTTPS certificate free of charge, and with just a few clicks.

"People need to understand that the network is evil and wants to attack you," says J. Alex Halderman, director of the Center for Computer Security and Society and board member of ISRG. "That's how we should think about unencrypted traffic passing through the Internet. The only way we can safeguard ourselves and protect our privacy is by using encryption. The era of innocence for Internet traffic has to be over today."

It appears that site hosts and users are catching up to this reality. In just one year, HTTPS page loads on the Web have increased from 38.5% to 49.5% according to Firefox counts from December 2016. Much of this progress can be attributed to the ease of use of Let's Encrypt, paired with large-scale deployments by Web hosting and cloud service companies.

The goal of Let's Encrypt isn't to have a monopoly on Web encryption, but to improve standards and tools that anyone can use to make encryption the default for all Web traffic. Major Internet forces, corporate and non-profit, are pulling together to see this happen.

Let's Encrypt's logo is modeled after the padlock in your browser's address bar.

Dutch pranksters turn surveillance into art

Using data from the Web and social media to guess the perfect birthday present for everyone in The Netherlands.
By Grace Dobush

One of six hackathons to create a National Birthday Calendar for Dutch citizens. Photo by SETUP.

Everybody Googles themselves once in awhile, but few people really have a handle on the depth, breadth and longevity of their online presence. It's hard to keep track of what's private and what's not when so much of what you see and do online is saved for posterity. Old school websites, social networks, directories, listservs and bulletin boards never really go away — archives and caches live forever.

A media lab in The Netherlands is bringing attention to online privacy with humor. For the past two years, Utrecht-based SETUP has been building a national database of Dutch citizens based exclusively on publicly accessible online data. It was initially conceived of as a National Birthday Calendar that would suggest custom birthday presents based on the data collected, but the information they found was so sensitive it was deemed illegal to complete the project.

SETUP gathered the information through six hackathons, scouring data from defunct websites, social networks and phone directories, gathering millions of details on Holland's population of 16 million. "Even though we kind of expected it, when you see how much data you can find, and how easily you can scrape it, it's still shocking," said project leader Ellen Bijsterbosch.

Legal advisors warned them against traveling to a conference in the United States with an encrypted hard drive that contained the highly detailed personal profiles they assembled on more than 800,000 people, saying it would be a violation of Dutch privacy laws.

Any artists who want to use the data to create projects must sign nondisclosure agreements to do so. "If a few nerds can cobble together this much, it's frightening to think what the NSA or serious criminals can do," said Bijsterbosch. "We believe that when the wider public cares, things can really change," says creative director Tijmen Schep. Early signs indicate that SETUP's approach is working: the Dutch national association of accountants, for example, no longer lists their members' addresses, first names and dates of birth online.

The SETUP team is now working on a project called Dubious Devices, which explores the reputation economy and the Internet of Things, says Schep. They've created a coffee machine that will brew you a free cup of coffee in exchange for your postal code. Using government data, the machine determines whether you deserve a primo cup of joe, or watered down sludge.

Another idea is a toaster that evaluates your online presence before browning your bread or burning it, if it finds you have a bad reputation.

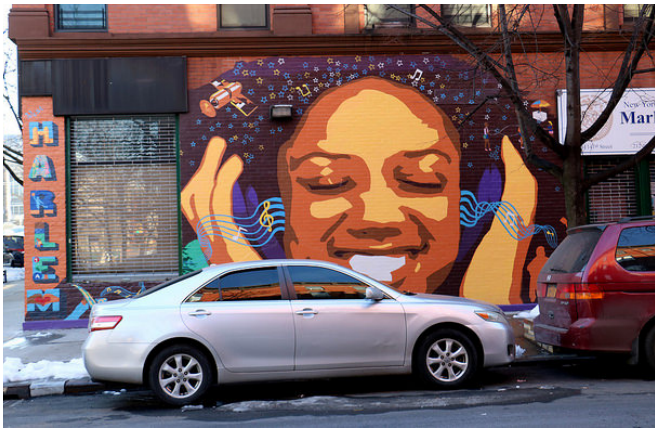
Teaching encryption in Harlem

CryptoHarlem teaches privacy and security tactics to residents of black communities in New York City.
By Kevin Zawacki

Matt Mitchell is a data journalist with an impressive resume: CNN, AOL, The New York Times. But during his time in newsrooms, he often found himself filling a role beyond storyteller or engineer.

"I would overhear people talking: 'What's the best way to protect this information, or a source?'" Mitchell recalls. Too often, he'd also overhear troubling responses in the form of ineffective and poor advice. So Mitchell would intervene, lending his digital security expertise. The audience would quickly swell.

"That conversation usually led to another reporter stopping by and taking notes, and then another," Mitchell says. "And soon we had a circle. I thought: Wow. This is a big need."



Mural on building in Harlem, New York City, 2016
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In 2012 — shortly after the shooting death of unarmed black teenager Trayvon Martin in Florida — Mitchell felt compelled to widen his audience. "I thought: there's something I can do in my community, Harlem, to help residents understand the issues of surveillance and criminal justice."

Soon after, Mitchell launched CryptoHarlem: a monthly, three-hour open workshop held at The Harlem Business Alliance on Malcolm X Boulevard in northern Manhattan.

CryptoHarlem provides the community with free advice and assistance related to online privacy and security. Mitchell was partially inspired by CryptoParty, a series of global events that educate the general public about cryptography.

"It's kind of like a surveillance clinic," Mitchell says, likening its format to the city's mobile dental clinics, which bring dental care to underserved neighborhoods. "[Instead], you bring your laptop and your phone and curiosity, and we answer your questions."
Each CryptoHarlem session sees around 50 guests, Mitchell says, including seniors, mothers and students. Mitchell's classes often start with privacy and security basics: "We cover Tor browsing and its benefits," Mitchell explains.
"We cover a lot of mobile questions," he continues, noting many community members rely on smartphones, not laptops or tablets, to access the Web. And so Mitchell teaches off-the-record messaging, encrypted email and other mobile security measures.

Teaching privacy in Harlem takes on a certain urgency, says Mitchell, because minority populations in New York City are often targets of mass surveillance: microphones, security cameras and stingray devices dot street corners; SkyWatch towers are a common sight and flood lights run throughout the night.

In the past, Mitchell has taught privacy and security to groups who view surveillance as an abstract concept, or question the need for encryption tools. "Those are questions I never get at CryptoHarlem," Mitchell says. "It's more like, 'Hey I can't buy a bag of potato chips without looking suspicious'."

Recently, Mitchell introduced a woman in her 70s to the encrypted messaging app Signal. "She said, 'this is going to be hard to use'," Mitchell recounts. But after a brief installation and walkthrough, she was quickly converted.

"She was sending text messages and making encrypted voice calls in 10 minutes," Mitchell says.

When his neighbors grasp encryption they feel empowered. "To have something that allows you to be expressive and not feel threatened or scared — people are really excited about that," Mitchell says.

Why don't more women code?

A conversation with Melissa Sariffodeen, co-founder and CEO of the Canadian nonprofit Ladies Learning Code

By Kevin Zawacki

Lauren, an 11-year-old girl in Calgary, recently launched her own robotics company. Latasia 12, built a sobering webpage that seeks to curb violence against indigenous women in Canada.

In a world where males routinely dominate STEM (science, technology, engineering, and mathematics) fields and computer science programs, Lauren and Latasia are exceptions to the status quo. The two have something else in common, as well: Each is an alumna of Ladies Learning Code.

Canadian nonprofit Ladies Learning Code (LLC) is an organization working to level the playing field for women online. Digital inclusion data often dismays and disheartens: In nearly all countries, the percentage of men using the Internet outpaces the percentage of women using the Internet. From Japan and Germany to Morocco and Turkey, more men than women are online.

Ladies Learning Code is seeking change. With 29 chapters across Canada, the nonprofit has already taught HTML, CSS, Python, web design, and other digital skills to over 40,000 learners. Ninety-two percent of those learners identify as women or girls.

An LLC learner. Photo by Cheryl Stephenson

Mozilla spoke with Melissa Sariffodeen — co-founder and CEO of Ladies Learning Code — just a few days after the nonprofits fifth birthday.

Mozilla: A big part of LLC is getting girls into STEM. Do you see yourselves as an advocacy organization in addition to an educational organization?

Melissa: We do programs that are co-ed — but women and girls are definitely our key focus. I wouldn't say we sell ourselves as an advocacy organization, but more and more we're starting to work with our local parliamentarians and government officials about impacting systemic issues. We're definitely advocating and supporting women and technology. But we've only recently started trying to move the needle in bigger way.

Mozilla: Do you often encounter girls with the assumption that coding is just for males?

Melissa: We do. Yesterday, there were a couple girls in the front of a classroom. They said, "I can't do this." We said, 'Why do you think that?" We're uncovering the idea that for so long, girls have been told technology is for boys.

The first 40 minutes, they were engaged and didn't want to try. But by the end of the class, the two girls loved it. They had great websites, they were styling like crazy. They were excited and they didn't want to leave. It doesn't take long to realize the value of coding — we see that time and time again in our programs. All the programs we run for girls specifically, we anchor with the question "Why." Not "how do I build it," but "why do I build it."

Mozilla: Almost across the board in countries around the world, more men than women use the Internet. Do you have insight into what's driving that?

Melissa: There was a point in the SOS–when the personal computer debuted — when we decided to gender technology. To promote it to one group over another. I think that's where there was a huge decline around women in technology. After that, you see the gap. Technology is very much geared toward boys, and I think that's systemic.

I see this in our community. Parents sign their boy up for co-ed [technology] camp, but don't sign their girl up. That's really, really pervasive. But I see this changing. I see the popularity of our programs across the country — we can't keep up with the demand. There are so many programs like ours across the world that are really encouraging girls to pursue technology early on.

This interview has been edited and condensed for clarity.