

# Decentralization



**A healthy Internet is decentralized.** There shouldn't be online monopolies or oligopolies. Instead, big and small businesses—and individuals from around the world—should all be able to contribute to and provide online services. Internet users should be able to reap the benefits of competition and exposure to different ways of thinking.

## From the Mozilla Manifesto:

**#06: The effectiveness of the Internet as a public resource depends on interoperability (protocols, data formats, content), innovation and decentralized participation worldwide.**

**#05: Individuals must have the ability to shape the Internet and their own experiences in it.**

The Internet is built on a straightforward stack of technical systems, depicted by the Open Systems Interconnection (OSI) model—network cables through communications protocols to applications. This structure facilitated the emergence of a diverse and heterogeneous Internet experience, where the open, shared, interoperable structure built around the TCP/IP protocol supported a wide variety of operating systems, applications and service providers.

But today, the picture is more complicated. Layers of devices, platforms, cloud storage systems and proprietary data dominate the landscape, connected through complex technical nestings and interconnections. And often, a single provider controls a vertical stack of applications and services, in the process offering walled gardens and limiting user choice and competition. This dynamic has become far more widespread and proved far more effective in the era of smartphones than it was for the web, as network effects and other factors have helped make a few titans dominant in social networks, search and other markets. And control over a small vertical or horizontal can often be leveraged into other segments of industry, creating an incremental creep towards ever more centralization and control.

We will lose something of what makes the Internet unique if the ecosystem of the future is dominated

by centralized one-provider experiences: the Internet, as brought to you by Apple, or Google, or another of a very few competitors. New entrepreneurs will struggle to succeed, unless they can latch themselves onto one of these powerful incumbent companies. Users who are frustrated by one application or service within the stack will often be stuck with it, as switching to a different silo would mean accepting other frustrating pieces—if portability is even possible.

In practice, this reality limits access to the Internet as a whole and the benefits it offers—even more so when a user believes the silo they are trapped within represents a full, complete Internet experience. At that point, not only is the user harmed, but the potential corrective tools of market forces are hamstrung by lack of awareness.

This challenge speaks directly to Mozilla's origins and identity. At our beginning, we made Firefox in response to the integrated Windows Internet Explorer stack. Microsoft had restricted effective competition and choice, and we seized the opportunity to be different. Today, we face this same set of issues again. So Mozilla continues to bring our spirit of willful independence into our products, and look for public policy levers to advance our vision of a decentralized Internet throughout the ecosystem.

*This is part of a series of briefs intended to provide more depth into Mozilla's thinking and actions on **five key issues that comprise Internet health**. Their objective is to educate, to guide, and to inspire action. They are meant to be illustrative, rather than exhaustive.*

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## Key topics in decentralization:

[Net neutrality](#)

[Interoperability](#)

[Competition and choice](#)

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# Net neutrality

▶ The Internet is at its best when it is an open and level playing field for innovation. Laws and regulations are needed to limit gatekeeper power and preserve net neutrality.

The Internet cannot be considered open if software developers and content creators cannot reach users over the Internet. Network operators manage the infrastructure between network endpoints; all Internet traffic passes through the system of at least one network operator and generally several different operators. This puts network operators in a powerful position, including to use technology and/or pricing practices to influence Internet users' online experiences. We have seen some network operators attempt to abuse this position—**harming their competitors**, or introducing **new discriminatory charges** that discourage innovation.

This is why we need net neutrality: a legal requirement that network operators cannot block or skew connectivity and the choices of Internet users, thereby unduly interfering with innovation and communication online.

At Mozilla, we have long been aggressive advocates for net neutrality in many countries and contexts - and we have helped to deliver major victories in the United States, Europe, and other regions around the world. We work directly with legislatures

and regulatory bodies to craft technologically sound rules and policy frameworks that promote innovation and end user choice. And we have built a global community of passionate Internet users who share our vision for net neutrality as a key driver of decentralization and innovation.

In the context of traditional net neutrality and the role of network operators, the side of decentralization has had many wins. We have seen several laws proposed, debated, and adopted to protect net neutrality, in countries all around the world. Yet those who seek to gain by influencing the flow of Internet traffic and skewing the network's neutrality have not abandoned their efforts, but merely pivoted and scoped them to the new regulatory model they face. Continued vigilance is needed to promote innovation and limit the restrictive power of gatekeepers, including continued support for net neutrality laws and principles around the world—even as the battlefield for decentralization expands and becomes more palpable in other contexts, above and beyond the actions of network operators.

# Interoperability

The Internet is built on interoperable, standards-based tech. But with proprietary ecosystems on the rise, competition, innovation and user choice are in jeopardy.

Throughout its history, the Internet has been engineered according to technical standards. Private sector companies work together through forums including the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C). Generally, these standards include interoperability as a design consideration. Interoperability allows a user to go from one web browser on one operating system on one company's hardware to a completely different stack of technologies, and have the same experience in loading and interacting with web sites. Open standards make interoperability work in practice, by providing engineers and designers with shared building blocks and language elements across a variety of systems.

Open standards and interoperability not only help provide a consistent user experience, but also a transparent and a participatory one—at its core, the technology can be understood and its future evolution can be shaped by many voices.

But these powerful, shared architectural assumptions are being eroded. Proprietary, closed app stores dominate the mobile experience today. Dominant positions empower advantageous maneuvers away from open standards to closed

ecosystems. And even building technology according to shared standards becomes irrelevant in a world where commercial agreements enforce exclusivity and prohibit interoperability.

At Mozilla, our primary contribution to changing this trajectory has been our engineering. We build for the web and to empower web developers, and we work with and lead standards bodies, including IETF and W3C. We also complement this work where feasible through broader public policy and advocacy efforts in support of interoperable, standards-based technology design.

It's unclear what the future holds for the web and for today's nascent proprietary ecosystems. Market forces—including network effects, first-mover advantages and leveraging across market segments—appear to be creating more immediate advantages for closed systems than the open web. But if short-term economic gains limit long-term industry innovation, then the entire technology industry and economy will suffer the consequences. Mozilla stands poised to be impactful on a number of fronts to try to prevent that from happening.

## Competition and choice

The Internet of tomorrow may be very different from today, and may poorly serve user choice and competition. Policymakers and technologists must find effective paths forward.

Net neutrality and interoperability represent pieces of a broader picture. Net neutrality limits the power of network operator gatekeepers to leverage their control of physical connectivity infrastructure over other actors. Interoperability as a positive vision for engineering design promotes the same spirit—willfully designing systems to disempower control over others through technological locks on the gates between systems. Above and around these is the landscape of competition and choice, as a policy framework and a holistic objective to harness market forces and user behavior to generate good outcomes.

As noted above, the open, standards based ecosystem that has long defined the Internet is increasingly being shadowed by proprietary, top-down ecosystems. The problems with this approach are bigger than a loss of transparency and participation in user experience. Vertically integrated silos subject users to a centrally controlled, homogenous stack of technologies. And at a particular moment, this can present a compelling user experience. But over time, such a world reduces the number of competitors to those few who can build and offer the whole stack, thus greatly limiting users' choices. In contrast, a diversified stack - one capable of being disrupted at

any individual level by an underdog or new entrant—promises greater capacity for competition and innovation, and a richer set of choices for users.

At Mozilla, we build for open into our technologies. We are not only standards-based but also open source. We bring transparency, participation, interoperability, and competition into everything we do. We evangelize for and support open source and open standards at every opportunity, including organizing conferences and funding open source software development. And in public policy, we oppose gatekeeper power where it appears, through advocacy for net neutrality, copyright reform, and other issues.

Public policy, today, seems **insufficiently equipped to face these silos**. For competition and user choice, the future will likely get worse before it gets better. The impact of a range of EU policies and proceedings relating to competition and the tech industry is uncertain. In the U.S., competition and consumer protection authorities have become more aggressive in recent years, but again, the ultimate impact is uncertain. Mozilla will continue to engineer both technology and public policy in support of constructive and effective paths forward for competition and consumer choice online.

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## Local contribution

► **Mozilla Manifesto 5:** individuals must have the ability to shape the Internet and their own experiences on it. In many parts of the world, that is easier said than done, without relevant content, applications, and services available online.

Decisions about the Internet are too often made by a few people in positions of power. This concentration limits the diversity of thought and perspective, which reduces the Internet's effectiveness at serving to benefit all users. And it can marginalize certain communities or individuals, whether intentionally or unintentionally.

As one example, the creation and distribution of digital content remains deeply uneven. The web is predominantly in English. Chinese, Spanish, Arabic and Portuguese speaking Internet users make up 37.5% of the total online population, **but only 11% of online content is in their language.**

Mozilla believes that the best way to sustain the Internet as a public resource and an integral part of modern life is to ensure that individuals have the ability to shape the Internet and their own experiences online. This means not limiting users to moving apps around on their homescreens, but instead inviting meaningful contribution to a range of layers in the Internet ecosystem, from web content to technical standards, engineering to policy. Generating locally relevant content

is particularly difficult as a component of this empowerment. Local relevance is about more than just language; it's also tailored to the cultural context and the local community. And where local content is generated by local communities, it is often confined to specific applications and services, like Facebook and Weibo, where it can be harder to achieve the same catalytic growth made possible by the open web - as well as easier for gatekeepers, whether corporate or government, to monitor, constrain, and censor content.

As mobile phones become more accessible, and Internet access expands into new regions and communities as a result, locally relevant content and contribution will be key to increasing the number of people who recognize and take advantage of the opportunities the Internet offers. In this context, it is also possible to envision new patterns of content creation - and ways in which users themselves can take a stronger role in shaping the Internet. Mozilla will continue to lead by example within tech, and try to build models that can be adopted by others.

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## Read More

We work alongside industry associations and public interest organizations in understanding the complex interplay of applications and services in the modern world, and advocating for architectural and policy approaches that promote competition and innovation, and put users at the center of the ecosystem.

### Here are a few additional resources from other groups:

**CDT Standards:** <https://cdt.org/issue/internet-architecture/standards/>

**CCIA Project Disco:** <http://www.project-disco.org/>

**Save the Internet:**

**US** (<http://www.savetheinternet.com/sti-home>)

**Europe** (<http://savetheinternet.eu/>)

**India** (<http://www.savetheinternet.in/>)