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The Internet Way of Networking

Safeguarding the future of the Internet



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Introduction

Founded in 1992, the [Internet Society](#) is a global charitable organization advocating for an open, globally connected, secure, and trustworthy Internet for everyone.

[Our mission](#) is to support and promote the development of the Internet as a global technical infrastructure, a resource to enrich people's lives, and a force for good in society.



The Internet is for everyone



Overview of our work



Making the Internet Stronger

The Internet needs our help to maintain its critical properties and be there for everyone.



Growing the Internet

Nearly a third of the world's population is not connected.



Empowering People

Attract, engage, and strengthen our whole community.



Connecting one of the most remote places in the world

The villages of Khunde and Khumjung in eastern Nepal are extremely remote, cut off from the world beyond by the mountains that define them.

They are at an elevation of about 4000m and are a few kilometres off the Everest Trail.



© Nyani Quarmyne





In 2022, via local partner the Nepal Internet Foundation, the Internet Society teamed up with the community to bring basic Internet connectivity to the villages.

It is a community network: local networks connected to the Internet built and maintained by the communities who use them.



Originally a research project, the Internet
is now everywhere.

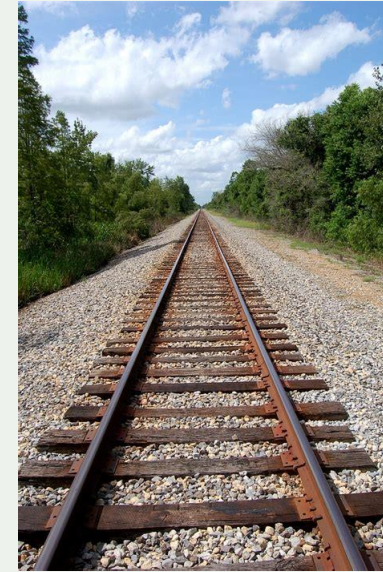
How? Why?



Comparing postal system & the Internet

To send mail, you need physical infrastructure:

- Post offices
- Roads
- Airports
- Railway



To transport any data across the Internet, like an email, you also need physical infrastructure:

- Undersea cables
- Fiber lines
- Ethernet
- 5G and wireless technologies
- Bluetooth
- Satellite connections



Explaining the Internet through the Postal System

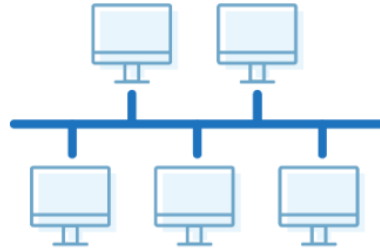
| Task | Postal System | Internet Protocol |
|----------------------------|---|---|
| Location | <p>Zip codes provide a numerical representation of a physical place. IETF at Hilton Union Square: 94109</p> <p>[941] [09] [01] [24]</p> <p>↓ ↓ ↓ ↓</p> <p>[DC] [Delivery Area] [Ellis St] [Building]</p> | <p>IP addresses provide a numerical representation of a server connected the Internet. IETF.org: 173.231.216.225</p> <p>[173.231] [216] [225]</p> <p>↓ ↓ ↓</p> <p>Network Subnetwork Server</p> |
| Human readable destination | <p>Street addresses provide a human readable representation of a physical place and correspond with zip codes.</p> | <p>Domain names provide a human readable representation of places on the Internet and correspond with IP addresses.</p> <p>https://www.IETF.org/</p> |
| Routing | <p>Using the zip code, sorting facilities send mail to other facilities closer to the destination and becoming more local in covered area. Mail can go on many different roads or via different vehicles and still reach the next facility.</p> | <p>Using the IP address as the destination, networks use routing protocols to route the data from one network to another until it reaches the destination.</p> |
| Transport | <p>Mail is transported in standardized envelopes or packages by vehicles to their destination. These have the destination and sender's addresses written on them.</p> | <p>Using the TCP/IP protocol. Data is sent in "packets" across networks to their destination. The packet has the the destination and sender's IP addresses.</p> |

Which one is like the Internet?

1 Point to point



2 Bus



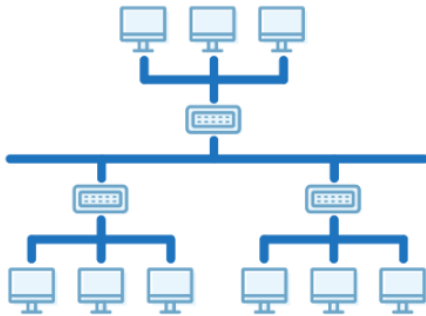
3 Ring



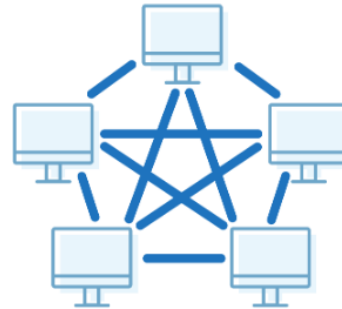
4 Star



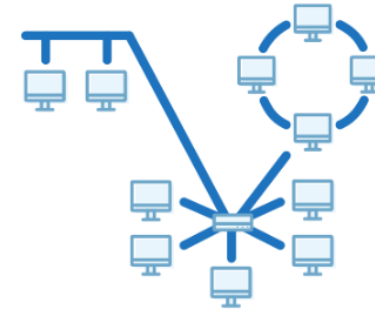
5 Tree

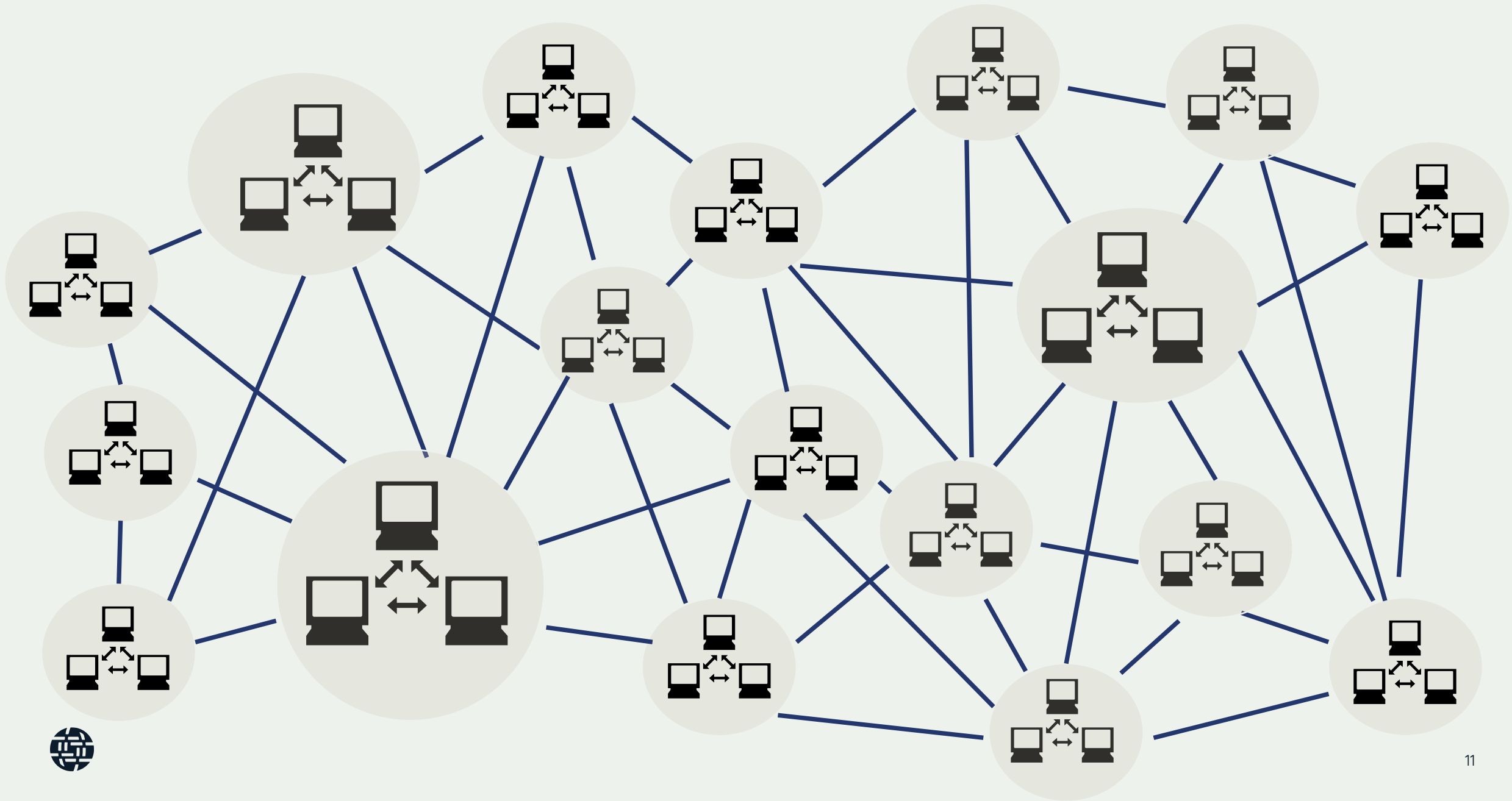


6 Mesh



7 Hybrid





US 'Clean Network' program seeks to build clouds, cables, and apps free of China

Impact Of India's Cybersecurity Directions On The Global Internet

Tech

Russia 'successfully tests' its unplugged internet

POLITICS

Cambodia plans China-style internet firewall

'National internet gateway' includes 'censorship angle' that alarms NGOs

TECHTANK
Battle lines for the future of the internet



What features of the Internet have led
to its success?



The critical properties of the Internet



Accessible
Infrastructure
with a Common
Protocol



Open
Architecture of
Interoperable and
Reusable Building
Blocks



Decentralized
Management and
a Distributed
Routing System



Common Global
Identifiers



Technology
Neutral, General-
Purpose Network





An Accessible Infrastructure with a Common Protocol

- You don't need permission from a central authority to connect to the Internet. You find a point nearby, make arrangements to connect, and you're on the Internet.
- Every node has a common, open, network layer protocol available: the Internet Protocol (IP).
- An Internet user trying to use a new application doesn't have to ask questions like "Are they running the same protocol I am?" or "Can I reach their part of the Internet from my part of the Internet?"





A Common Global Identifier System

- There's an essential glue that allows every user to connect to the applications they use: IP addresses.
- Having common global identifiers delivers a key benefit: consistent addressability. The common identifier space, underneath all of the various levels of application, delivers a coherent view of the entire network.
- From any point on the Internet, a tiny packet of information can be passed from computer to computer, each one examining the same few bits — the address — to clearly identify a destination.
- The Domain Name System (DNS) has many uses, but the most common is the creation of a consistent mapping between names and IP addresses










Example: Domain Name System

- DNS queries enable servers to translate human-friendly names into corresponding computer-friendly IP addresses.
- The “DNS protocol” is the set of rules for network entities to use in queries and responses regarding names in the global, distributed, hierarchical database.
- The content of the server for the domain name system does not matter. The IP Address the server is assigned does not matter. All that matters is that the domain name translate to the right address.



Five critical properties and their benefits

| | Critical Property | Benefits to the Users |
|--|--|---|
|  | An Accessible Infrastructure with a Common Protocol | Unrestricted access and common protocols deliver global connectivity and encourage the network to grow. As more and more participants connect, the value of the Internet increases for everyone. |
|  | A layered architecture of interoperable reusable building blocks | Open architecture creates common interoperable services, which deliver fast and permissionless innovation everywhere. The inclusive standardization process and demand-driven adoption ensures that useful changes are adopted, while unnecessary ones disappear. |
|  | Decentralized management and distributed routing | Distributed routing delivers a resilient and adaptable network of autonomous networks, allowing for local optimizations while maintaining worldwide connectivity. |
|  | A Common Global Identifier System | A common identifier set delivers consistent addressability and a coherent view of the entire network, without fragmentation or fractures. |
|  | A General Purpose Network | Generality delivers flexibility. The Internet continuously serves a diverse and constantly evolving community of users and applications. It does not require significant changes to support this dynamic environment. |

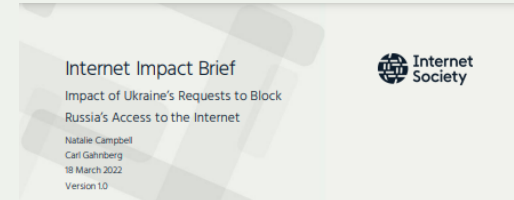
Enablers for an Internet for everyone

| Internet goals | Enablers |
|--------------------|---|
| Open | Easy and Unrestricted access |
| | Collaborative Development, Management, and Governance |
| | Unrestricted Use and Deployment of Internet Technologies |
| Globally Connected | Unrestricted Reachability |
| | Available Capacity |
| Secure | Data Confidentiality of Information, Services, and Applications |
| | Integrity of Information, applications, and services |
| Trustworthy | Reliability, Resilience, and Availability |
| | Accountability |
| | Privacy |



Internet Impact Briefs

- Analyses of whether and how a proposal, development, or trend will benefit or harm the Internet
- Examples from APAC:
 - India CERT-In Cybersecurity Directions 2022 (Jun 2022)
 - Bangladesh Social Media Guidelines 2021 (March 2022)
 - Cambodia National Internet Gateway (Feb 2022)
 - India's Intermediary Guidelines (Nov 2021)



Internet Fragmentation

The Internet is a 'network of networks': a web of thousands of networks, connecting to one another voluntarily.

Internet fragmentation is the division or splintering of the unified, open, global Internet into smaller, isolated networks.

These networks can be subject to different rules, regulations, and technical standards and are sometimes unable to connect or operate together seamlessly.



Attacks on the borderless, seamless, interoperable Internet can make it unrecognizable

Access to websites, platforms, and services will **depend on who and where** we are.

Content will be **curated** and only available depending on the approval of or sanction by a particular government or company.

In certain jurisdictions, services will **cease to be available** at all.



When the Internet stops being the Internet

When we don't protect what the Internet needs to exist and thrive, it starts to shatter.

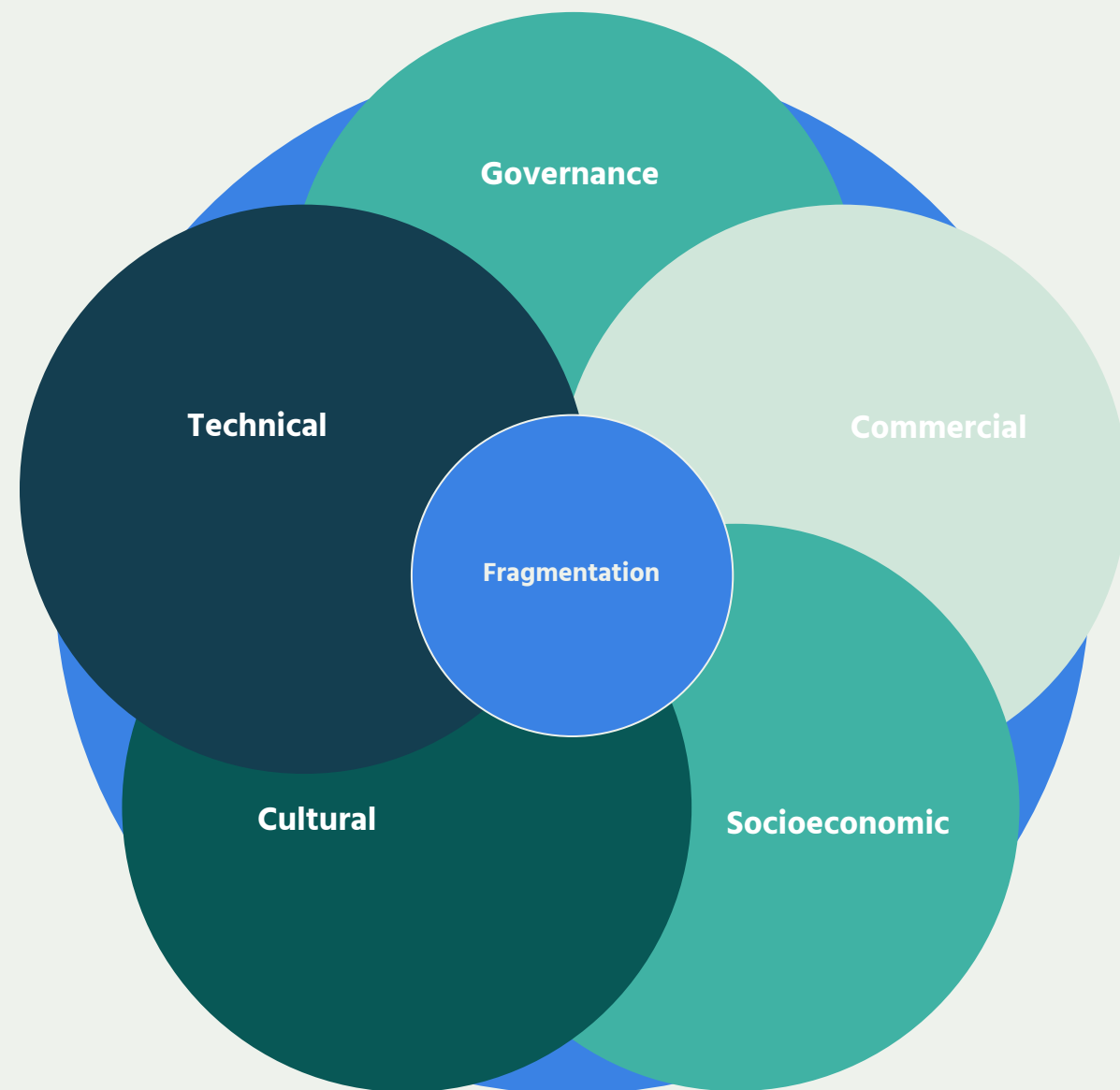
A splinternet is a collection of isolated networks controlled by governments or businesses that don't connect or interoperate with each other efficiently.



Photo courtesy of Katelyn Greer via Unsplash

Axes of fragmentation

1. **Governance:** Fragmentation can occur when the power to make decisions about the Internet is centralised in the hands of a few.
2. **Commercial:** Business decisions or policies can limit users' access to services, platforms, apps or websites.
3. **Socioeconomic:** Restrictions on Internet access, access to information, or freedom of expression could result in communities being 'left behind', exacerbating poor digital literacy and deepening inequalities.
4. **Cultural:** When governments or businesses use social norms to restrict access to information or certain forms of expression.
5. **Technical:** Decisions that divide the open, unified Internet into smaller, isolated networks that are subject to different rules, regulations, and technical standards.



An impact assessment –
not for the environment,
but for the Internet.



Fellowship programs



Programs that build knowledge, skills and competencies of Internet leaders who defend an open, globally connected, secure, and trustworthy Internet for everyone.



Our Programs

Mid Career Fellowship

Equips global mid-career Internet champions with the with knowledge, skills and competencies to enable inclusive, innovative, holistic, and strategic leadership.

15 Fellows
7 Months

Applications open in March

<https://www.internetsociety.org/fellowships/mid-career/>

Early Career Fellowship

Equips global early career Internet champions with the practical knowledge and skills for them to contribute to the development and defense of the Internet.

15 Fellows
6 Months

Applications open in January

<https://www.internetsociety.org/fellowships/early-career/>

Youth Ambassador Program

Equips the next generation of Internet champions with knowledge, skills and competencies to influence policies that defend the Internet at key industry events.

15 Ambassadors
10 Months

Applications open in September

<https://www.internetsociety.org/policy-programs/youth-ambassadors/>



Our Programs

Polymakers Program

Offers training to policymakers on the Internet's operations. It also provides visibility on the Internet Engineering Task Force's standards environment.

5/10 Fellows
3 Times a Year

<https://www.internetsociety.org/policy-programs/policymakers-program-to-ietf/>

AfPIF Fellowship

Equips Internet experts with skills and tools to address interconnection, peering, and traffic exchange challenges and maximize opportunities that grow Internet at the *African Peering and Interconnection Forum*.

15 Fellows
4 months

<https://www.internetsociety.org/fellowships/afpif/>

Pulse Research Fellowship

Provides an opportunity for people to work on data-driven analysis related to the Internet, how it works, and artificial Internet limitations

3 Fellows
6 Months

<https://pulse.internetsociety.org/fellowship>



Benefits

Expertise & know-how

Access to world-class experts.

Deepen subject matter expertise.

Learn how to navigate digital transformation and disruption.



Professional development

Get 1:1 mentorship by key Internet actors.

Develop skills to become Internet leaders.

Present and promote your work at events.

Shaping the future of the Internet

Lead Internet-related projects and initiatives.

Address challenges to growing and strengthening the Internet.

Access to the community

Join an interactive alumni network to keep building skills & connections.

Be part of a global community with Chapters, Special Interest Groups and Standing Groups

Get involved

- Take the free, 4-week self-paced online course
 - (<https://www.internetsociety.org/learning/iwn/>)
- Check out the Internet Impact Assessment Toolkit
 - (<https://www.internetsociety.org/issues/internet-way-of-networking/internet-impact-assessment-toolkit/>)
- Spot a threat that could harm the open, globally connected, secure and trustworthy Internet?
Let us know!
- Follow us to learn about our campaigns and help amplify our messages on social media.
- Support us as we promote and defend the open, globally connected, secure and trustworthy Internet. Become a member or join your local chapter!



Thank you.

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