16 September 2023

Introduction to “How does the Internet work”

About the Internet Society

The Internet is for Everyone.

We work towards reaching our vision by building, promoting, and defending a bigger and stronger Internet.

About the Internet Society

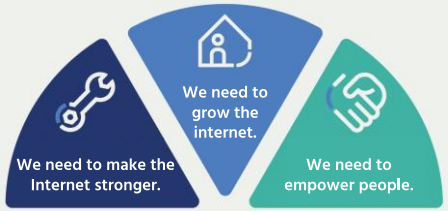
Founded by Internet pioneers in 1992, the Internet Society is home to a global community driven by a common idea: when people have access to the Internet, incredible things happen. They share ideas, build communities, connect to education opportunities, improve health outcomes, and more.

Volunteers from the NYC Mesh community installing Internet connections at new locations to connect underserved areas of New York City, October 2019. © Chris Gregory

About the Internet Society

The Internet Society is a global nonprofit organization connecting and empowering communities to ensure the Internet remains **open, globally-connected, secure, and trustworthy**.

The organization defends and promotes policies, standards, and protocols that create access and build trust in the way the world exchanges information.



Internet Society Ethiopia Chapter Launch Event in Addis Ababa, Ethiopia. March 2020. © Internet Society

Inspiring people make the Internet Society

100,945

Over 100k Members have joined local chapters and participate in online forums and attend events.

130

Chapters and Special Interest Groups in 125 countries are comprised of local volunteers who run programs and activities that support our principles and mission.

136 Over 135 staff speaking 38 languages in 28 countries.

Internet Society in Numbers:

Public Interest Registry .org domains

88

Organization Members are companies and organizations from the technology community, business, academia, and the not-for-profit sector.

96

About 100 **Contributors**

35 MM U$D

1,5 MM U$D

3 MM U$D

Total budget: 39,5 MM U$D

Tangible impact

The Internet must remain **open, globally connected, secure, and trustworthy.**

Every day, we are making this a **reality.**

2021 key achievements

6 Countries where we have launched new Internet exchange points (IXPs).

20 strengthened existing IXPs, donating equipment and providing training

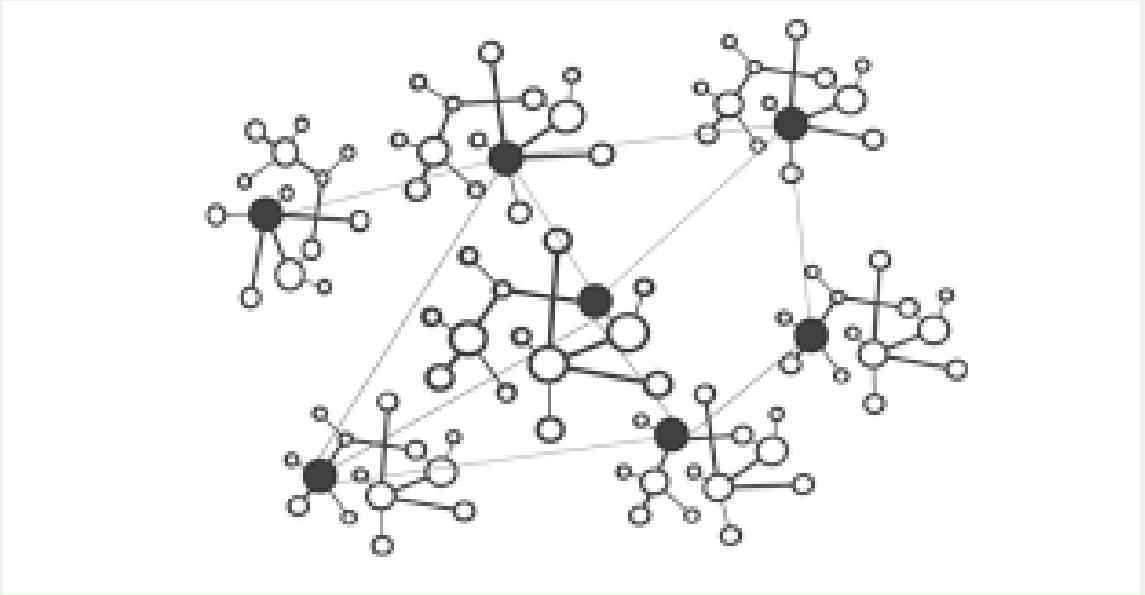
1,300 network operators in **60** countries trained on routing security.

33 community networks supported worldwide.

https://www.internetsociety.org/impact-report/2021/

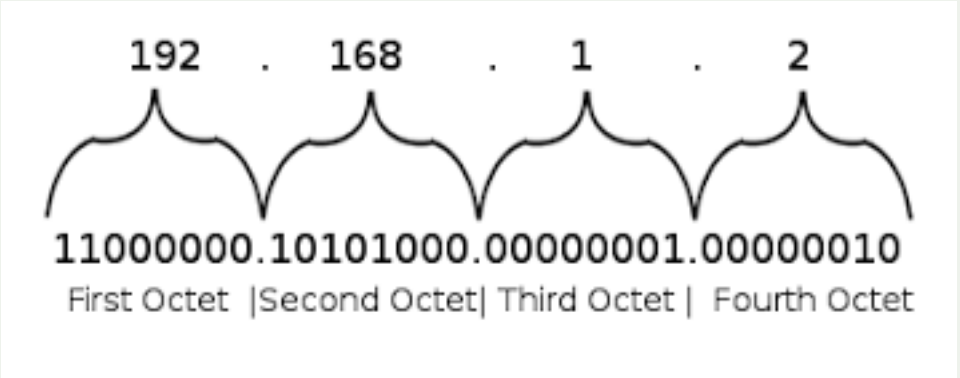
Internet technology and governance primer

Internetwork



What is needed to Interconnect?

- Same language
- Agree on a number of protocoles
- For packet switching
    - Size of the packets
    - Source and destination locations
    - How receipient acknowledges receipt of packets
    - What happens if the receipient does not acknowledge a packet



1973
First description of TCP/IP from Vint Cerf, Robert Kahn

1974
Published paper on subject

1975
First successful experiments conducted

History of the Internet

- Spread information
- Allow collaboration and interaction
- Overcome limits of geographic location

1969
First ARPANET packet is sent

1974
TCP/IP published

1983
DNS created

1990
World Wide Web

1992-1993
First Internet browser

History of the Internet

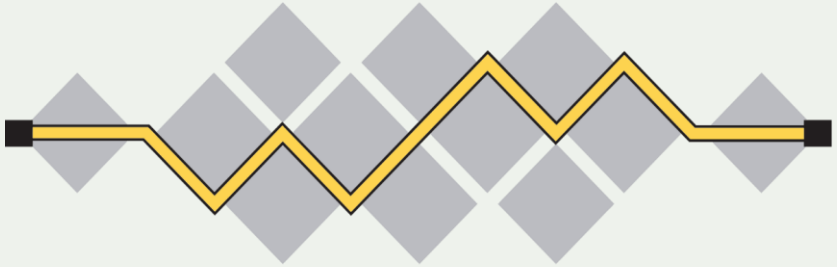
The need for governance institutions

- Before 1985, all the TCP/IP networks were under ARPANET

- There were coordination bodies such as Internet Activities Board (IAB)

- But with NSFTNET and others interconnecting, there was a need of governance institutions

The need for governance institutions …



IETF®

✓Decentralized and collegial nature
✓No centralized governance
✓No central planning
✓No grand design

Resources management

- In addition to protocoles, the Internet needs a few resources amongst which
  - Internet numbers
  - Domain names

Resources management: Internet numbers

-

Internet Assigned Numbers Authority

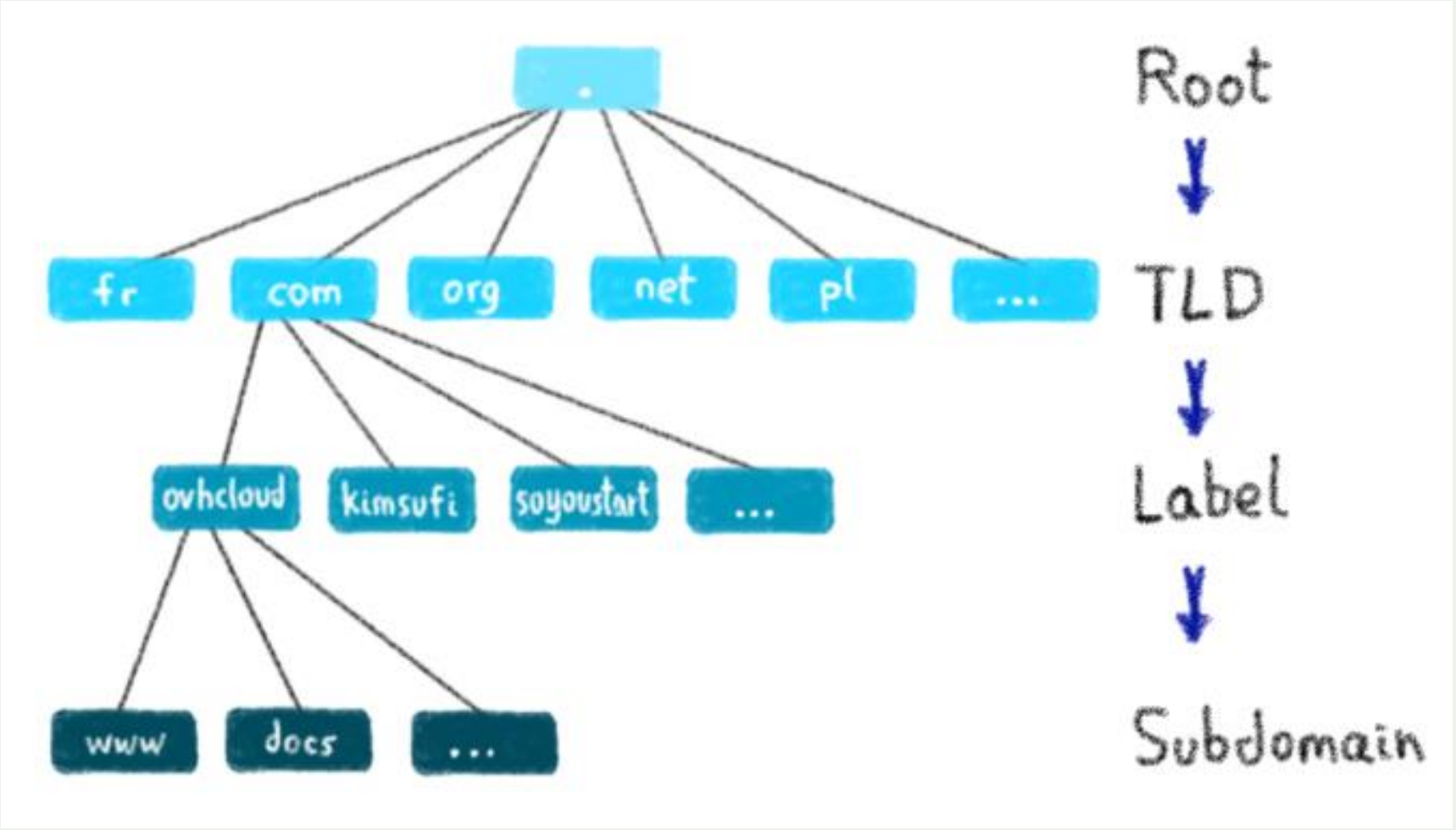
RIPE NCC
RIPE NETWORK COORDINATION CENTRE

APNIC

ARIN
American Registry for Internet Numbers

AFRINIC
The Internet Numbers Registry for Africa

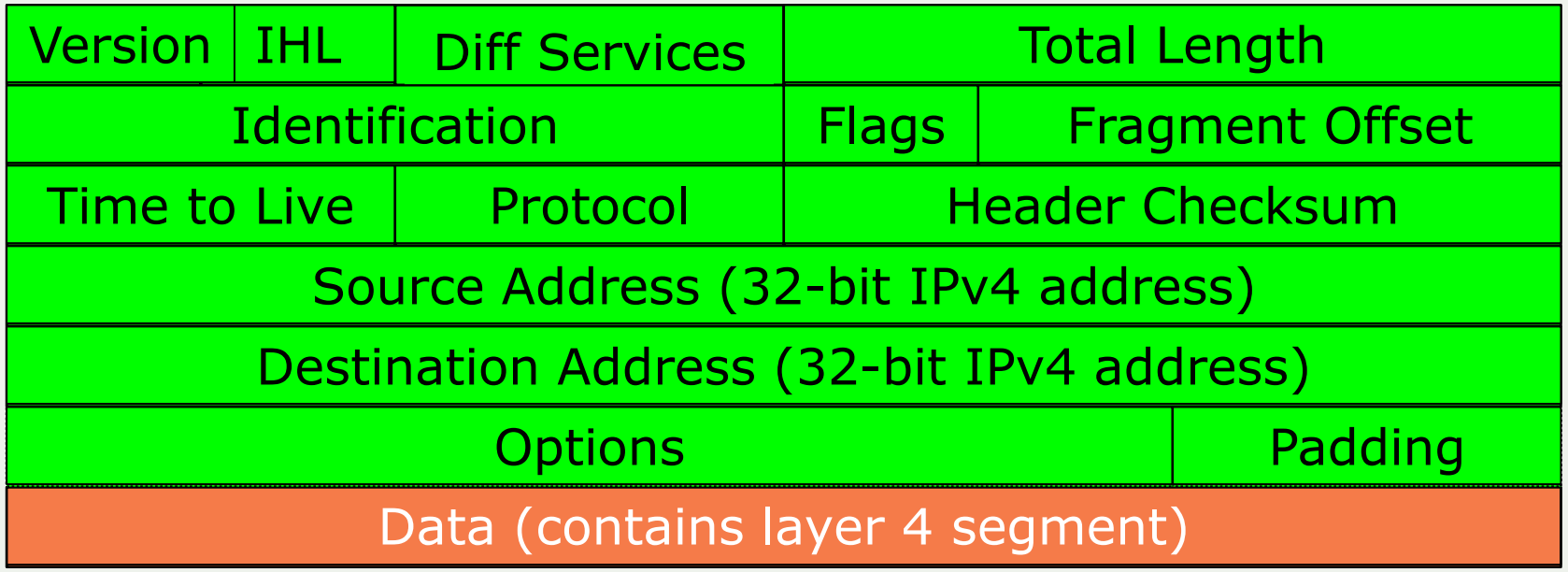
Resources management ...



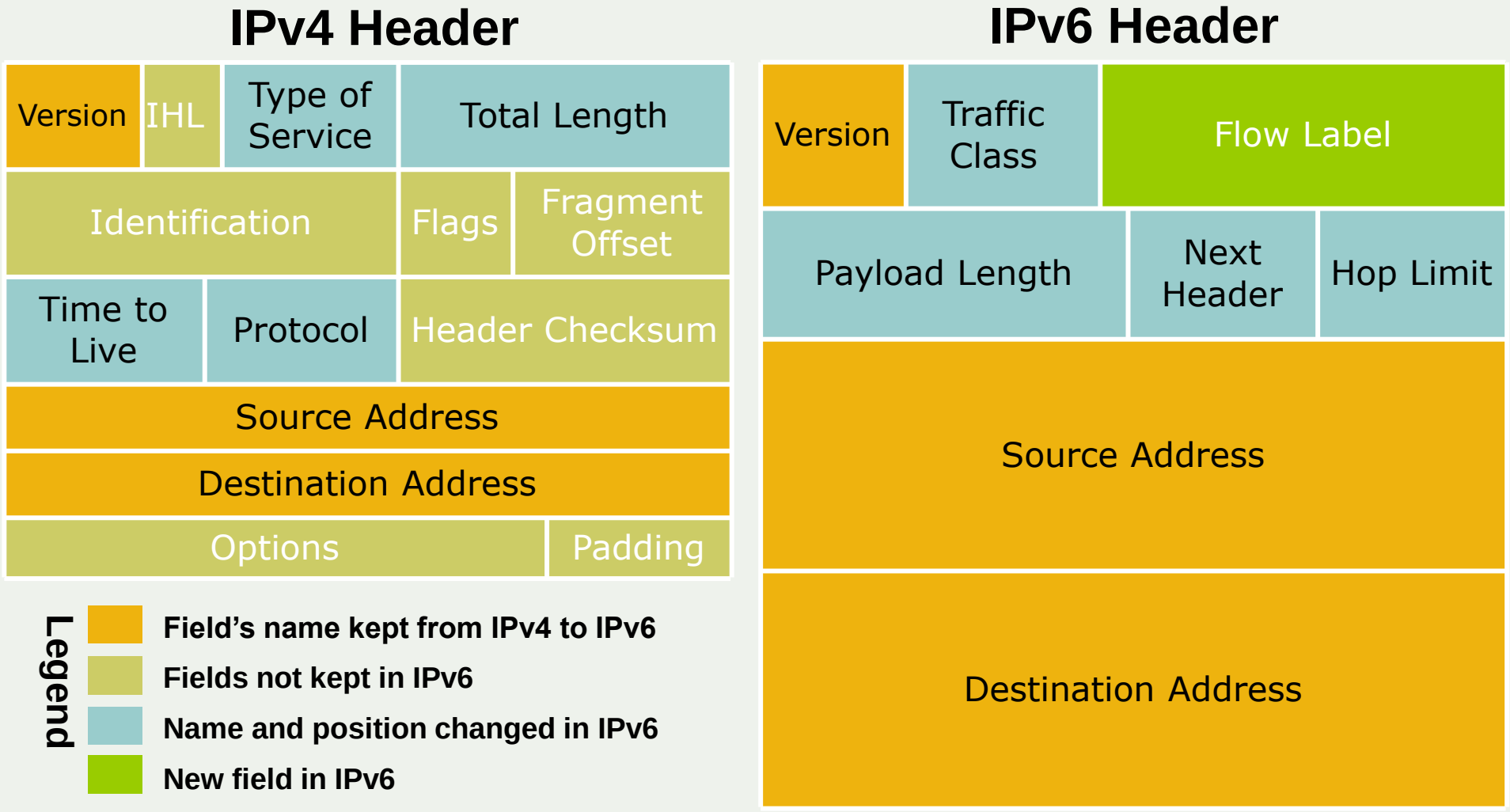
- Under the control of the DoC
- Responsibilities
  - Addresses
  - Domain names
  - Protocols
- RIRs, Registries/Registars and IETF were delegated by ICANN to perform these tasks
- In 2016, freed from US government control

IPv4 and IPv6

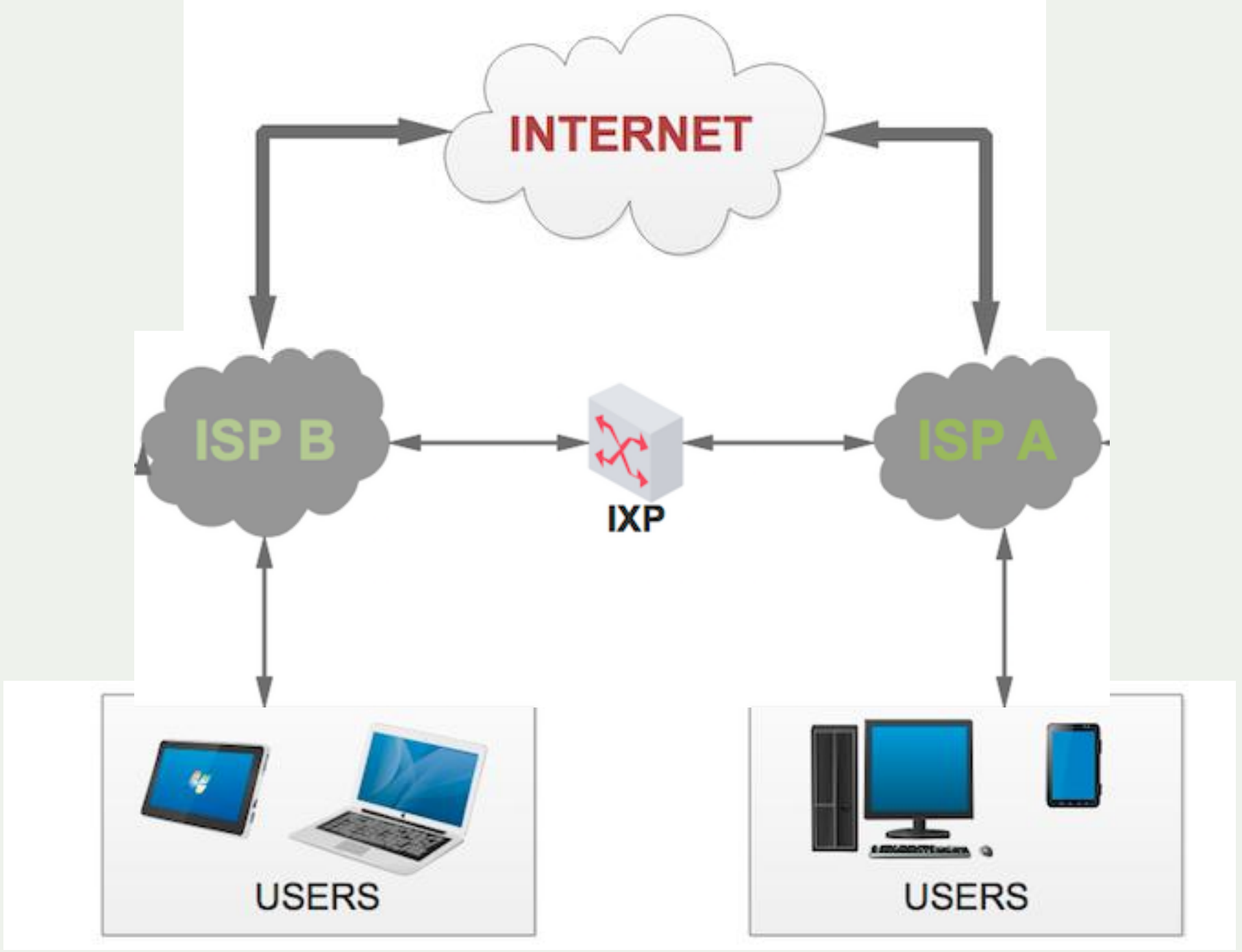
IPv4


Version
IHL
Diff Services
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol
Header Checksum
Source Address (32-bit IPv4 address)
Destination Address (32-bit IPv4 address)
Options
Padding
Data (contains layer 4 segment)

IPv4 and IPv6 Header Comparison



Internet Exchange Points (IXP)


INTERNET
ISP B
IXP
ISP A
USERS
USERS

The Internet Ecosystem

The Internet Ecosystem

The Internet Ecosystem

- ICANN
  - PTI
- RIRs
- gTLD registries
- ccTLD registries

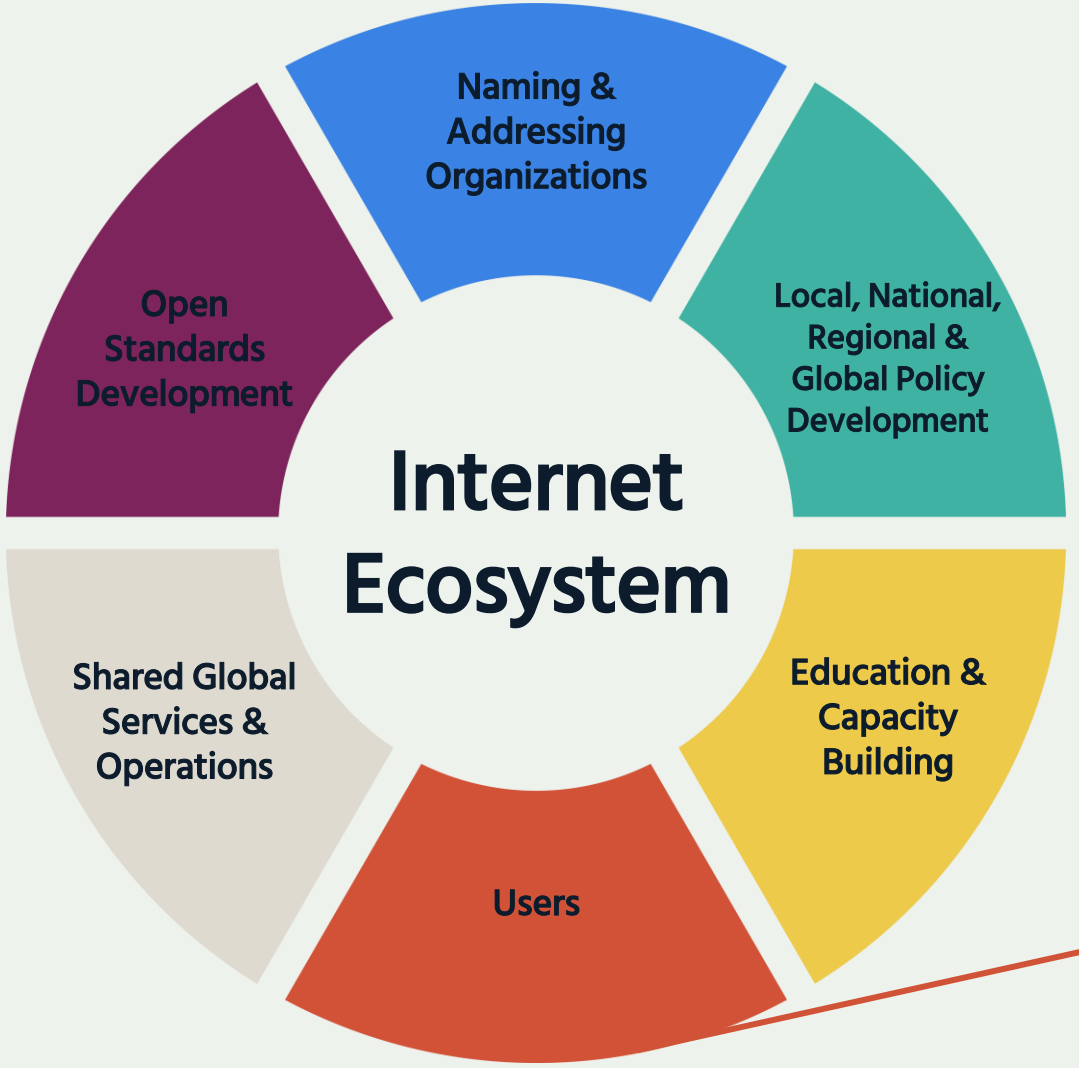
The Internet Ecosystem

- National governments, provincial/state/regional governments
- Regional intergovernmental organizations
- Global intergovernmental organizations

The Internet Ecosystem

- Governments
- Intergovernmental organizations & development agencies
- Internet Society
  - Chapters & special interest groups
  - Individual members
  - Organization members
- Internet community organizations/businesses
- Universities & academic institutions
- Civil society groups

The Internet Ecosystem



- Individuals
- Organizations
- Businesses
- Governments
- Service & apps creators/equipment builders

The Internet Ecosystem

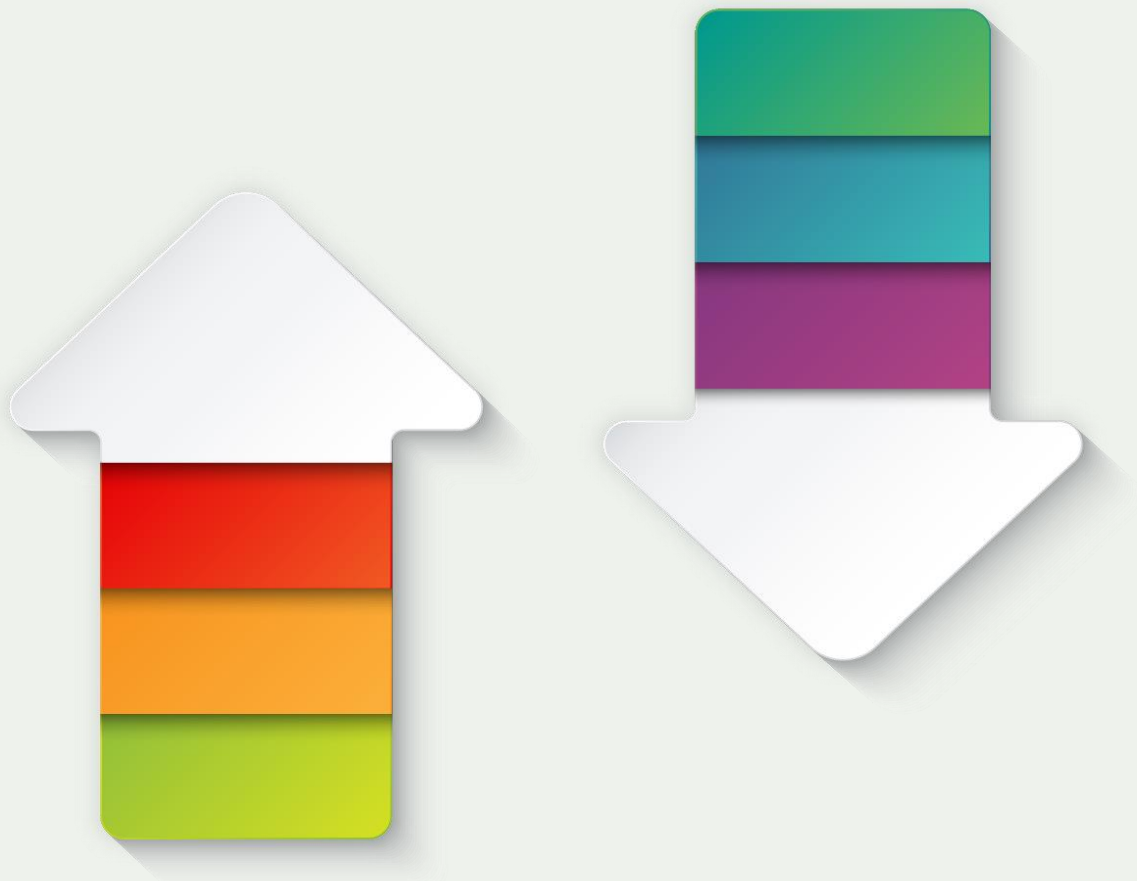
- Root servers
- Network operators
- Service providers
- IXPs
- gTLDs
- ccTLDs

The Internet Ecosystem

- Technical bodies
- IETF
- W3C
- IEEE
- Other specialized bodies

The Internet Ecosystem

- Open technical standards
- Freely accessible processes for technology and policy development
- Transparent and collaborative governance
- Distributed responsibility for technical management, and administrative functions



Questions?

Internet Society

Thank you.

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