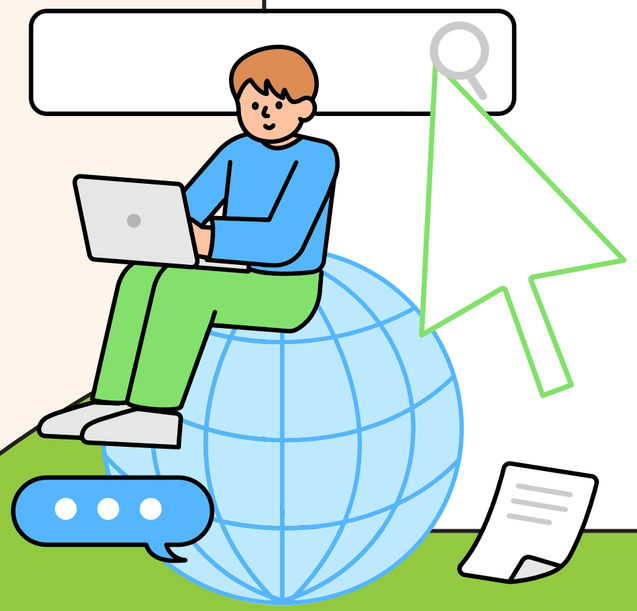
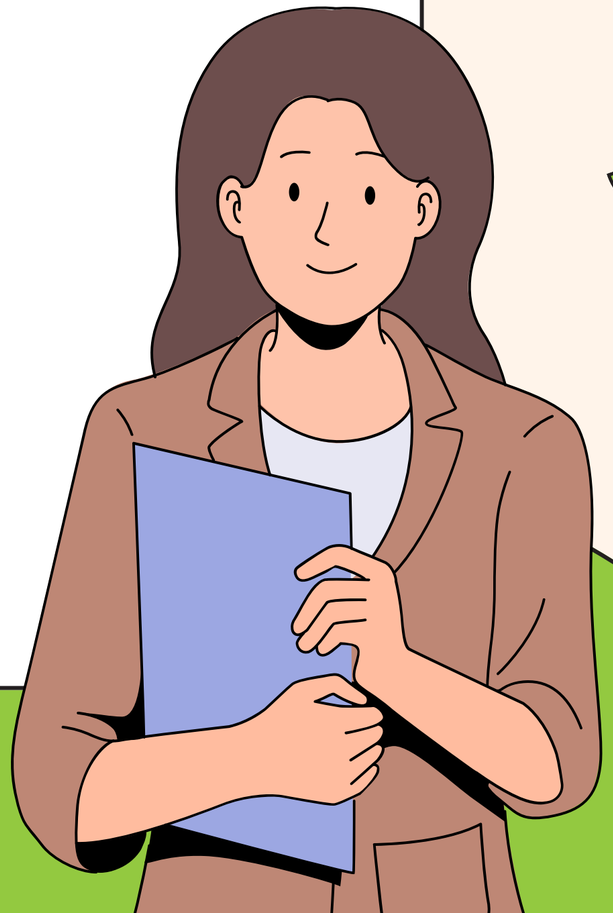
BEHIND THE WEB: UNDERSTANDING INTERNET INFRASTRUCTURE

By: Socheata SOKHACHAN

Let's explore!





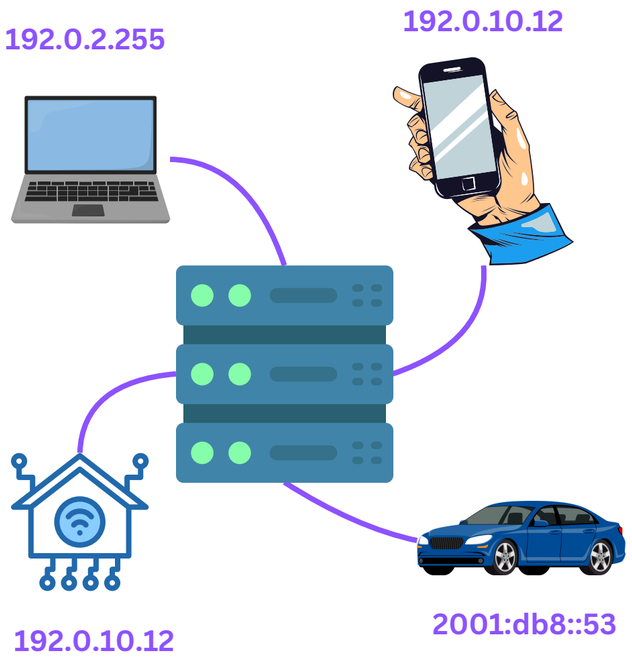
AGENDA

1. How does the Internet work?
2. Who makes up the Internet Governance ecosystem?
3. History of Internet Governance
4. Key Issues of Internet Governance

1. HOW DOES THE INTERNET WORK?

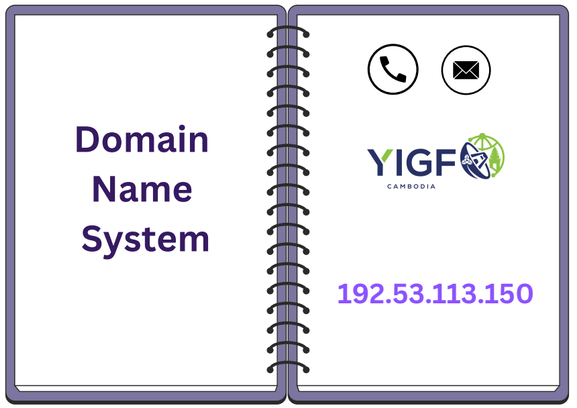
HOW DOES THE INTERNET WORK?

Each device or website on the Internet has a unique address – like a telephone number.



This address is a series of numbers and letters, called an IP address.
IP stands for Internet Protocol.

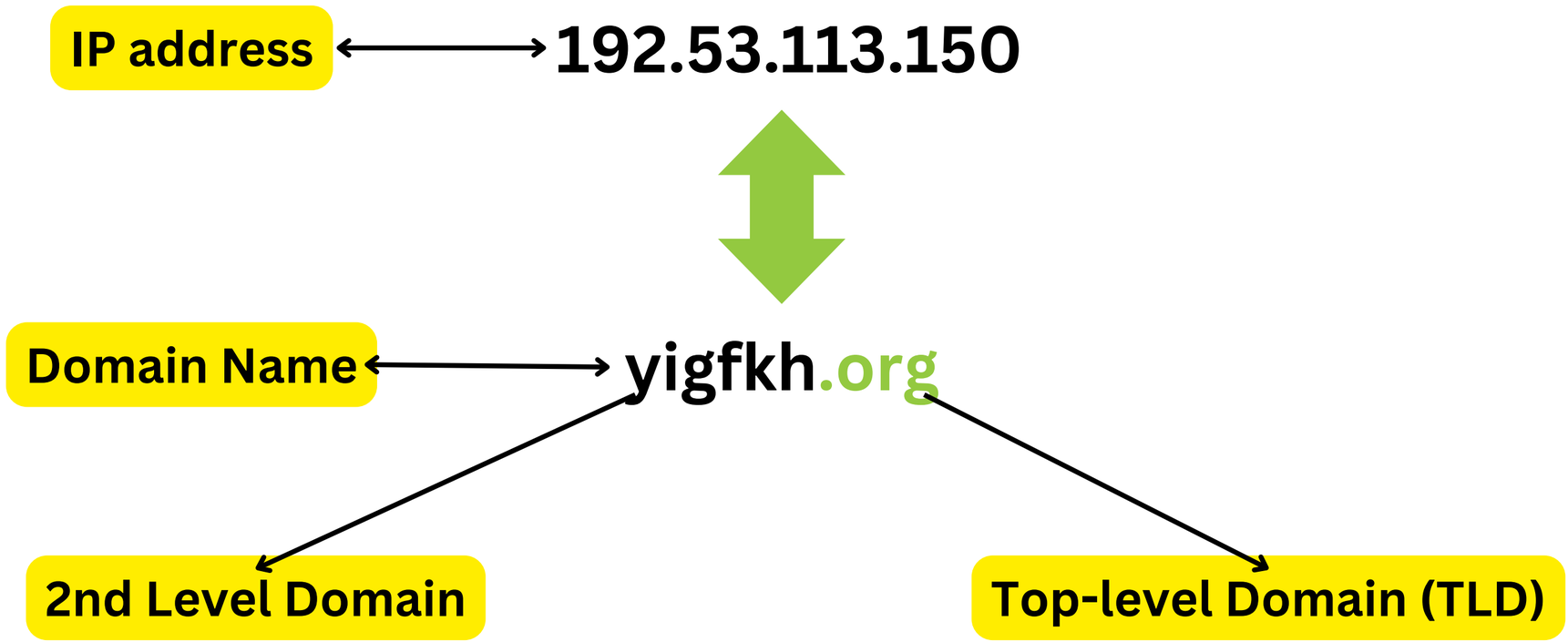
The Domain Name System (DNS) makes navigating the Internet easier by allowing users to type in familiar letters (the domain name)
–
instead of the IP address.



Phone book

For example, you only need to type in https://yigfkh.org to reach YIGF Cambodia's website,
instead of its IP address 192.53.113.150

WHAT HAPPENS WHEN YOU BROWSE A WEBSITE?



WHAT HAPPENS WHEN YOU BROWSE A WEBSITE?

Hey Bro! Where is yigfkh.org?

Your laptop asks the DNS resolver.

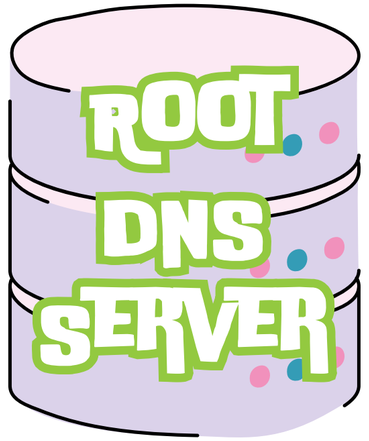
DNS resolver is a server on the Internet that converts domain names into IP addresses.

WHAT HAPPENS WHEN YOU BROWSE A WEBSITE?

Homie! Where is www.yigfkh.org

The DNS resolver asks a root DNS server

Go to .org server!



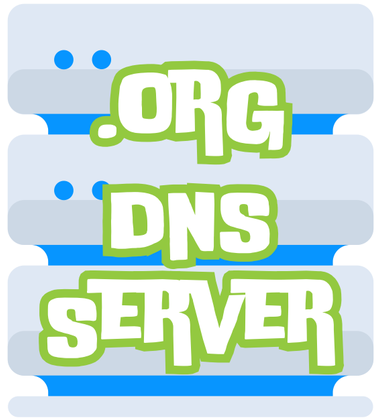
Root DNS servers only know information about top-level domain (TLD)* names, so it tells the DNS resolver to “try .org” and gives the DNS resolver referral information to a “.org” server.

WHAT HAPPENS WHEN YOU BROWSE A WEBSITE?

The DNS resolver asks the .org DNS server

Hey! Where is www.yigfkh.org

Go to yigfkh DNS server!



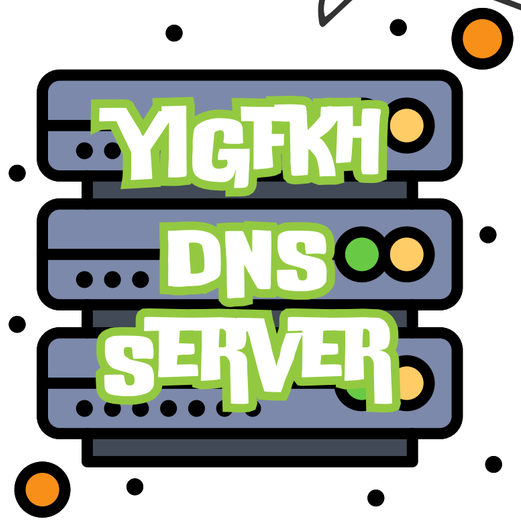
The .org server only knows about .org domains, so it tells the DNS resolver to “try www.yigfkh.org” and gives the DNS resolver referral information to a www.yigfkh.org DNS server

WHAT HAPPENS WHEN YOU BROWSE A WEBSITE?

Bro! Where is www.yigfkh.org

The DNS resolver asks the www.yigfkh.org DNS server

Go to this IP 192.53.113.150



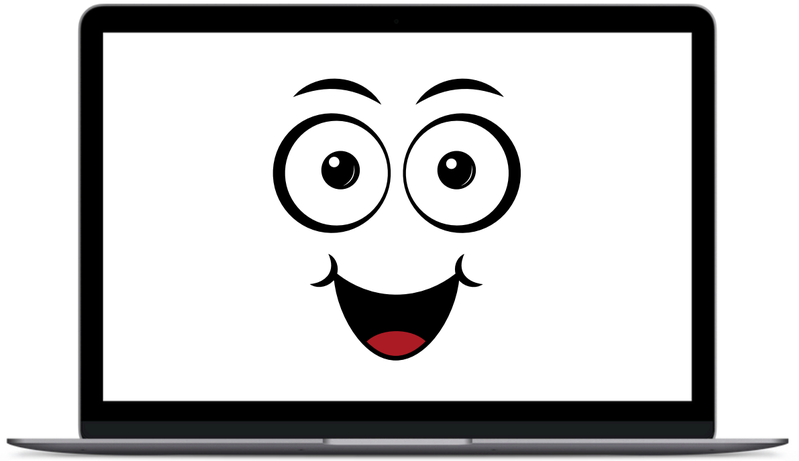
Since the www.yigfkh.org DNS server knows about the entire website address, not just the TLD, it tells the DNS resolver that “www.yigfkh.org is at IP address 192.53.113.150”

WHAT HAPPENS WHEN YOU BROWSE A WEBSITE?

It is at
192.53.113.150

The DNS resolver tells your laptop

Success!



The root servers are critical to the operation of the Internet with the ability to obtain the initial referral provided by the root servers to look up any domain names on the Internet.

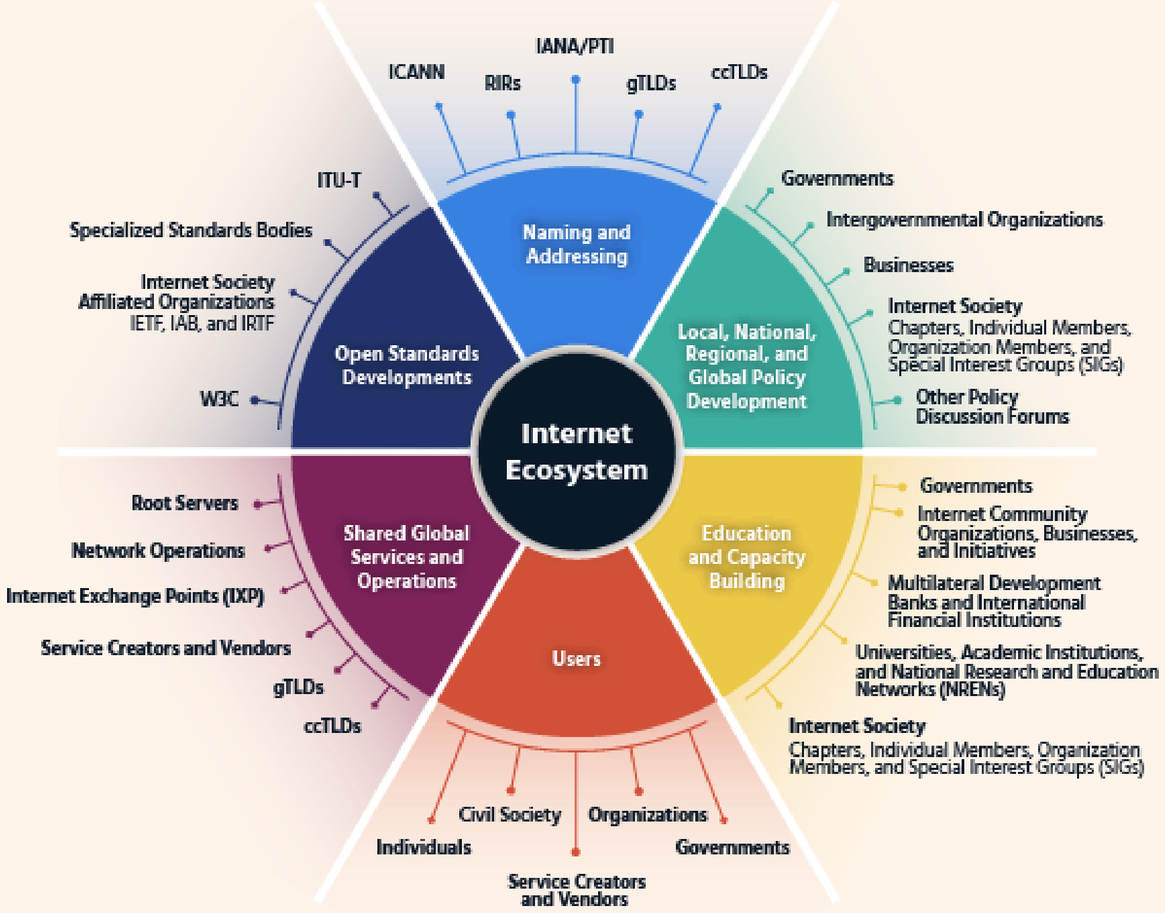
WHAT HAPPENS WHEN YOU BROWSE A WEBSITE?

There are 12 independent root server operators that manage 13 root identities across the globe. The ICANN organization runs one of these root identities. These identities represent over 1,000 individual servers, each providing identical information from the root zone to resolvers all over the world.

The root zone holds referral information for the TLDs, which points to their DNS servers to help resolve your device's request.

WHAT HAPPENS WHEN YOU BROWSE A WEBSITE?

Without the DNS, we wouldn’t have a global, interoperable Internet.

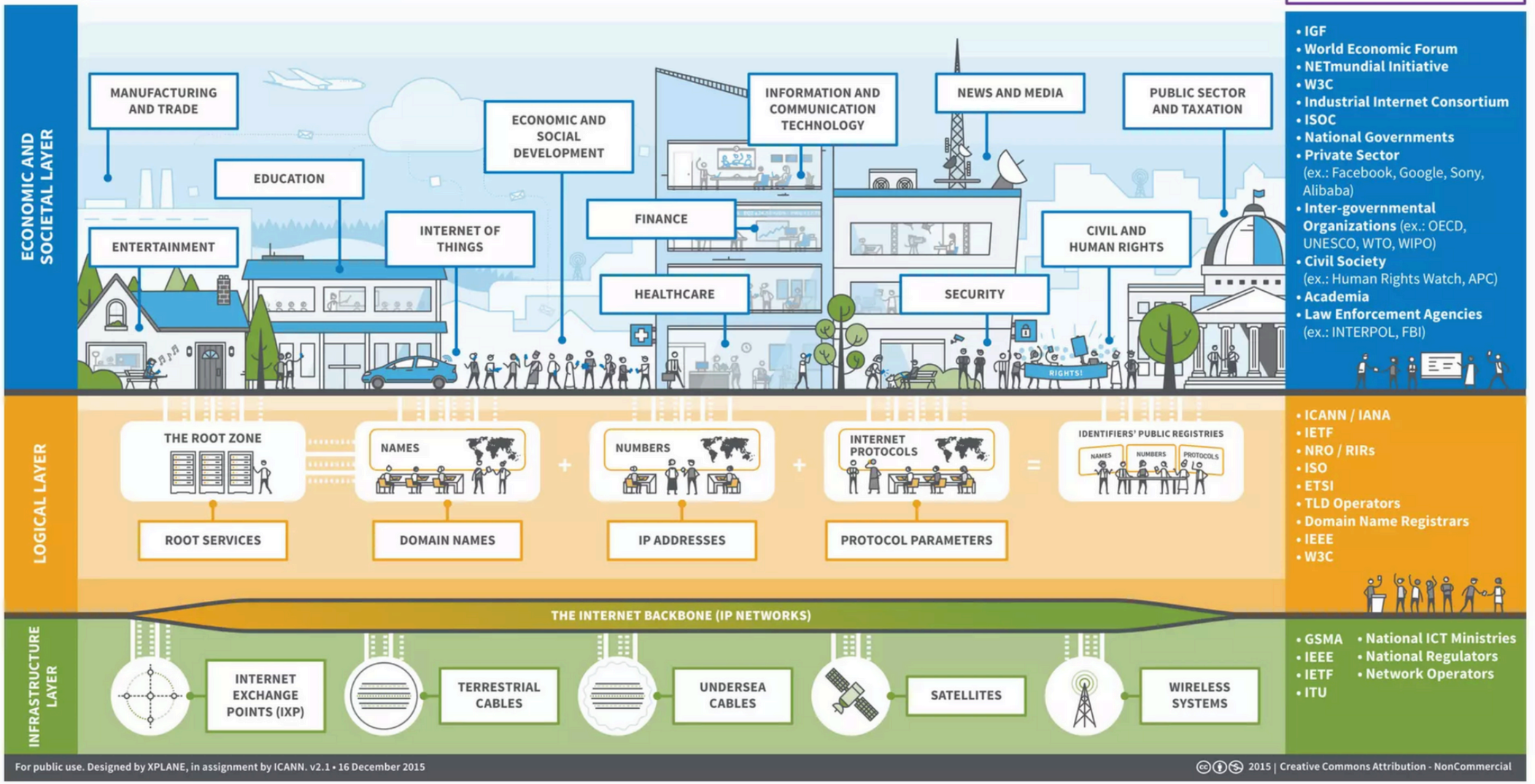


2. WHO MAKES UP THE INTERNET GOVERNANCE ECOSYSTEM?

THE THREE LAYERS OF DIGITAL GOVERNANCE

No one person, government, organization, or company governs the digital space. Digital Governance may be stratified into the three layers depicted here: Infrastructure, Logical, Economic and Societal. Solutions to issues in each layer include policies, best practices, standards, specifications, and tools developed by the collaborations of stakeholders and experts from actors in business, government, academia, technical, and civil society. For a map of Digital Governance Issues and Solutions across all three layers, visit https://map.netmundial.org.

DIGITAL GOVERNANCE ACTORS



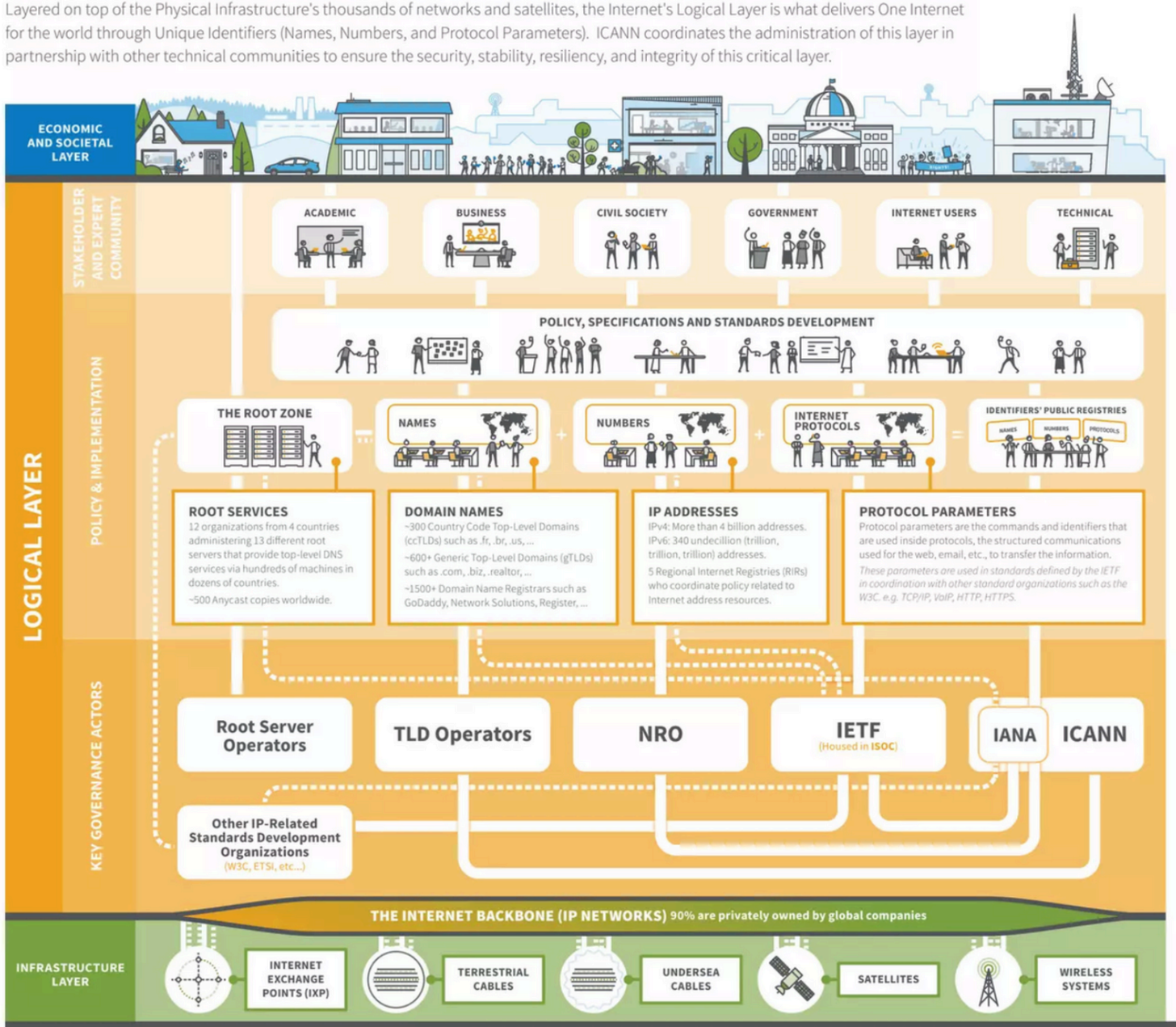
- IGF
- World Economic Forum
- NETmundial Initiative
- W3C
- Industrial Internet Consortium
- ISOC
- National Governments
- Private Sector (ex.: Facebook, Google, Sony, Alibaba)
- Inter-governmental Organizations (ex.: OECD, UNESCO, WTO, WIPO)
- Civil Society (ex.: Human Rights Watch, APC)
- Academia
- Law Enforcement Agencies (ex.: INTERPOL, FBI)

- ICANN / IANA
- IETF
- NRO / RIRs
- ISO
- ETSI
- TLD Operators
- Domain Name Registrars
- IEEE
- W3C

- GSMA
- IEEE
- IETF
- ITU
- National ICT Ministries
- National Regulators
- Network Operators

THE LOGICAL LAYER OF DIGITAL GOVERNANCE

Layered on top of the Physical Infrastructure's thousands of networks and satellites, the Internet's Logical Layer is what delivers One Internet for the world through Unique Identifiers (Names, Numbers, and Protocol Parameters). ICANN coordinates the administration of this layer in partnership with other technical communities to ensure the security, stability, resiliency, and integrity of this critical layer.



TECHNICAL OPERATIONS

The technical operating community is made up of multiple independent actors bound by common principles and mutual commitments that ensure the security and stability of the Internet Infrastructure. Each actor's community develops policies and standards in an open, inclusive, and consensus-based approach.

KEY GOVERNANCE ACTORS

ICANN *Internet Corporation for Assigned Names and Numbers*
Helps coordinate the Internet's systems of unique identifiers including domain names and IP addresses, as well as manages the IETF's protocol parameter registries.
www.icann.org

IANA, the Internet Assigned Numbers Authority, is a set of functions housed and operated within ICANN. It acts as the top-level allocator for blocks of IP addresses and AS numbers, proposes creation of and changes to DNS top-level domains, and manages lists of unique identifiers used in Internet protocols.
www.iana.org

IETF *Internet Engineering Task Force*
Develops and promotes a wide range of Internet standards dealing in particular with standards of the Internet protocol suite. Their technical documents influence the way people design, use, and manage the Internet. The IETF operates under the Internet Society (ISOC) with architectural oversight provided by the Internet Architecture Board (IAB).
www.ietf.org

ISO *International Organization for Standardization*
Standardizes, among many other things, the official names and postal codes of countries, dependent territories, special areas of geographic significance.
www.iso.org

NRO *Number Resource Organization*
A coordinating body for the five Regional Internet Registries (RIRs). The RIRs manage the distribution of IP addresses and Autonomous System Numbers in their regions of the world.
www.nro.net

AFRINIC	*www.afrinic.net*	LACNIC	*www.lacnic.net*
APNIC	*www.apnic.net*	RIPE NCC	*www.ripe.net*
ARIN	*www.arin.net*		

TLD Operators *Top Level Domain Operators*
Organizations which have been assigned the management of Top-Level Domains such as: Generic TLDs (.com, .edu, .info, .name etc ...), Country Code TLDs (.fr, .us, .gh, .cn etc...) and non-ASCII alphabet TLDs (in language such as Chinese, Korean, Arabic, Russian, French etc....) —among others.

Root Server Operators
12 independent organisations operate the 13 authoritative name servers (A through M) that serve the Domain Name System (DNS) root zone. The name servers are a network of hundreds of physical servers located in many countries around the world.
www.root-servers.org

W3C
The World Wide Web Consortium (W3C) is an international community where Member organizations, a full-time staff, and the public work together to develop Web standards. W3C's mission is to lead the Web to its full potential.
www.w3.org

STAKEHOLDER AND EXPERT COMMUNITY

Academic
- Institutions of higher learning
- Academic thought leaders
- Professors & students

Business
- Private-sector companies from across industries
- Industry and trade associations

Civil Society
- International organizations
- Non-governmental organizations
- Non-profit organizations
- Think Tanks

Government
- National governments
- Distinct economies recognized in international fora
- Multinational governmental and treaty organizations
- Intergovernmental organizations
- Public authorities (with a direct interest in global Internet Governance)

Internet Users
- Private citizens interested in regional or global Internet Governance

Technical
- Internet engineers
- Computer engineers
- Software developers
- Network operators

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INTERNET ECOSYSTEM

ICANN: Coordinating Internet Identifiers

The root servers are critical to the operation of the Internet with the ability to obtain the initial referral provided by the root servers to look up any domain names on the Internet.

ICANN

IETF: Setting Technical Standards

The premier Internet standards body that develops open standards for the evolution of Internet architecture and operation.

IETF®

Internet Society (ISOC):

A non-profit organization that supports and promotes the development of the Internet globally.

Internet Society

Internet Governance Forum (IGF)

A discussion forum that brings together various stakeholders to engage on public policy issues related to the Internet.

IGF Internet Governance Forum

INTERNET ECOSYSTEM

Regional Internet registry (RIR)– (APNIC)

APNIC allocates IPv4 and IPv6 addresses, supports network infrastructure development, and helps ensure the technical stability of the internet in the region.

APNIC

Youth Initiatives

Initiatives that encourage and involve young people in the substantive discussion on Internet governance at national, regional, or global levels.

YIGF CAMBODIA

HK.yigf.asia

YOUTH IGF INDIA

YOUTH IGF CANADA

SEA YOUTH IGF

yigf.asia

National and Regional IGF Initiatives (NRIs): Localized Perspectives

Independent, multistakeholder initiatives that discuss Internet governance issues from the perspective of their respective communities or regions.

rIGF WWW.APrIGF.ASIA

PACIFIC IGF

Macao IGF

North African IGF

المنتدى العربي لحوكمة الإنترنت ARAB IGF

ARAB INTERNET GOVERNANCE FORUM

3. HISTORY OF INTERNET GOVERNANCE

HISTORY OF INTERNET

Present

The adoption of the multi-stakeholder model, where different stakeholders come together as equals to develop policies, standards, and specifications for the Internet.

1990s-2000s

Emergence of the need for Internet governance, involving various stakeholders including governments, civil society, the technical community, academia, and the business sector.

1990s

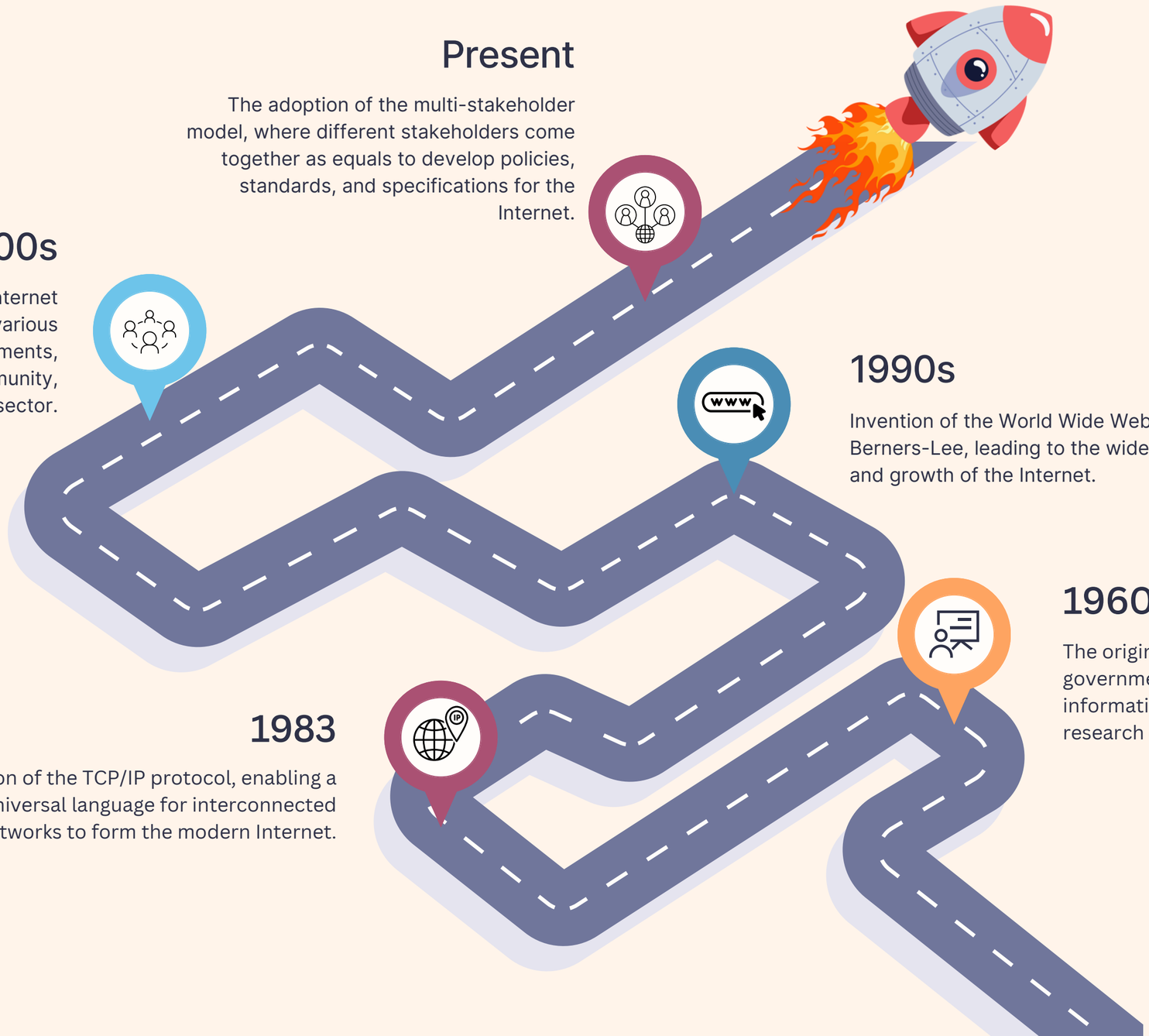
Invention of the World Wide Web by Tim Berners-Lee, leading to the widespread use and growth of the Internet.

1960s

The origins of the Internet: ARPANET, a government-funded network for information sharing among academic and research organizations.

1983

Adoption of the TCP/IP protocol, enabling a universal language for interconnected networks to form the modern Internet.



4. KEY ISSUES OF INTERNET GOVERNANCE

KEY ISSUES

Coordination of Unique Identifiers

Emerging Technologies

Privacy and Data Protection

Content Regulation and

Digital Divide

Internet Fragmentation

Internet Security

Intellectual Property and Copyright

Cybersecurity

Net Neutrality

Online Misinformation

Internet Shutdowns and Censorship

THE INTERNET HAS BECOME AN INDISPENSABLE PART OF OUR DAILY LIVES, ENABLING ACCESS TO EDUCATION, COMMUNICATION, AND ECONOMIC OPPORTUNITIES.

EFFECTIVE GOVERNANCE OF THE INTERNET IS CRUCIAL TO ENSURE ITS STABILITY, SECURITY, AND ACCESSIBILITY FOR ALL USERS.

THANK YOU!

Q&A?