How does INTERNET work?

www.lacnic.net

John, an academic professional, is about to connect to the Internet from home to conduct research.

To access the Internet, John needs a device, such as a computer, that can connect to it.

Through an Internet connection, his device can **send and receive data,** allowing him to surf the web.

John has a device called a “router”that allows him to connect all his home devices, either through Ethernet cables or wirelessly.

These “routers” allow John to connect to the Internet through a one-time connection or Internet subscription from an Internet service provider (ISP).

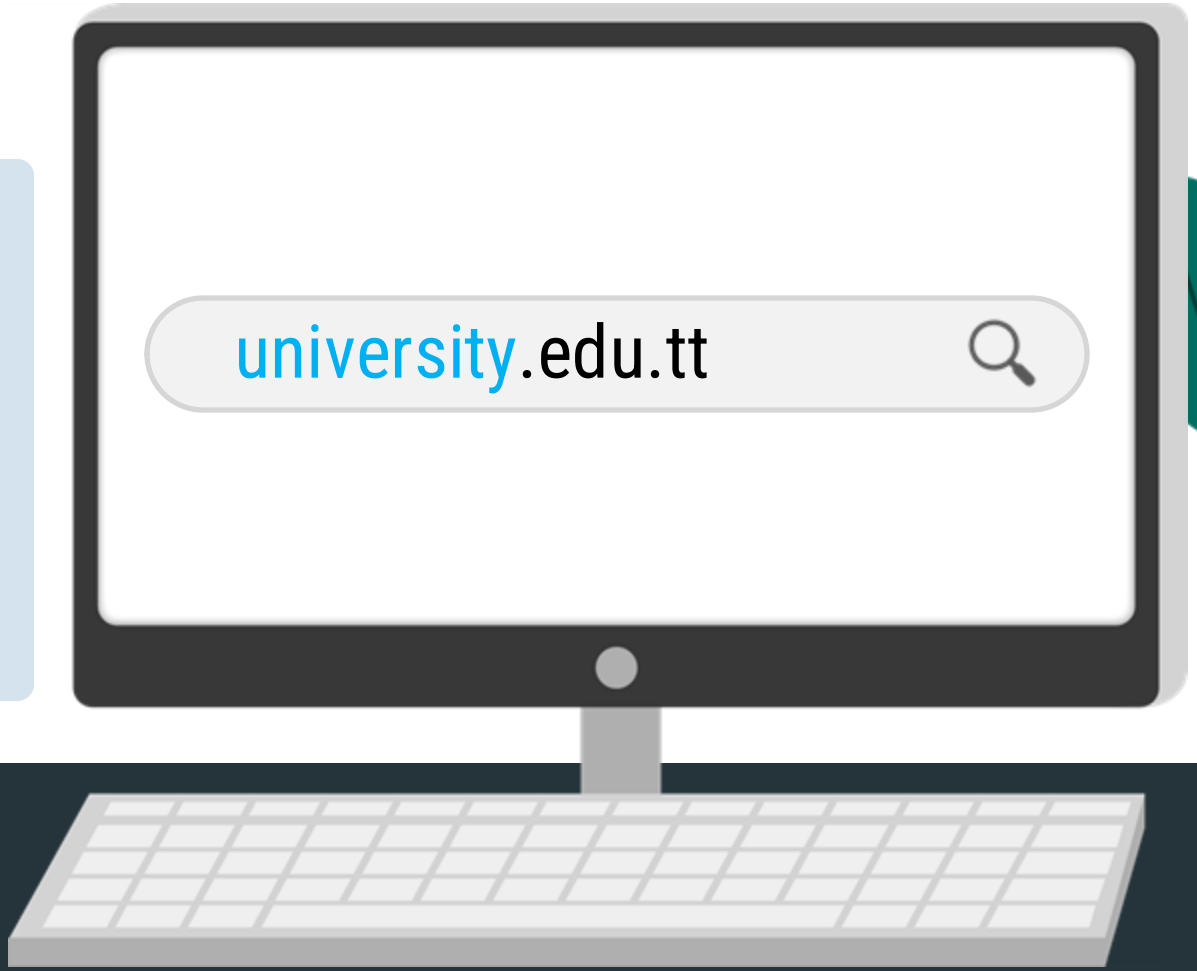
To access the Internet, the “router” must have a unique ID called an IP address. This ensures that the information John sends and receives can travel to and from him without confusing where it came from, or where it’s going.

John’s ISP has provided him with this IP address (Internet Protocol).

Similarly, John’s computer and devices, like his **cellphone,** use his “router” to connect to the Internet via the Wifi signal at his home.

When John is outside or at home without WiFi, his cellphone connects to the Internet through his **mobile provider's network**. This provider assigns him a unique IP address to access to the Internet.

When John needs to find information, he opens his browser and types in the website's address, i.e. its domain name.



Domain names work like a phone book, **using easily rememberable words**, to help John find the IP address and location of the server hosting the webpage he is looking for.

Once the server hosting the page is found via the domain, (which could be anywhere in the world), the content is downloaded to John's computer and viewed through his browser.

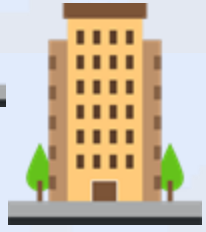
Users (John)

Users

Users

Users

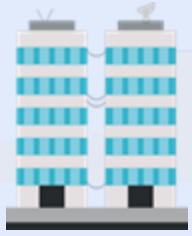
ICANN



Internet Service Provider (ISP)

RIR

Mobile Network Operator (MNO)



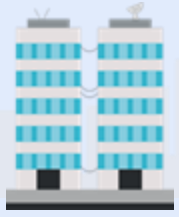
ccTLD

Corporate Internet Service Provider (ISP)

Internet Exchange Point (IXP)

Content Distribution Network (CDN)

Content Provider

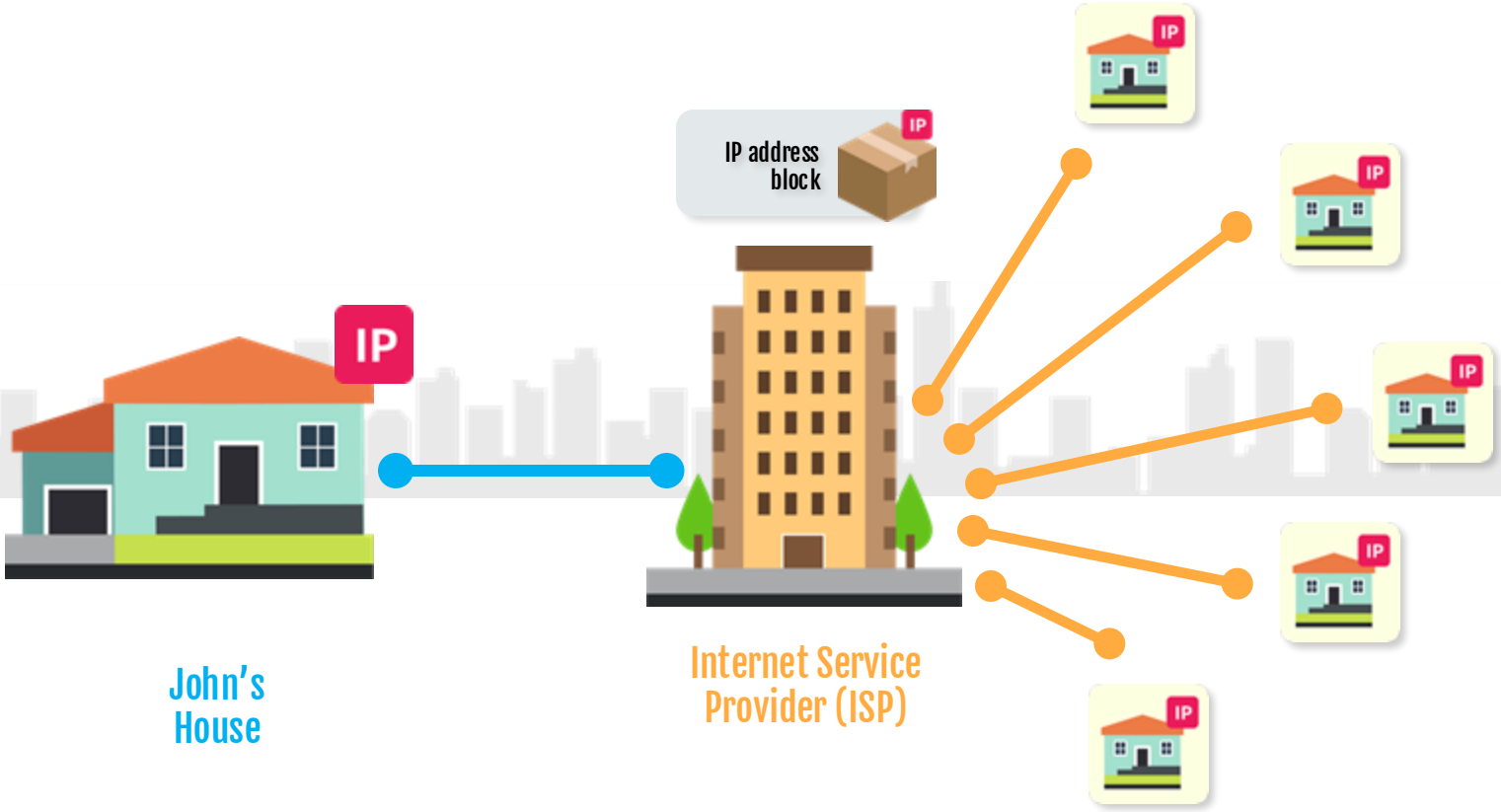


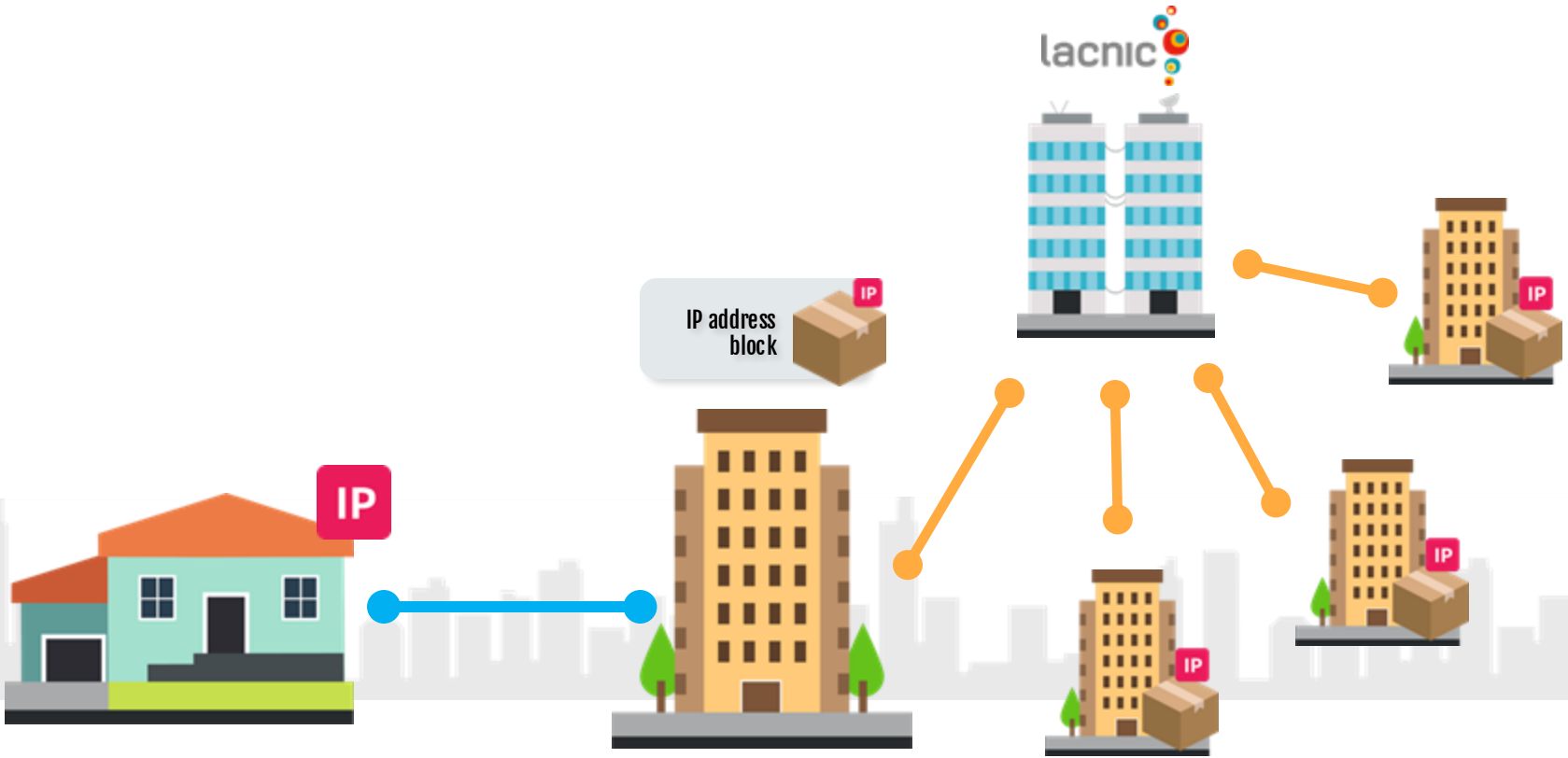
Hosting Service Provider (Datacenter)

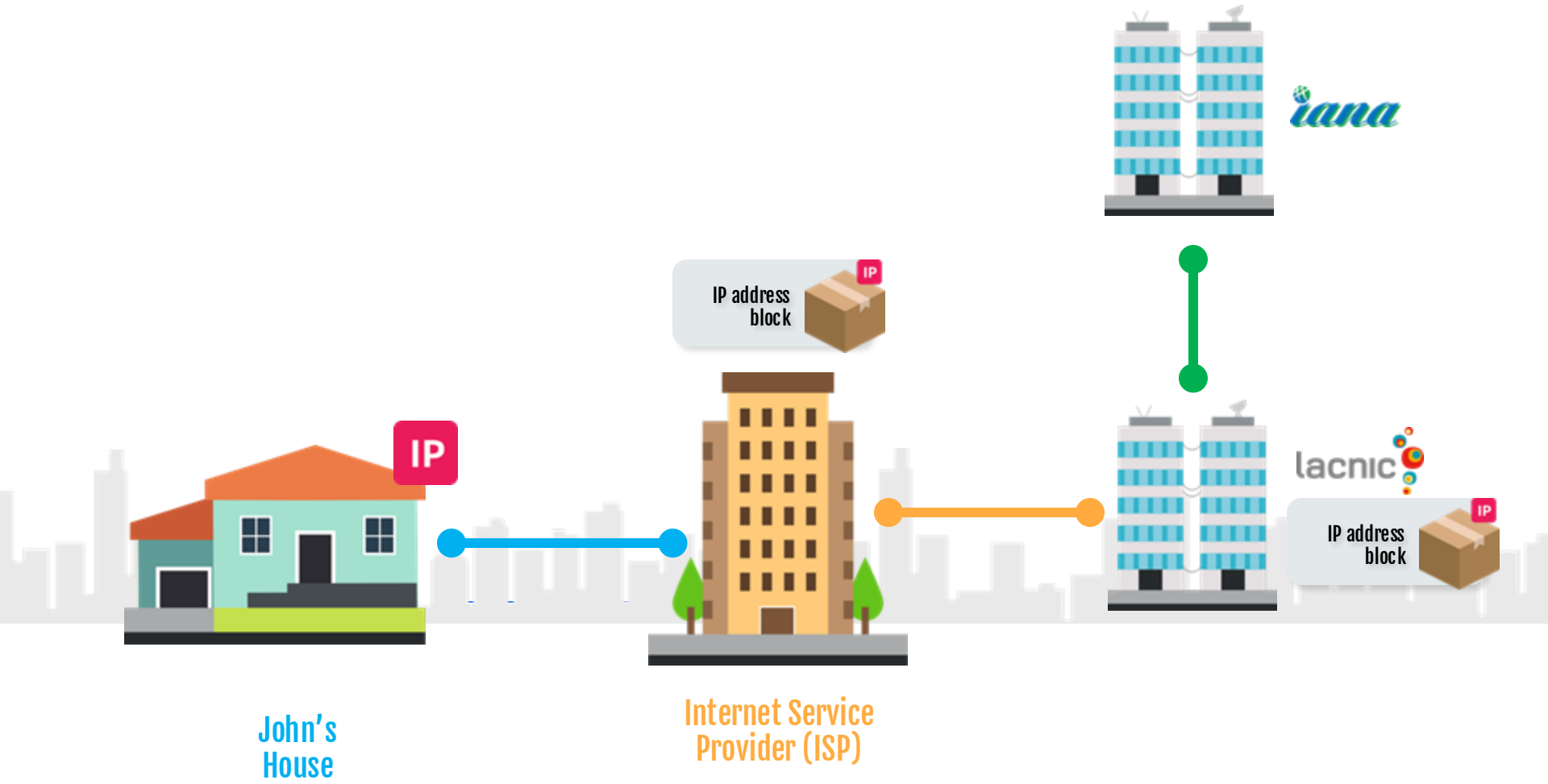
Internet

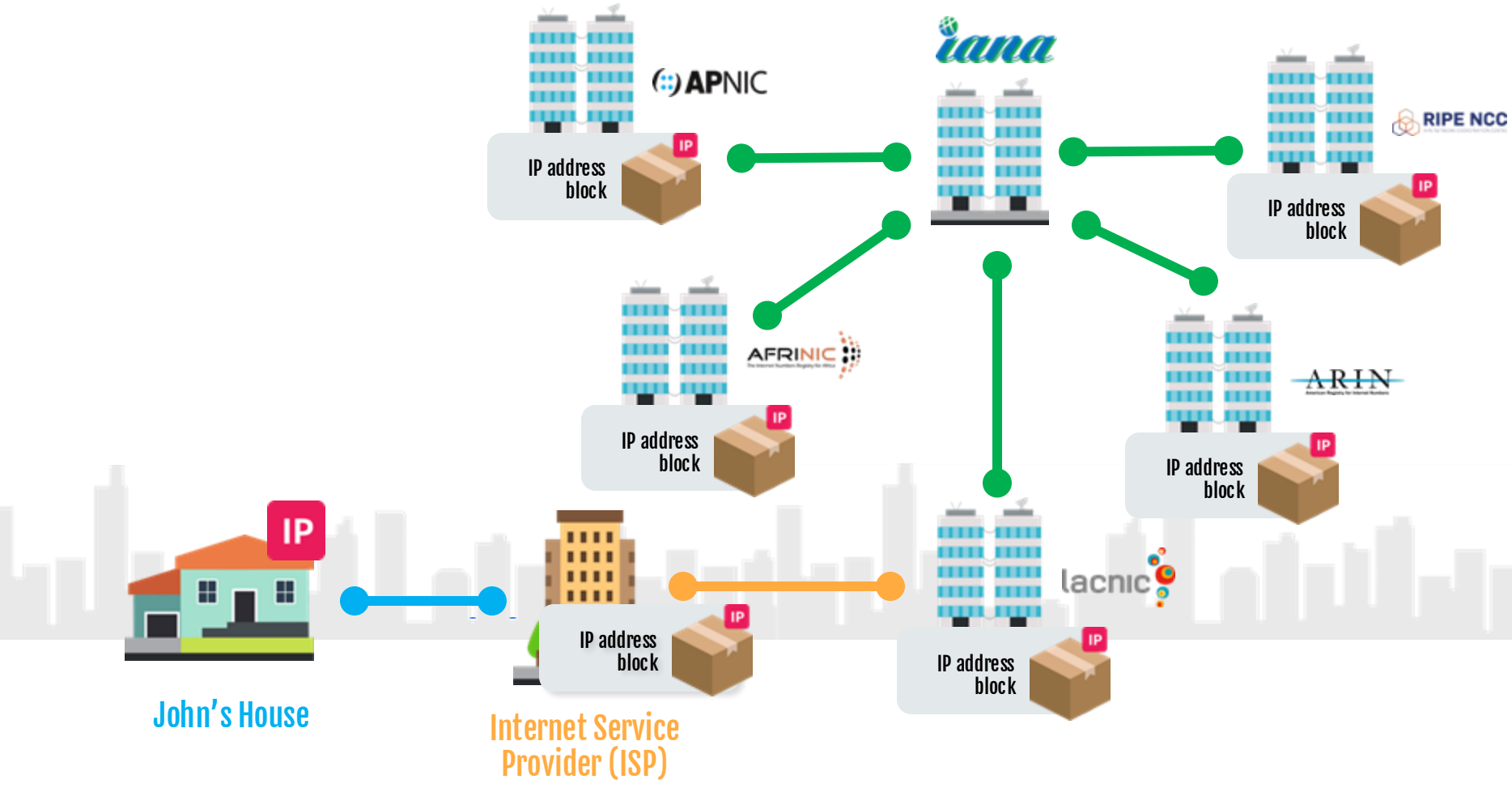
John's House

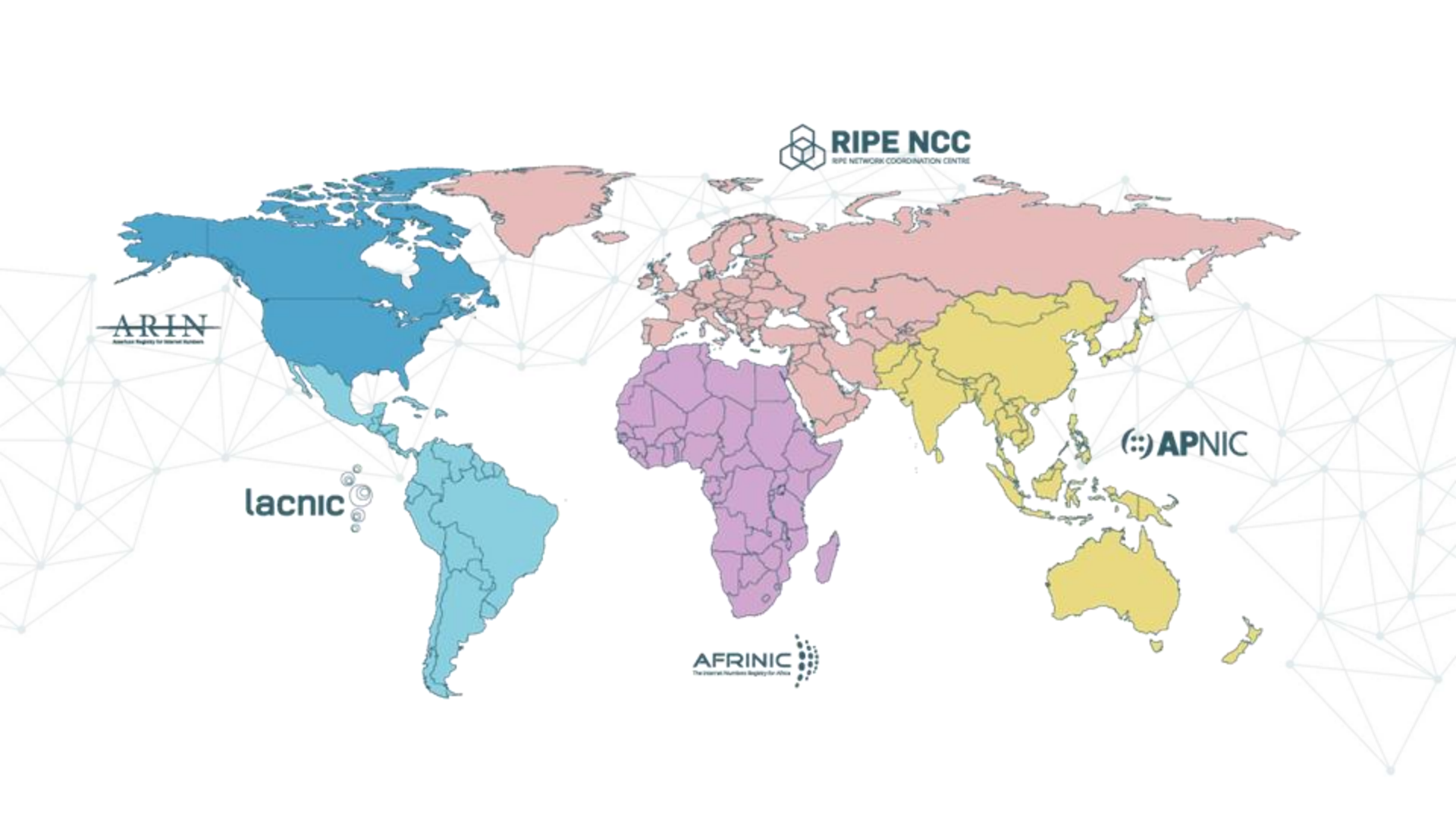
Internet Service Provider (ISP)

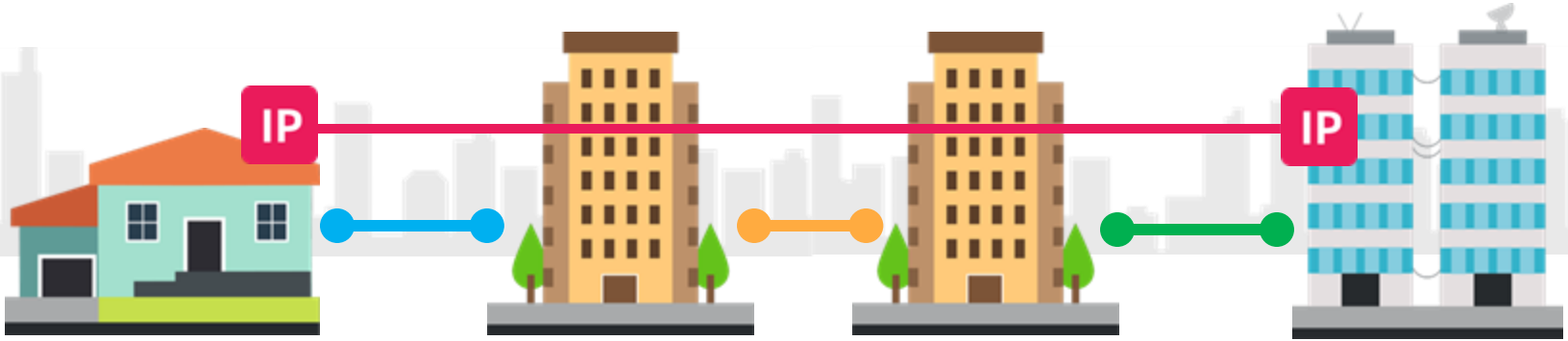

IP address block
IP
IP
IP
IP
IP
IP
IP
John's House
Internet Service Provider (ISP)


lacnic
IP address block
IP
IP
IP
IP
IP
IP
John's House
Internet Service Provider (ISP)


IP address block
IP
IP
iana
lacnic
IP address block
John's House
Internet Service Provider (ISP)


APNIC
IP address block
IP
iana
RIPE NCC
IP address block
IP
AFRINIC
IP address block
IP
ARIN
IP address block
IP
IP
John's House
IP address block
IP
Internet Service Provider (ISP)
lacnic
IP address block
IP


RIPE NCC
RIPE NETWORK COORDINATION CENTRE
ARIN
lacnic
APNIC
AFRINIC

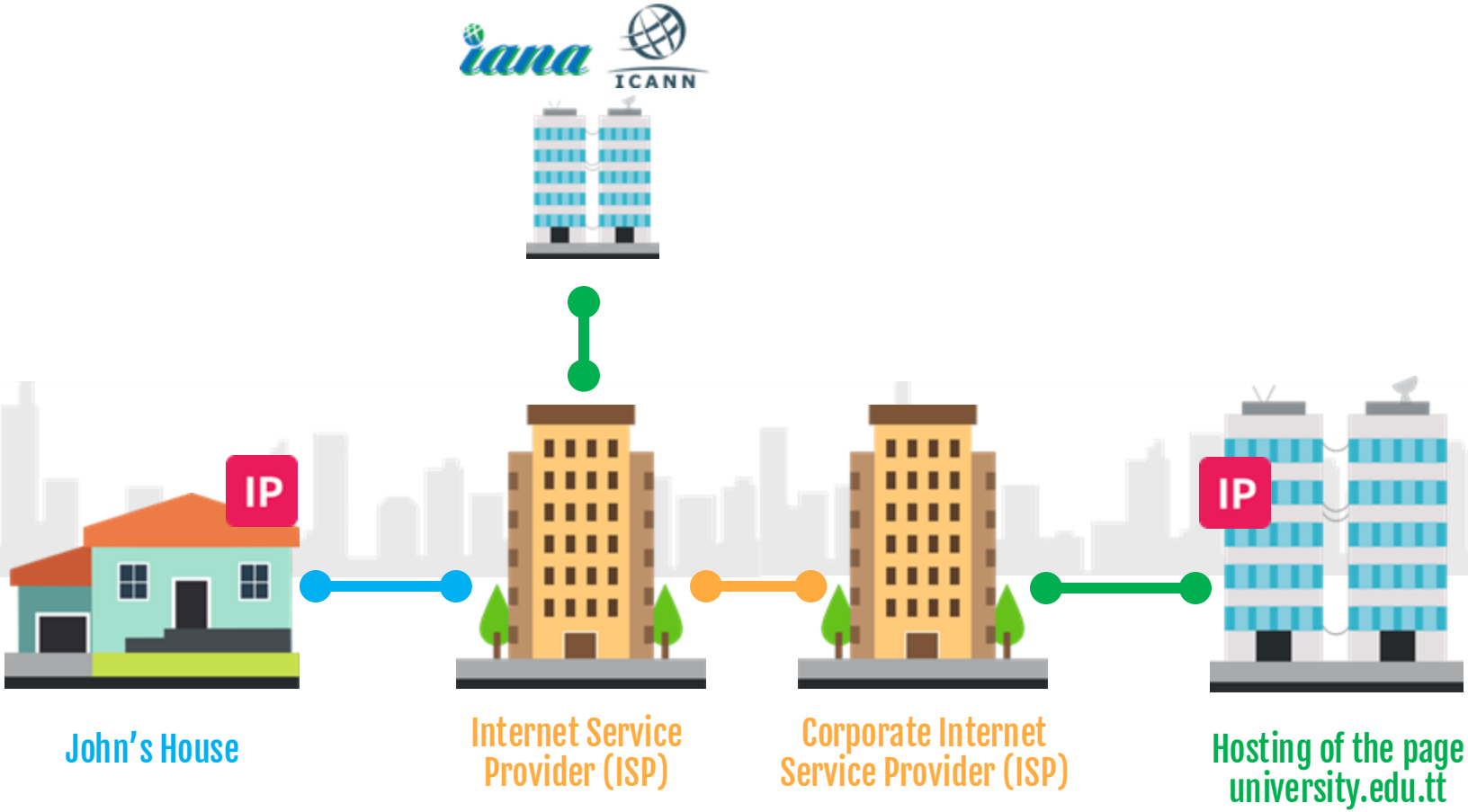


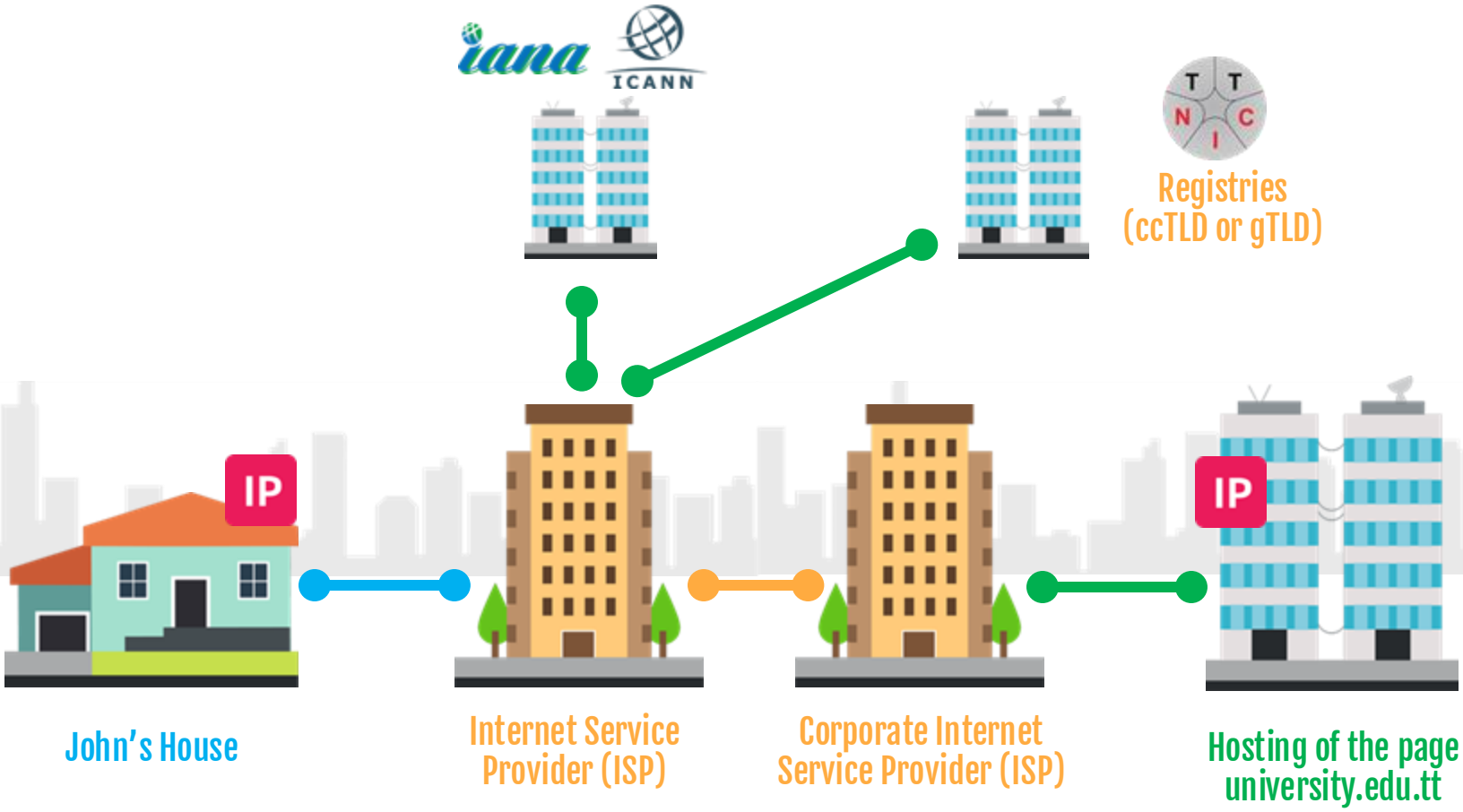
John's House

Internet Service Provider (ISP)

Corporate Internet Service Provider (ISP)

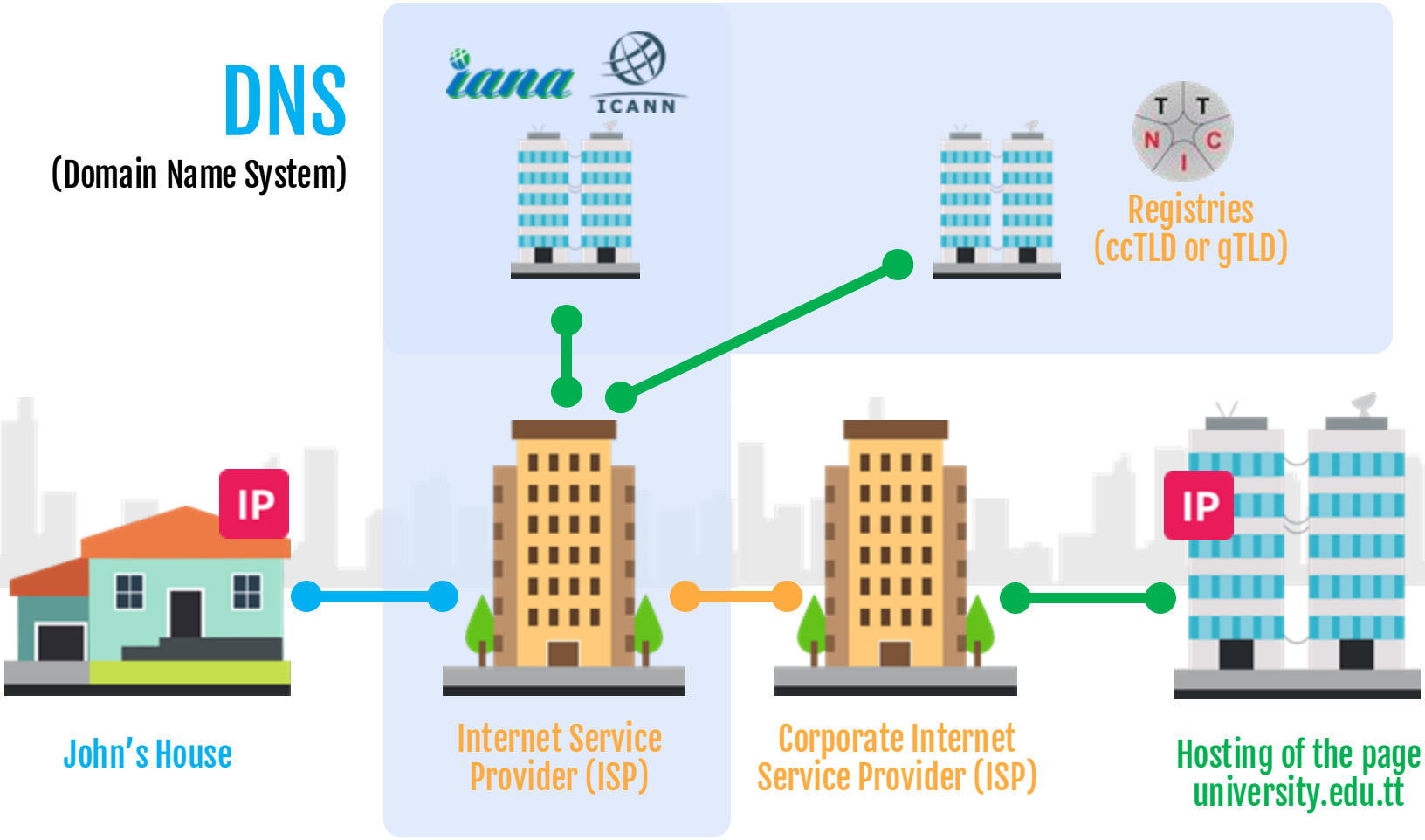
Hosting of the page university.edu.tt


iana
ICANN
IP
IP
John's House
Internet Service Provider (ISP)
Corporate Internet Service Provider (ISP)
Hosting of the page university.edu.tt

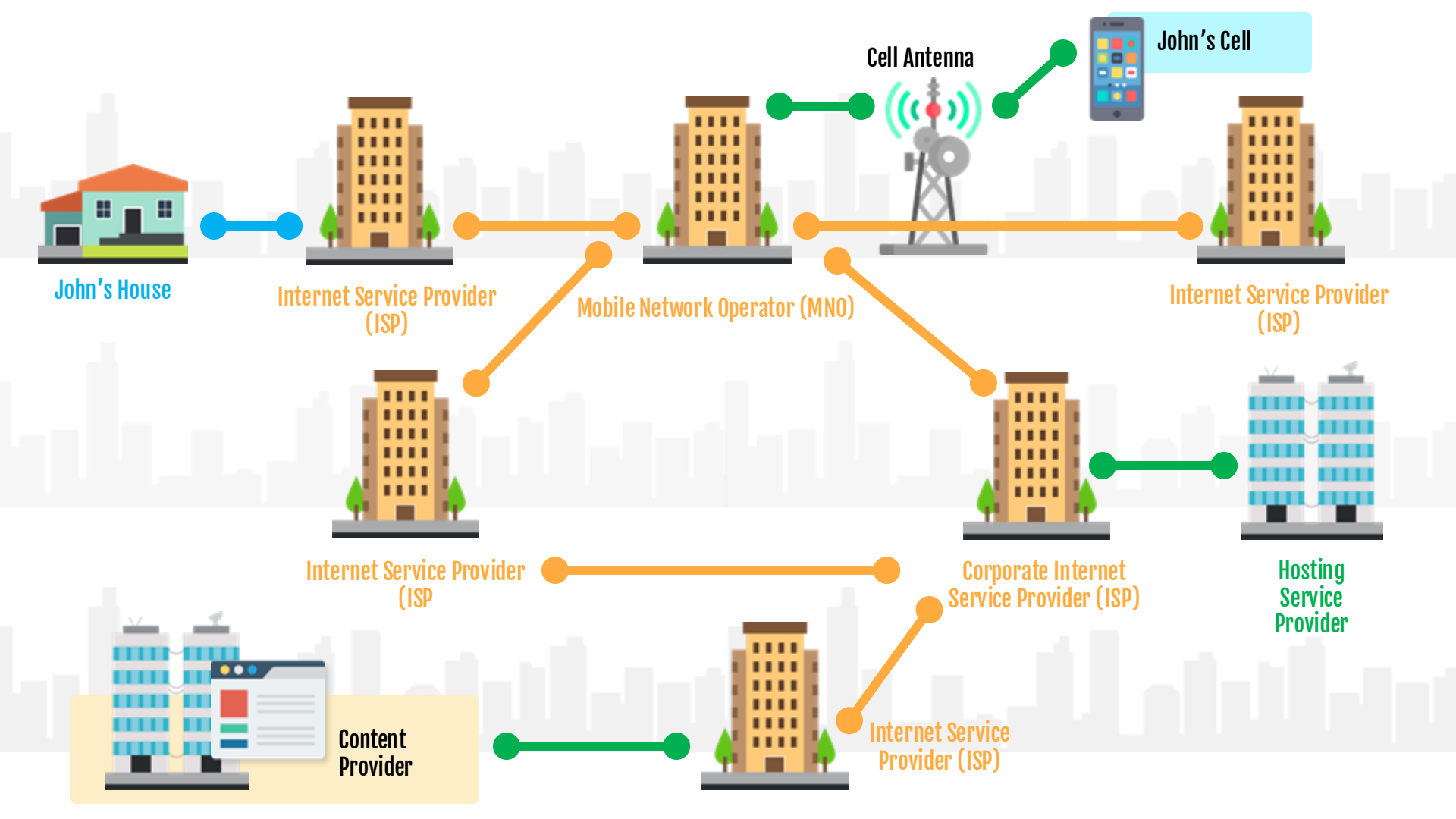

iana
ICANN
T T
N C
I
Registries
(ccTLD or gTLD)
IP
IP
John's House
Internet Service
Provider (ISP)
Corporate Internet
Service Provider (ISP)
Hosting of the page
university.edu.tt

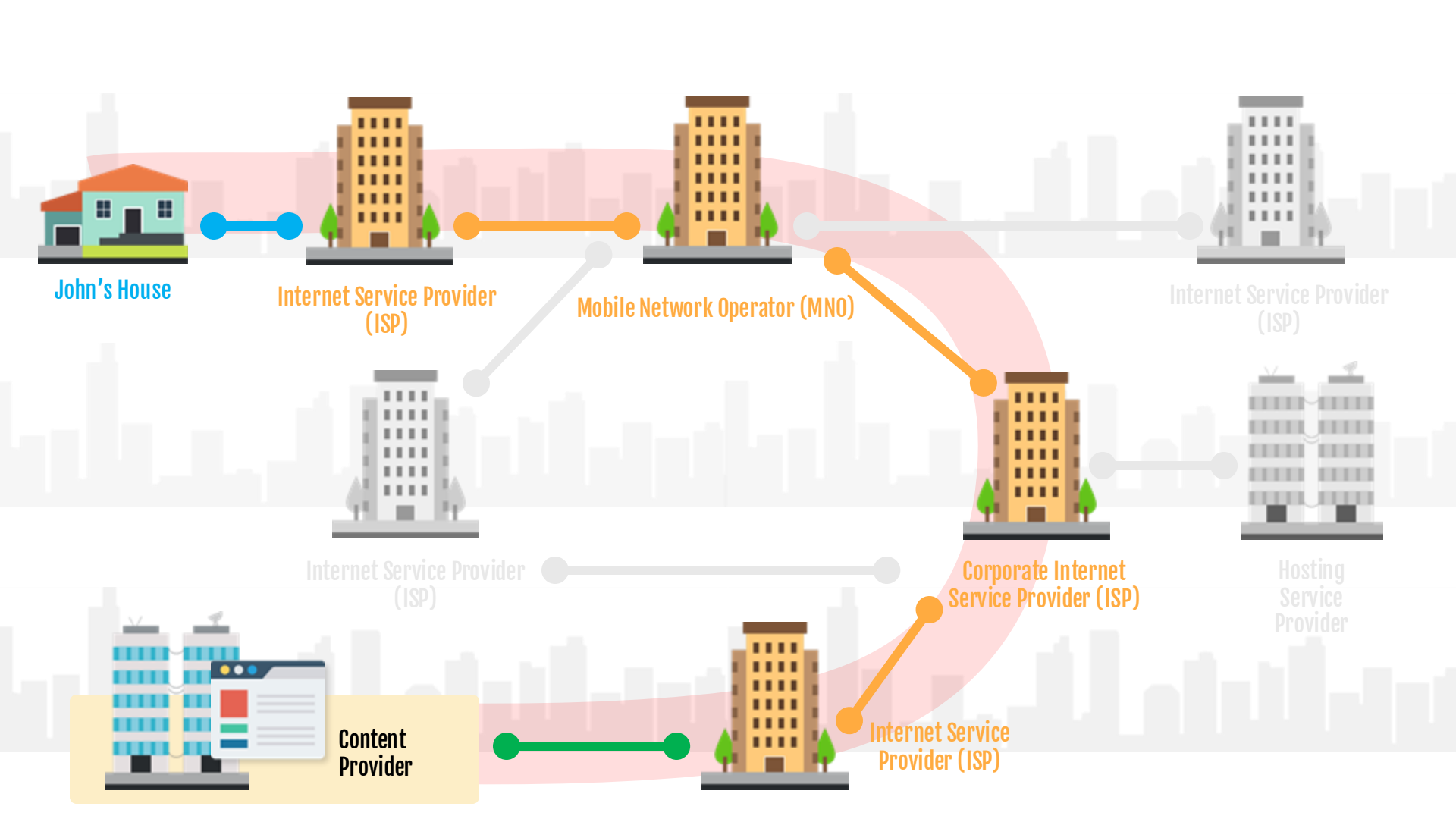
DNS

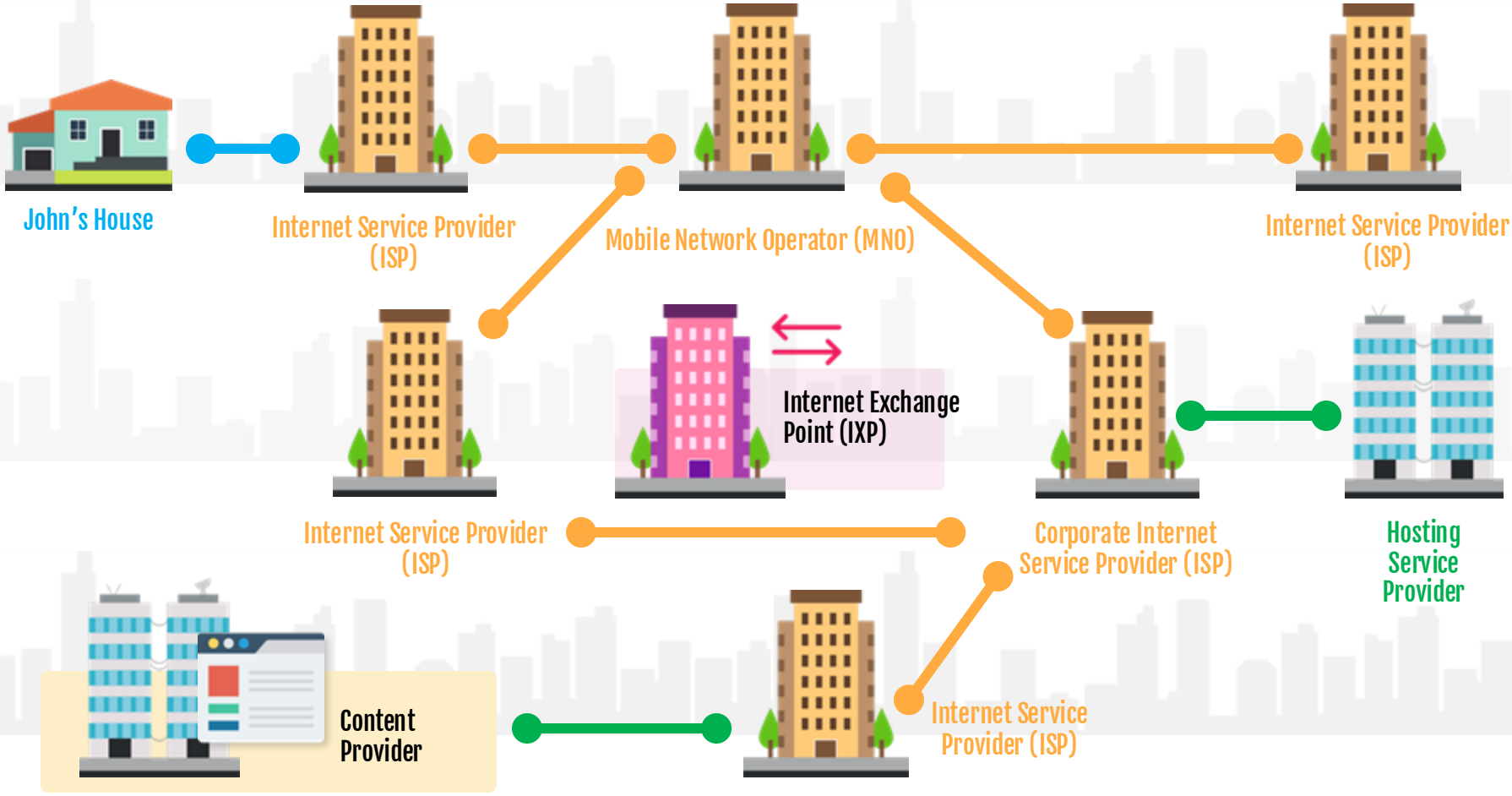
(Domain Name System)

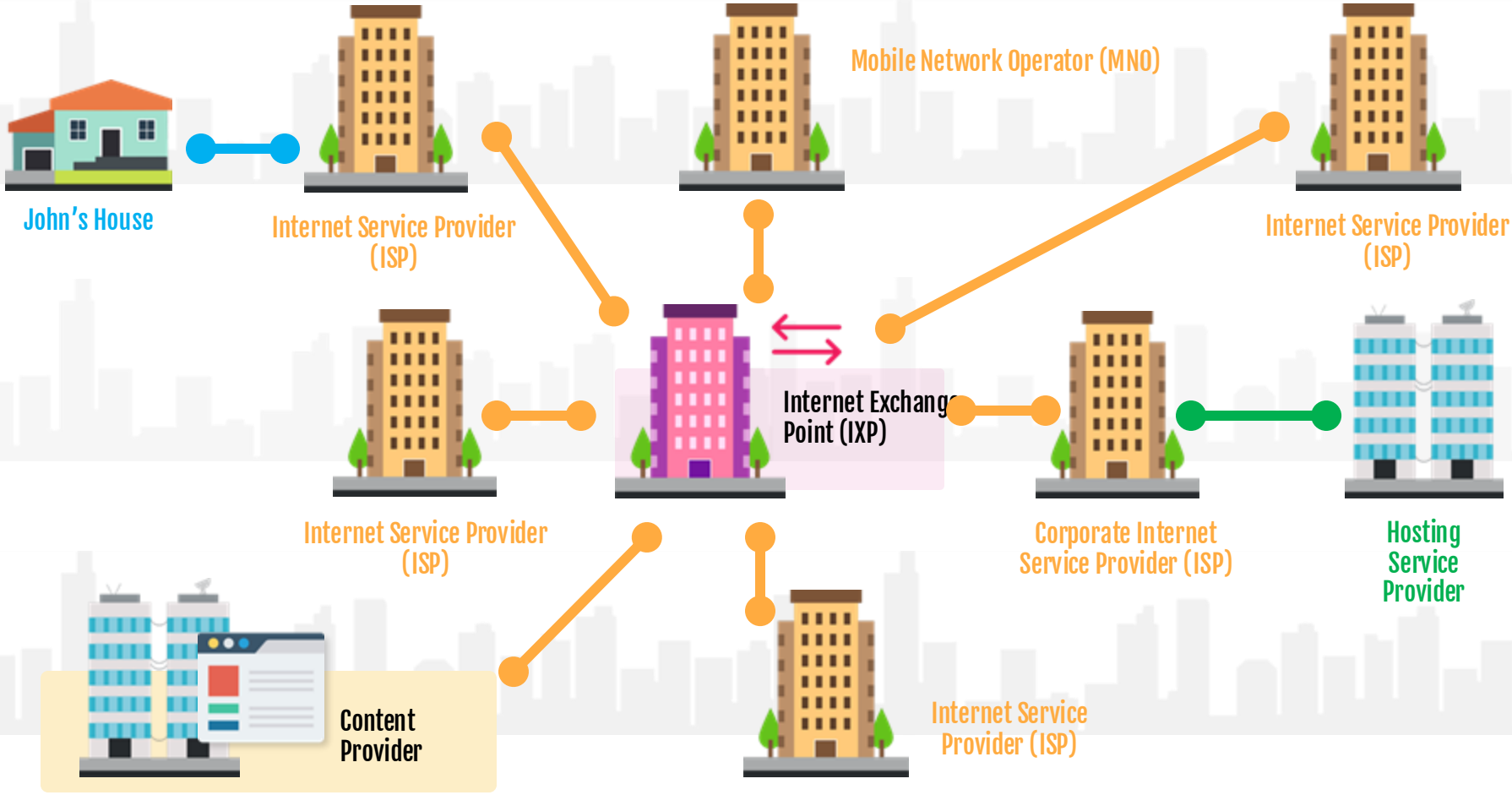


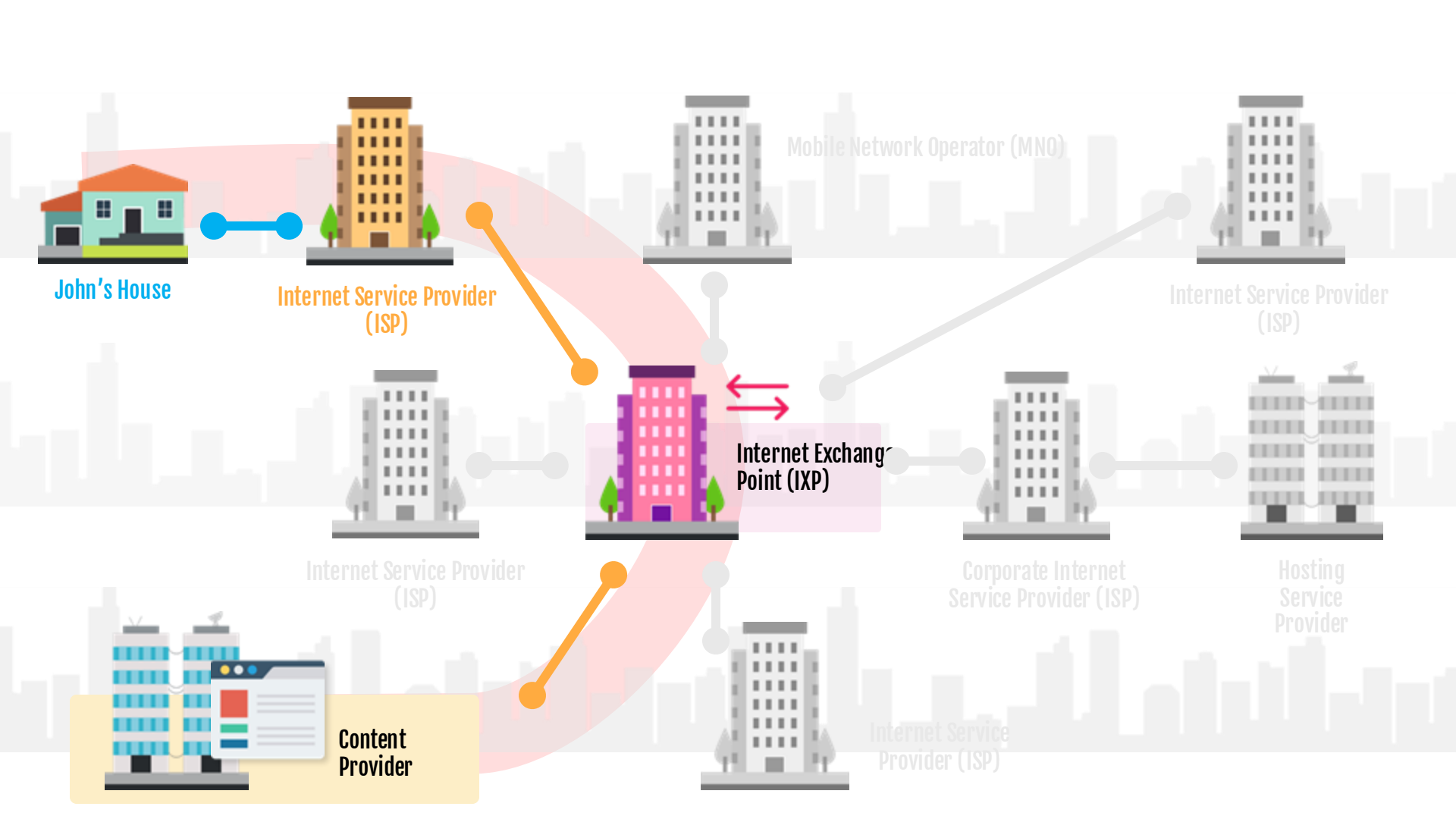
If John needs **listen to sound clips or watch videos** for his research, we will certainly find other players and services that ensure he can hear and see high-quality media.


John's Cell
Cell Antenna
John's House
Internet Service Provider (ISP)
Mobile Network Operator (MNO)
Internet Service Provider (ISP)
Internet Service Provider (ISP)
Corporate Internet Service Provider (ISP)
Hosting Service Provider
Content Provider
Internet Service Provider (ISP)


John's House
Internet Service Provider (ISP)
Mobile Network Operator (MNO)
Internet Service Provider (ISP)
Internet Service Provider (ISP)
Corporate Internet Service Provider (ISP)
Hosting Service Provider
Content Provider
Internet Service Provider (ISP)

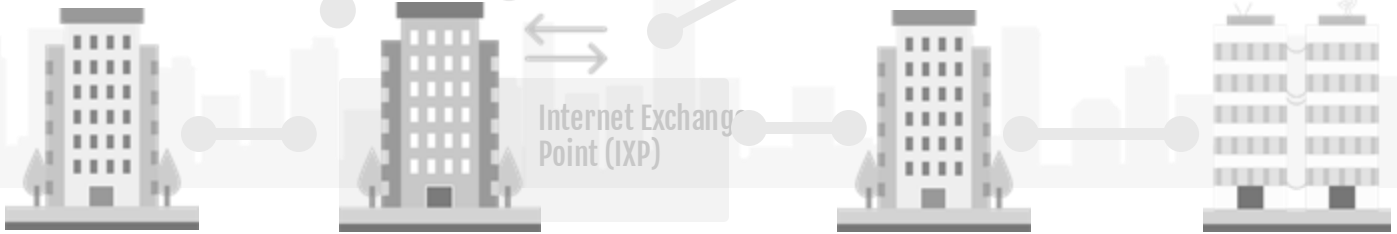

John's House
Internet Service Provider (ISP)
Mobile Network Operator (MNO)
Internet Service Provider (ISP)
Internet Service Provider (ISP)
Internet Exchange Point (IXP)
Corporate Internet Service Provider (ISP)
Hosting Service Provider
Content Provider
Internet Service Provider (ISP)


John's House
Internet Service Provider (ISP)
Mobile Network Operator (MNO)
Internet Service Provider (ISP)
Internet Service Provider (ISP)
Internet Exchange Point (IXP)
Corporate Internet Service Provider (ISP)
Hosting Service Provider
Content Provider
Internet Service Provider (ISP)

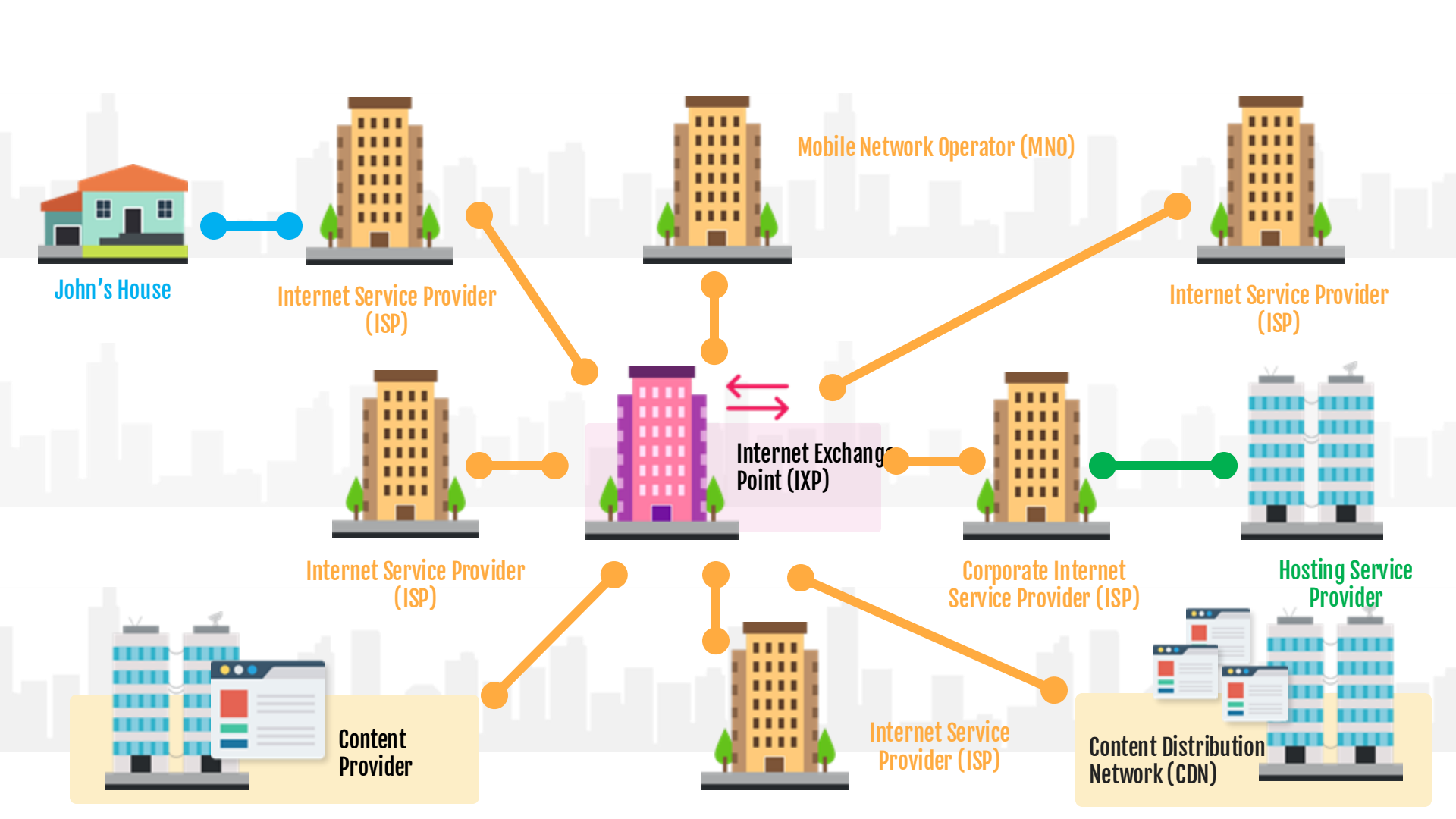

John's House
Internet Service Provider (ISP)
Mobile Network Operator (MNO)
Internet Service Provider (ISP)
Internet Service Provider (ISP)
Internet Exchange Point (IXP)
Corporate Internet Service Provider (ISP)
Hosting Service Provider
Content Provider
Internet Service Provider (ISP)

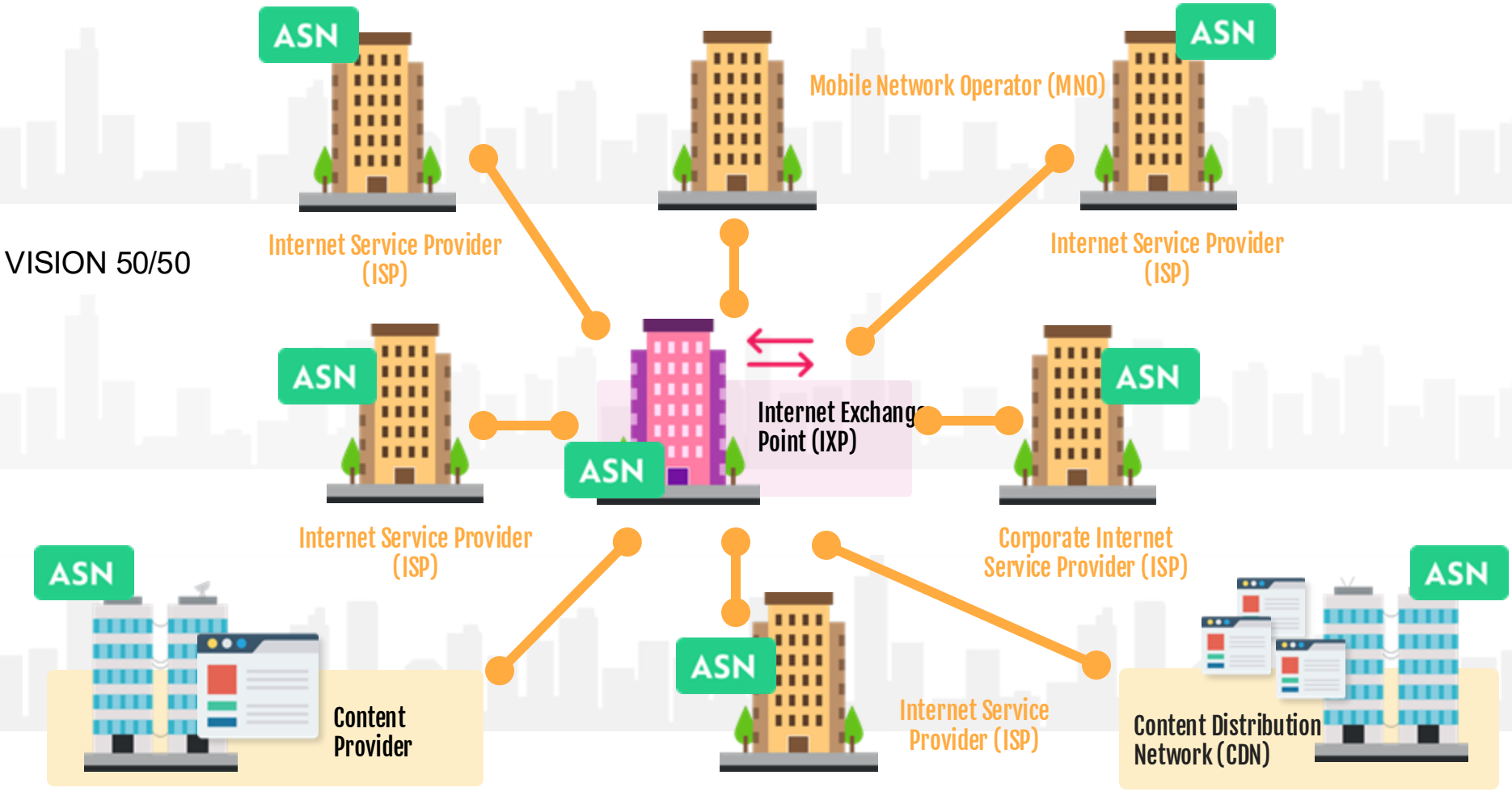

John's House
Internet Service Provider (ISP)


Mobile Network Operator (MNO)
Internet Service Provider (ISP)


Internet Exchange Point (IXP)
Internet Service Provider (ISP)
Corporate Internet Service Provider (ISP)
Hosting Service Provider


Content Provider
Internet Service Provider (ISP)

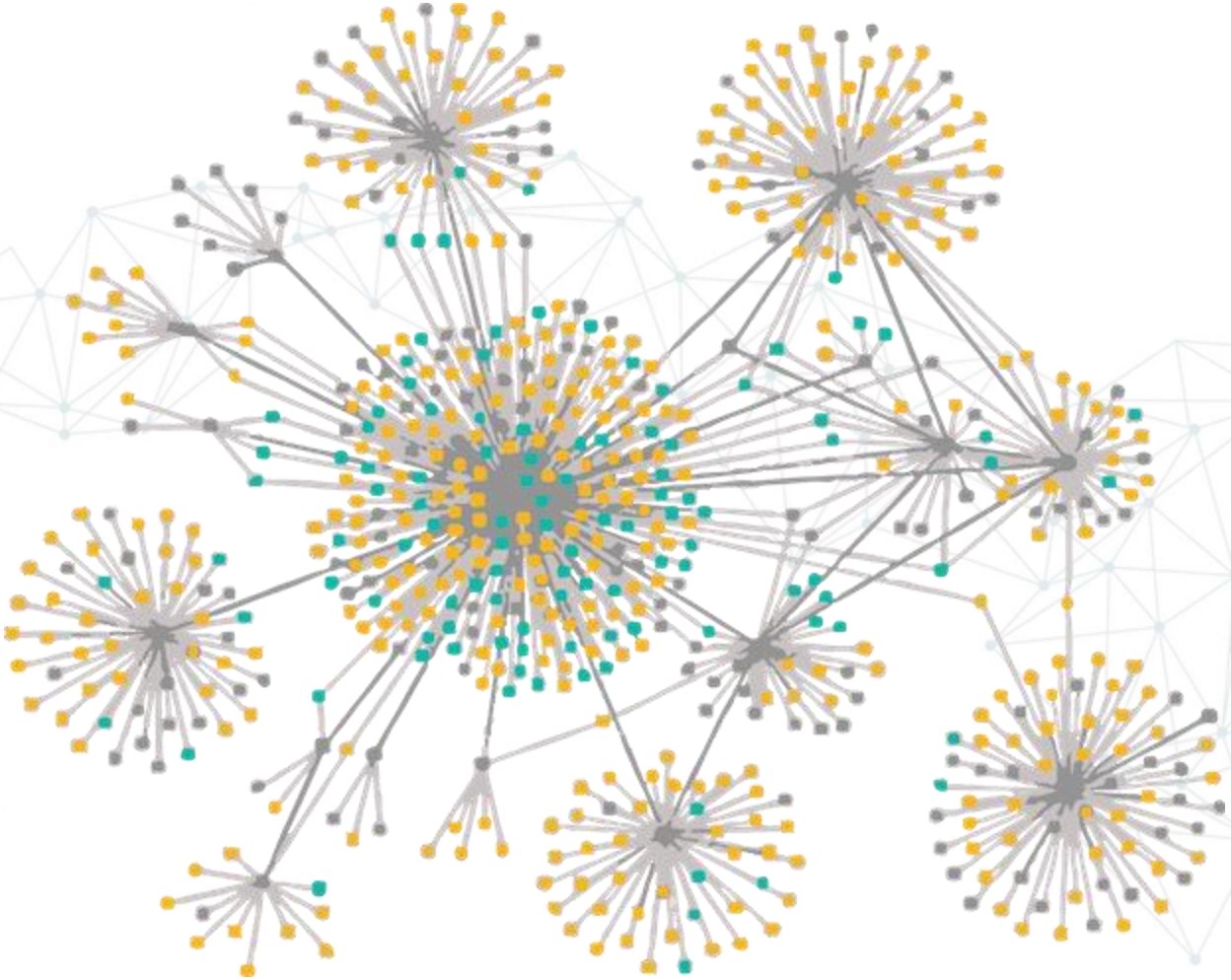

John's House
Internet Service Provider (ISP)
Mobile Network Operator (MNO)
Internet Service Provider (ISP)
Internet Service Provider (ISP)
Internet Exchange Point (IXP)
Corporate Internet Service Provider (ISP)
Hosting Service Provider
Content Provider
Internet Service Provider (ISP)
Content Distribution Network (CDN)


ASN
Mobile Network Operator (MNO)
ASN
Internet Service Provider (ISP)
Internet Service Provider (ISP)
VISION 50/50
ASN
ASN
Internet Exchange Point (IXP)
ASN
Internet Service Provider (ISP)
Corporate Internet Service Provider (ISP)
ASN
ASN
ASN
Content Provider
Internet Service Provider (ISP)
Content Distribution Network (CDN)

More than

90,000

Networks or ASes

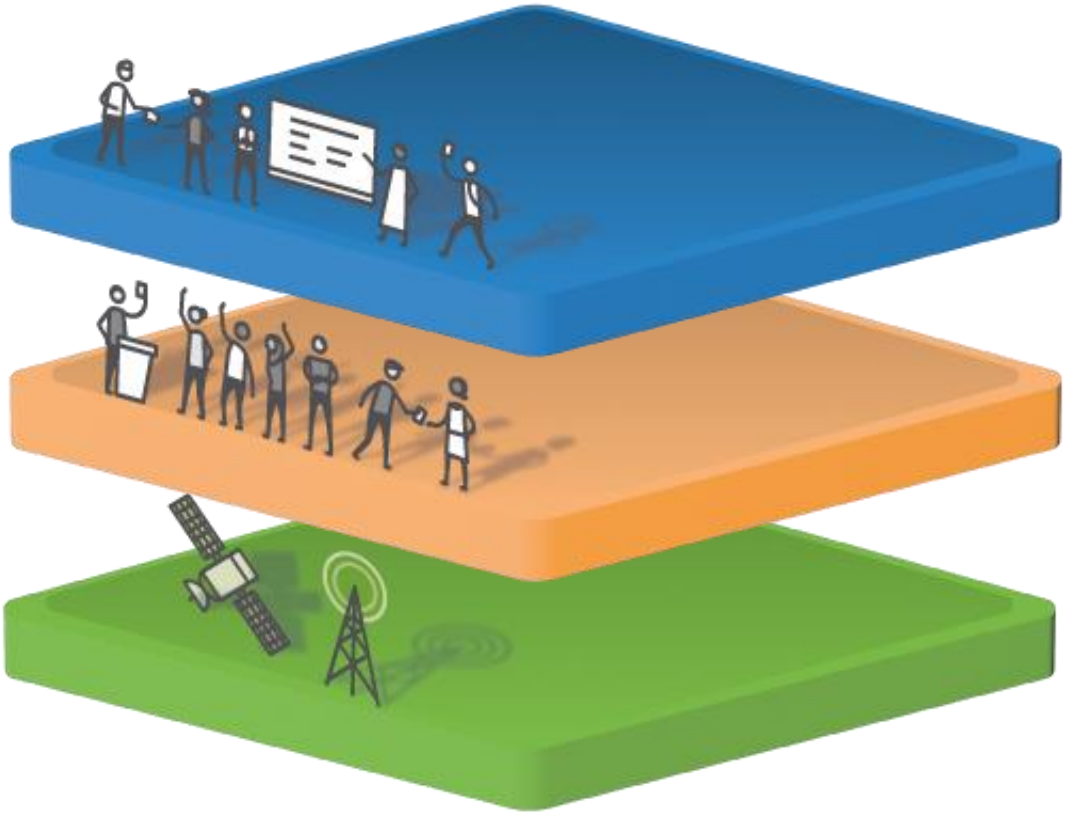


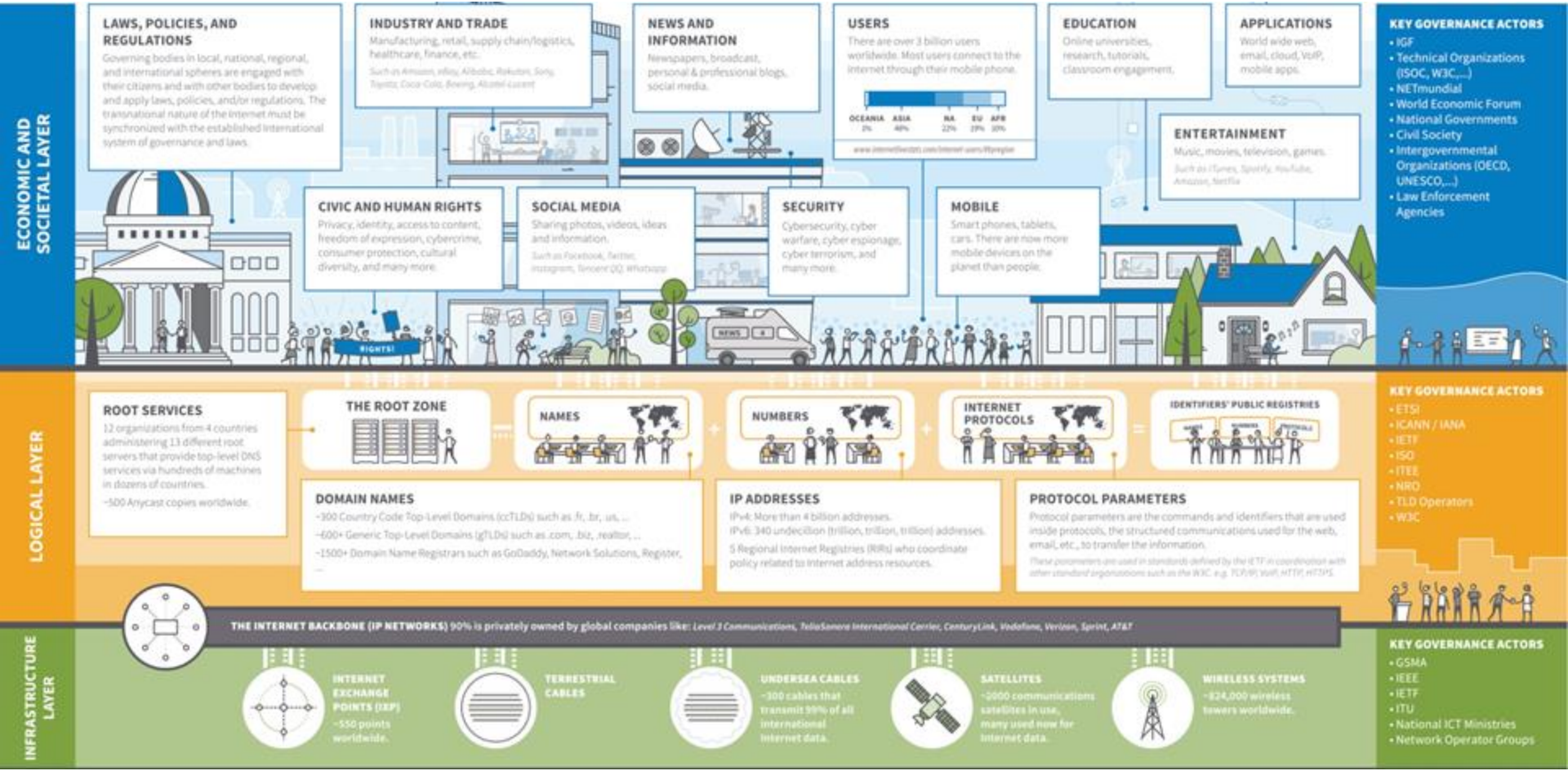
3 Digital Governance Layers

Economic &
Societal Layer

Logical
Layer

Infrastructure
Layer



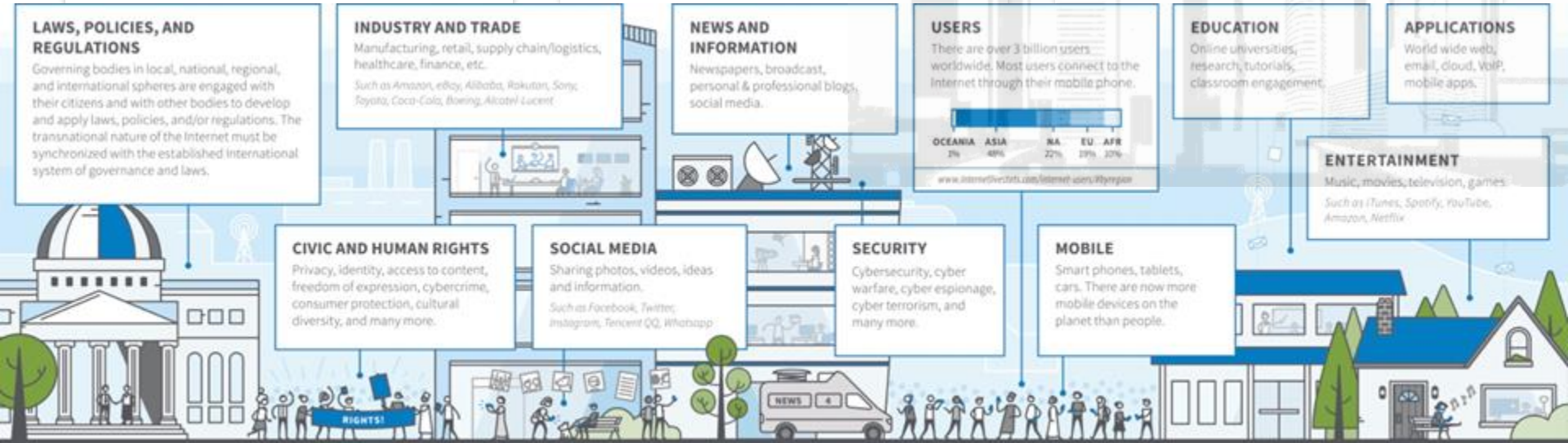

ECONOMIC AND SOCIETAL LAYER
LAWS, POLICIES, AND REGULATIONS
Governing bodies in local, national, regional, and international spheres are engaged with their citizens and with other bodies to develop and apply laws, policies, and/or regulations. The transnational nature of the Internet must be synchronized with the established international system of governance and laws.
INDUSTRY AND TRADE
Manufacturing, retail, supply chain/logistics, healthcare, finance, etc.
Such as Amazon, eBay, Alibaba, Rakuten, Sony, Toyota, Coca-Cola, Boeing, Alcatel-Lucent
NEWS AND INFORMATION
Newspapers, broadcast, personal & professional blogs, social media.
USERS
There are over 3 billion users worldwide. Most users connect to the Internet through their mobile phone.
OCEANIA 1%
ASIA 46%
NA 22%
EU 19%
AFR 10%
www.internetlivestats.com/internet-users/#byregion
EDUCATION
Online universities, research, tutorials, classroom engagement.
APPLICATIONS
World wide web, email, cloud, VoIP, mobile apps.
ENTERTAINMENT
Music, movies, television, games.
Such as iTunes, Spotify, YouTube, Amazon, Netflix
CIVIC AND HUMAN RIGHTS
Privacy, identity, access to content, freedom of expression, cybercrime, consumer protection, cultural diversity, and many more.
SOCIAL MEDIA
Sharing photos, videos, ideas and information.
Such as Facebook, Twitter, Instagram, Tencent QQ, Whatsapp
SECURITY
Cybersecurity, cyber warfare, cyber espionage, cyber terrorism, and many more.
MOBILE
Smart phones, tablets, cars. There are now more mobile devices on the planet than people.
KEY GOVERNANCE ACTORS
• IGF
• Technical Organizations (ISOC, W3C,...)
• NETmundial
• World Economic Forum
• National Governments
• Civil Society
• Intergovernmental Organizations (OECD, UNESCO,...)
• Law Enforcement Agencies
LOGICAL LAYER
ROOT SERVICES
12 organizations from 4 countries administering 13 different root servers that provide top-level DNS services via hundreds of machines in dozens of countries.
~500 Anycast copies worldwide.
THE ROOT ZONE
NAMES
NUMBERS
INTERNET PROTOCOLS
IDENTIFIERS' PUBLIC REGISTRIES
DOMAIN NAMES
~300 Country Code Top-Level Domains (ccTLDs) such as .fr, .br, .us, ...
~600+ Generic Top-Level Domains (gTLDs) such as .com, .biz, .realtor, ...
~1500+ Domain Name Registrars such as GoDaddy, Network Solutions, Register, ...
IP ADDRESSES
IPv4: More than 4 billion addresses.
IPv6: 340 undecillion (trillion, trillion, trillion) addresses.
5 Regional Internet Registries (RIRs) who coordinate policy related to Internet address resources.
PROTOCOL PARAMETERS
Protocol parameters are the commands and identifiers that are used inside protocols, the structured communications used for the web, email, etc., to transfer the information.
These parameters are used in standards defined by the IETF in coordination with other standard organizations such as the W3C, e.g. TCP/IP, VoIP, HTTP, HTTPS
KEY GOVERNANCE ACTORS
• ETSI
• ICANN / IANA
• IETF
• ISO
• ITEE
• NRO
• TLD Operators
• W3C
INFRASTRUCTURE LAYER
THE INTERNET BACKBONE (IP NETWORKS) 90% is privately owned by global companies like: Level 3 Communications, TeliaSonera International Carrier, CenturyLink, Vodafone, Verizon, Sprint, AT&T
INTERNET EXCHANGE POINTS (IXP)
~550 points worldwide.
TERRESTRIAL CABLES
UNDERSEA CABLES
~300 cables that transmit 99% of all international Internet data.
SATELLITES
~2000 communications satellites in use, many used now for Internet data.
WIRELESS SYSTEMS
~824,000 wireless towers worldwide.
KEY GOVERNANCE ACTORS
• GSMA
• IEEE
• IETF
• ITU
• National ICT Ministries
• Network Operator Groups

Economic & Societal Layer

Applications
(WWW, E-mail, VoIP, etc)

Online Education

Entertainment



Logical Layer

Protocols

IP Addresses

Domain Names

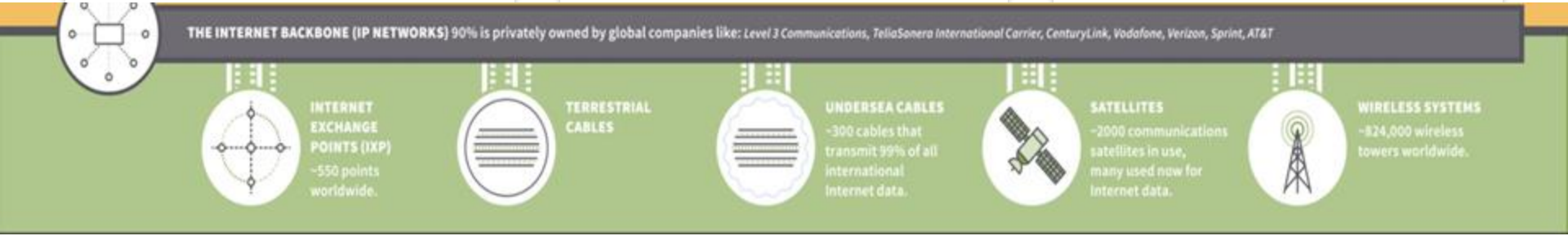
Root Servers

Infrastructure Layer

Networks

Routers

Means of transmission



Thank You

www.lacnic.net