

LIBERIA FIRST SCHOOL OF INTERNET GOVERNANCE 2020

OCTOBER 16, 2020 @ CORINA HOTEL
MONROVIA, LIBERIA

MEET OUR COLLABORATING PARTNERS



WHO AM I ?

- Technical Analyst for the International Gateway Services Department, of The Liberia Telecommunications Authority
- Coordinator of Internet Governance at LTA
- Project lead on Internet Exchange Point, Country Code Top Level Domain (ccTLD) and Cybersecurity
- Administrator of Facebook Blog: Liberia Internet Governance Association Forum (LIGAF)
- Member of Internet Society, Liberia Chapter

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TODAY'S FOCUS TOPIC:

- ❖ THE INTERNET ADDRESSING SYSTEM:
- ❖ NUMBERS AND NAMES SCOPE:
- ❖ OVERVIEW OF INTERNET NAMES AND NUMBERS AND HOW THEY ARE MANAGED GLOBALLY, REGIONALLY AND NATIONALLY FOCUSING ON ICANN AND AFRINIC AND LTA AS CCTLD.

THE INTERNET ADDRESSING SYSTEM

Introduction to Internet Identifiers

- Identifier Systems

1. Media Access Control (MAC) addresses
2. Internet Protocol (IP) addresses
3. Autonomous System Numbers (ASNs)
4. Domain Names

MAC ADDRESS

1. Media Access Control addresses are 48-bit identifiers

- 48-bits: up to 281,474,976,710,656 unique addresses
- Example: D4:61:9D:05:6C:30

Every networking component is given a MAC address at the time of manufacture

- Wi-Fi adapter
 - Ethernet adapter
 - Bluetooth
 - 4G/5G
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- MAC addresses are “burned” into network adapters by manufacturers. In fact, 24-bits of a MAC address identify a manufacturer (e.g., Intel, Apple, Dell, etc.)
 - MAC addresses are often considered permanent identifiers because they remain constant (do not change) when a device leaves one network and connects to another

IP ADDRESS

2. An Internet Protocol address (IP address) is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication.

Two main functions of an IP address:

- Host
- Network interface identification and location addressing.
- IP requires each host to have an address in order for Network operators agree to communicate – to exchange information across the wire – using predefined protocols
 - TCP/IP- Transmission Control Protocol/Internet Protocol
 - UDP - User Datagram Protocol
- An IP can be either:
- IPv4
 - 32-bit address space
 - 4.29 Billion addresses
 - Example: 192.168.0.1
- IPv6
 - 128-bit address space
 - 340 Undecillion addresses (340,282,366,920,938,463,463,374,607,431,768,211,456)
 - Example: 2620:0000:2830:0296:0000:0000:0000:0252
- The Internet is a mesh of networks
- Networks use identifiers to *name* or *number* individual computers (“hosts”) to enable internetworking.

AUTONOMOUS SYSTEM NUMBERS (ASNS)

- An autonomous system is a group of networks that comprise a single administrative routing domain.
- Autonomous systems are identified with Autonomous System Numbers.
- The ASN space is a 32-bit number space. There are 4.29 billion ASNs
- Think of AS numbers as a way to identify networks you visit:
 - www.google.com is part of AS15169
 - www.icann.org is part of AS40528
- AS numbers are used in routing processes to find the networks IP addresses are in

DOMAIN NAME

- The Domain Name System (DNS) maps semantic names (easily understood by humans) to these IP addresses
- These semantic names are not limited by language or alphabet
 - Unicode is translated into machine-readable ASCII strings
 - Allows Internet users writing in most any language in the world to participate
 - Humans do not want to have to memorize IP addresses

WHO MANAGES THE INTERNET ADDRESSING SYSTEM

- The Institute for Electrical and Electronics Engineers (The IEEE):
 - MAC addresses
- The Regional Internet Registries – the RIRs
 - IPv4 addresses
 - IPv6 addresses
 - AS Numbers
- Domain Name Registries
 - Top-level Domains – TLDs (e.g., .com, .net, .museum)
- Domain Name Registrars
 - Individual domain name registrations

NUMBERS AND NAMES SCOPE

- ❖ IP addresses are easy for machines but hard for people
- ❖ People need to use names to clearly identify networks
- ❖ In the early days of the Internet, names were simple
 - No domain names yet
 - “Single-label names”, 24 characters maximum
 - Referred to as *host names*

Reference: <https://www.cloudns.net/blog/dns-history-creation-first/#:~:text=The%20DNS%20was%20created%20in,types%20that%20it%20can%20carry.>

- ⊙ Discussion started in the early 1980s on a replacement
- ⊙ Goals:
 - ⊙ Address HOST.TXT scaling issues
 - ⊙ Simplify email routing
- ⊙ Result was the ***Domain Name System***
- ⊙ Requirements in multiple documents:
 - ⊙ RFC 799, “Internet Name Domains”
 - ⊙ RFC 819, “The Domain Naming Convention for Internet User Applications”

OVERVIEW OF INTERNET NAMES AND NUMBERS
AND HOW THEY ARE MANAGED GLOBALLY,
REGIONALLY AND NATIONALLY FOCUSING ON
ICANN AND AFRINIC AND LTA AS CCTLD.

GLOBAL MANAGEMENT



- ICANN-Internet Corporation for Assigned Names and Numbers is a nonprofit organization responsible for coordinating the maintenance and procedures of several [databases](#) related to the [namespaces](#) and numerical spaces of the Internet, ensuring the network's stable and secure operation



Internet Assigned Numbers Authority

- IANA- is responsible for global coordination of the Internet Protocol addressing systems, as well as the Autonomous System Numbers used for routing Internet traffic.

REGIONAL MANAGEMENT FOR NAME SPACE

Regional Internet Registries



REGISTRY	AREA COVERED
AFRINIC	Africa Region
APNIC	Asia/Pacific Region
ARIN	Canada, USA, and some Caribbean Islands
LACNIC	Latin America and some Caribbean Islands
RIPE NCC	Europe, the Middle East, and Central Asia

NATIONAL MANAGEMENT OF .LR DOMAIN

The “.lr” country-code Top Level Domain (ccTLD) is an Internet Top Level Domain resource, reserved by ICANN for Liberia and is used as a unique identifier in the internet domain space.

In 2001, Data Technology Solutions, Inc. acquired “trusteeship” of the .lr ccTLD from Jon Postel (ICANN) and to date, continues to manage the .lr Top Level domain

In 2010, the Government of Liberia through the Ministry of Posts & Telecommunications adopted the National ICT Policy of 2010-2015, delegating to LTA, the responsibility to administer the .lr domain and develop Regulations to safeguard its use

Pursuant to the National ICT Policy 2010-2015, LTA adopted a Strategic Plan 2010-2015, setting as a Strategic Goal, “Reclaiming the .lr domain”

Through consultations – Local Stakeholders have voiced dissatisfaction about the difficult administrative processes employed by the current manager; thus, limiting access to, and use of the .lr domain

LTA-WHERE ARE WE NOW

- Have published Draft ccTLD Management and Policy Framework:

The major objective of this Policy is to liberalize the management of .lr Country Code Top Level Domain Name and come up with a management framework that will ensure transparency and greater accountability towards the Internet community of Liberia and the rest of the Global Internet Community.

- Have also published the ccTLD Implementation Manual:

This Implementation Manual is an essential reference document for any individual or organization interested in operating or managing a domain name under Liberia's country code Top Level Domain (ccTLD). It provides practical information and concrete assistance to potential applicants and other stakeholders seeking information on the registration of a domain name under Liberia's ccTLD. It summarizes the role of the Registrars and spells out the Domain Name Registration Requirements and how Domain name can be changed or cancelled, among others.

Reference: <https://www.lta.gov.lr/publications/>

- Had favorable meetings with current Management
 - Is finally convinced that .LR will be in safe and reliable hands using multi-stakeholder approach
- Is preparing to take over as Registry:
 - Registry equipment
 - Identify strategic location with uninterrupted electricity and Internet supply

PROPOSED STRUCTURE

Stakeholders' Advisory Comm.:

- Internet Society of Liberia (ISOC)
- Academia and/or Civil Society
- GoL (ICT Policy Arm)

Registry/LTA:

- Administrative: Policy/Procedure Development
- Technical: Primary & Secondary DNS Infrastructure Management

Accredited Registrars:

- International ICANN-Accredited
- Local LTA-Accredited

Registrants:

Local users or applicants (.lr Domain)

KEY NOTES

Internet names and numbers seek to address the following:

- Promote an operational framework under an acceptable standard,
- A predictable internet addressing system
- Make use of MAC and IP addresses
- Provide platform for DNS
- Provide a rallying point for diverse stakeholders to address issues that matter to them and end users
- Policy, regulating authorities, CSOs, Academia to work together
- Other

Thank you!!

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