BUSINESS PERSPECTIVES on IPv6 Adoption, new gTLDs & Standards

A Presentation at

ITU Annual Regional Human Capacity Building Workshop on
"Strengthening Capacities in Internet Governance in Africa"

Abuja, 28 August 2018

✓ The Challenge

✓ The Solutions

✓ Impact for Businesses & Govt

✓ Impact for Carriers & Operators

✓ About BCN

Tried registering an open PA email address?

Musa@xyz.com gets a suggestion as Musa1921@xyz.com

You were not born in **1921**. Your father was not even born then☻

Ever tried registering a domain?

Abujaplumbers.biz gets a suggestion for *Abujaplumbers123.biz*

What message does this send about my business??
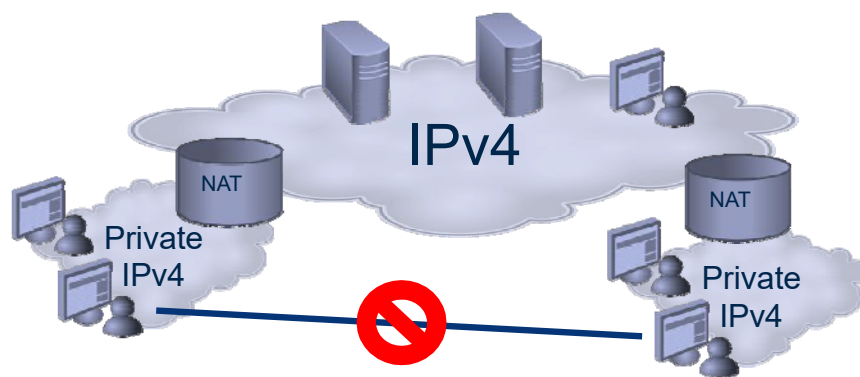
The limiting IPv4 NAT

- Constrained IPv4 space means more NAT
- NAT gateways may be performance bottlenecks Not
- an option for servers
- Pockets of machines that can't directly communicate
- Client addresses "translated" so servers lose visibility

The Challenge

IPv4 Reality

- Must not waste host addresses

- Must allocate subnets by single bits (conservation thinking)

- Must make do with initial allocation size from ISP or RIR

Managing IPv4
RFC1918 Addressing

NAT –
Static, Dynamic

PAT

One to One Mappings

One to Many Mappings

The Solutions

22 ➤ **1000+**

ICANN - New gTLDs

IPv6 Reality →

1. No host address conservation required
2. Subnetting done 4 bits at a time (i.e., "nibble boundaries")
3. An allocation large enough to fit your best design is available

Building A Better Internet –

While the principal goal of IPv6 was larger address space, it will drive better Internet.

• Scale – Larger address space (128-bit)

• Functionality – IPv4 basic functionality preserved

• Security (privacy/authentication headers)

128-bit

Seamless Migration

Secure

THE LIMITS OF THE ADJECTIVE "ASTRONOMICAL"
(VIS-Á-VIS IPv6)

Stars in the Milky Way: 400 billion

Galaxies in the Universe: 2 trillion

$(4.0 \times 10^{11}) \cdot (2.0 \times 10^{12})$

$$\frac{(3.4 \times 10^{38})}{(8.0 \times 10^{23})}$$

IPv6 offers approximately 430 trillion times more addresses than there are estimated stars in the Universe…

IPv4 ■■■■ 32 bits

Only 4 billion addresses

IPv6 ■■■■■■■■■■■■■■■■ 128 bits

Over 10^{38} possible addresses
Enough to give 50 million addresses to every bacteria on Earth!

"The Unix philosophy basically involves giving you enough rope to hang yourself.
And then a couple of feet more, just to be sure."

-Anonymous

Internet, Connectivity & Services of Everything

More devices

More users

More traffic

More IP addresses

More transparency/accountability

More manageability

Better performance

For Operators & Carriers

*With abundant Capacity & Connections, service providers and operators **must** move up the value chain*

Growth / Mature

Developing

Content Driven Services

High level services will drive increasing capacity utilization and digital adoption

Internet of Everything
Content Rich Applications
E-education and e-government
Telemedicine and Telepresence
Disaster Recovery/Content Mirrors
VPN Access
Cloud Computing Infrastructure

Growth & Revenue Opportunities by leveraging on IPv6, new gTLD etc

Wholesale Capacity

Wholesale IP Transit
Metro Ethernet - Wholesale
Long Distance and WAN Ethernet
HDTV Programming, Satellite Content
Video Streaming

Additional products that drive differentiation

Infrastructure Elements

Collocation/Space/Power
DWDM/Wavelengths
Ducts/Fiber

Base level assets likely already commoditized

Improved Business while addressing challenges & innovation

- Scalability: IPv6 offers More Address Space and more security options. _Readiness for Internet of Everything_

- New gTLDs will allow a business to specify clearly what it wishes to relate to, whether that may be a certain product or service, hobby, interest group, business, city, etc.

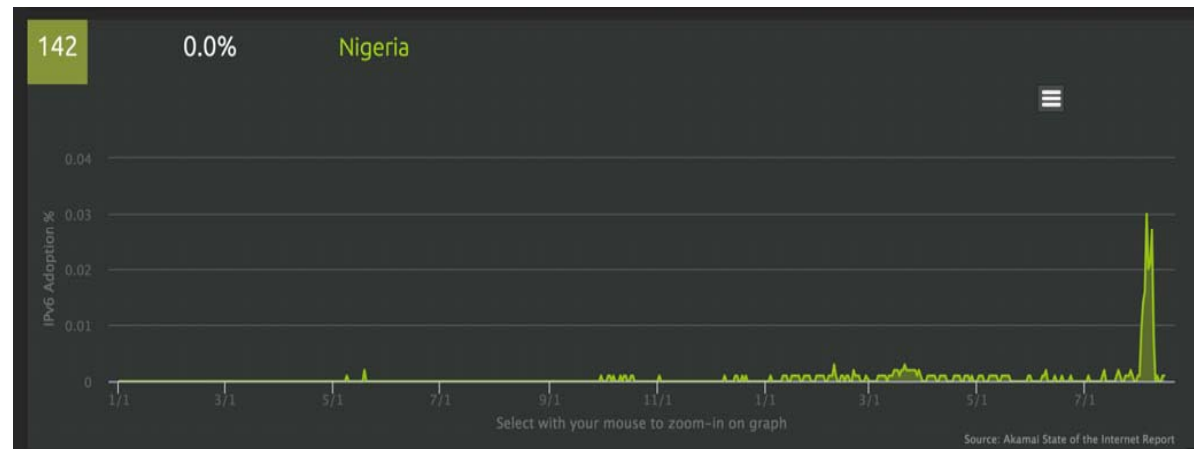- Online visitors will instantly know what to expect from the website. For instance, visiting www.xyz.doctor will let you know right away that it is related to doctors or medicine

- Better Branding & Marketing. Companies don't have to settle with domain names that are either too long or non-related.

- Differentiation and Localization. For example, a business website using a www.abc.**lagos** extension lets everyone know where the store is physically located.

- SEO - It allows for better search engine optimization (SEO).

IPv6 Adoption

RANK	IPV6 % ▼	COUNTRY
1	46.4%	Belgium
2	40.4%	United States of America
3	36.6%	India
4	32.2%	Greece
5	25.5%	Germany
6	21.7%	Luxembourg
7	20.8%	Switzerland
8	20.7%	Finland
9	19.8%	Brazil
10	18.7%	Canada

20	11.1%	Zimbabwe

51	2.0%	Egypt

63	0.3%	South Africa

142	0.0%	Nigeria

Source: Akamai State of the Internet Report

https://www.akamai.com/us/en/about/our-thinking/state-of-the-internet-report/state-of-the-internet-ipv6-adoption-visualization.jsp
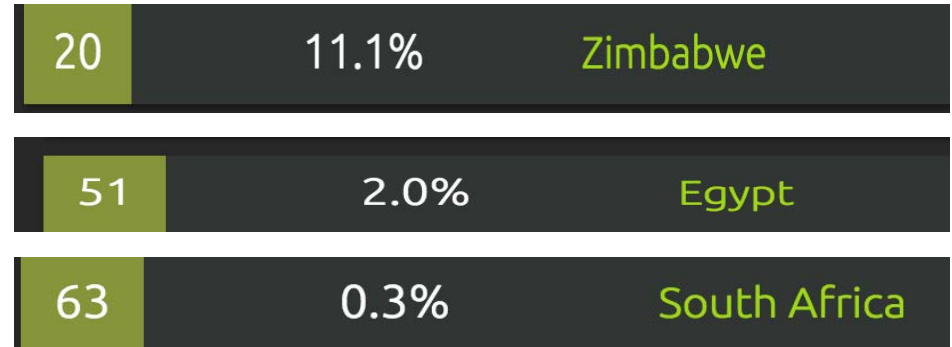
Blockers for IPv6 user adoption

☑ OS support
☑ Client software support   Small issues remain
☑ Infrastructure/backbone support

☑ Content availability
☑ End-user connectivity   Making solid progress
☑ End-user CPE device support

☐ Human Capacity   Gaps Exist !!!

BCN IPv6 - Motivation

Worldwide

BCN

IPv4 Address exhaustion

Spreading IPv6 networks

+

Replacement Plan of our network Devices to enhance Backbone, Core and Access Networks Performance

BCN decided to start IPv6 deployments
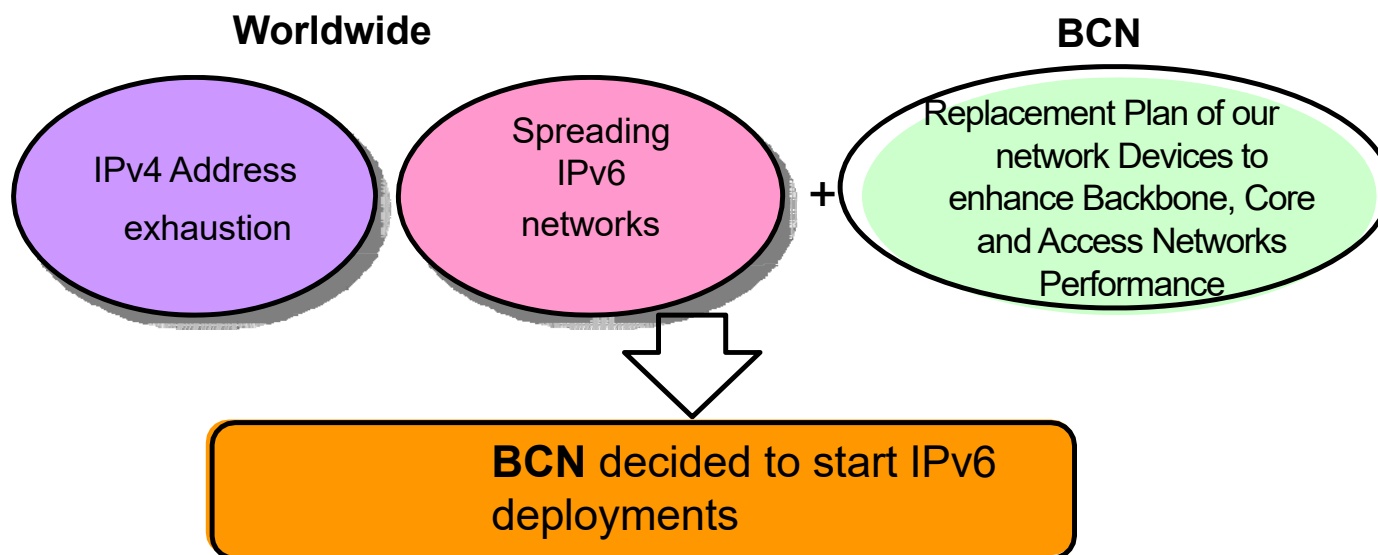
June 2018:   Networks Upgrade

September 2018:   Recruitment of additional IPv6 skills

November 2018:   Further IPv6 deployment testing

February 2019:   Start IPv6 deployments

BCN IPv6 - new service menu

Internet

Backbone network

BCN Lite/Access

BAS

Optical Fiber Access Network
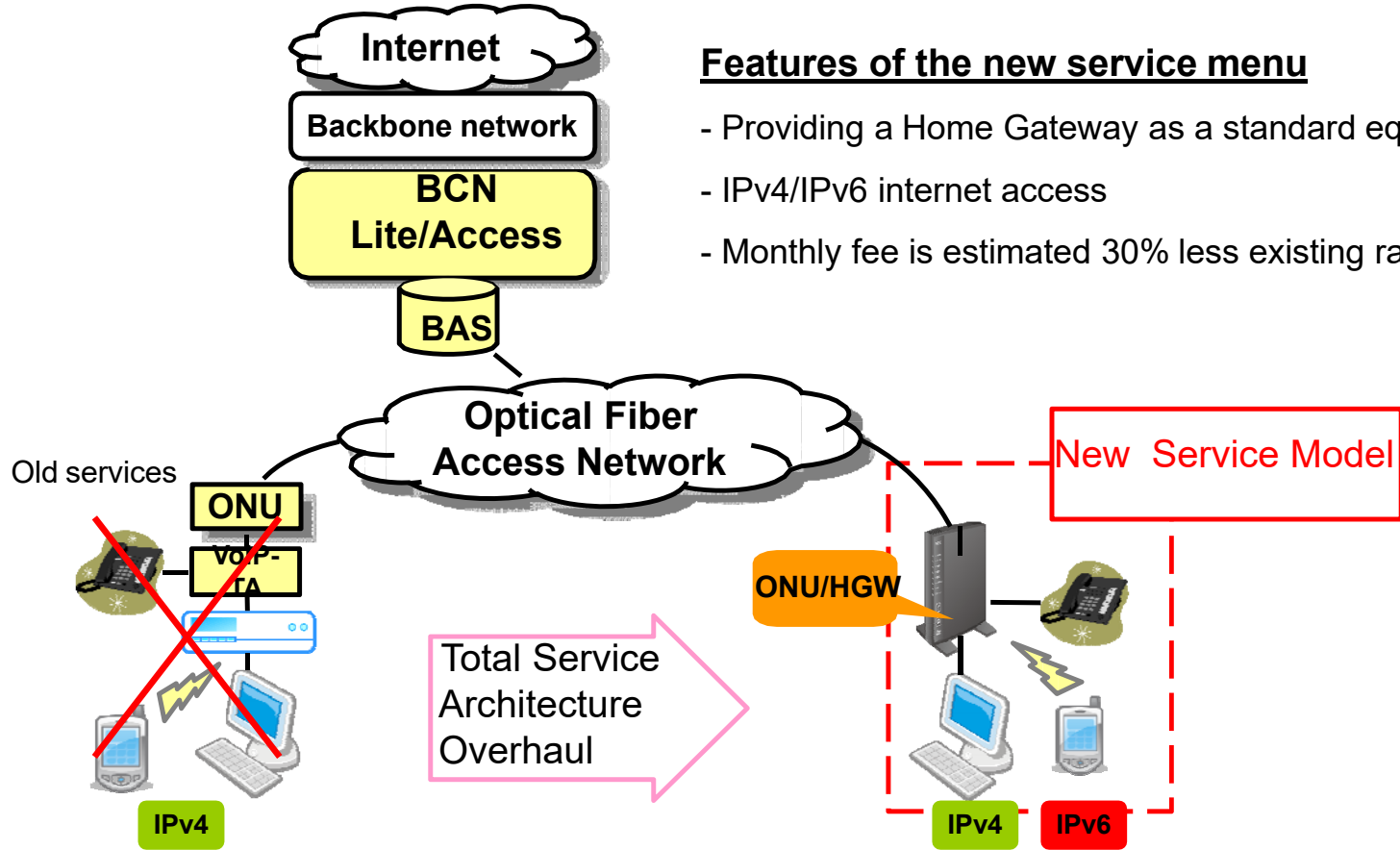
Features of the new service menu

- Providing a Home Gateway as a standard equipment

- IPv4/IPv6 internet access

- Monthly fee is estimated 30% less existing rates

Old services

ONU

VoIP-TA

New Service Model

ONU/HGW

Total Service Architecture Overhaul

IPv4

IPv4   **IPv6**

About BCN

A Neutral, Open-Access, Wholesale Operator providing services to Governments, Businesses, Carriers & Operators

The Company

NCC Licenses

- Unified access service license
- Metropolitan license
- Long distance license

Experience (in collaboration with Abuja Federal Capital Development Agency)

- 500km fibre optic cable in metropolitan Abuja
- Connectivity and internet to banks, embassies, multilateral organizations, and residential
- Direct linkage via cable to Tier-1 Carriers ensuring high quality and scalability
- Over 1000km of OFC Network in North Central and North East of Nigeria

Products & Services

- Broadband Network Infrastructure
- Triple Play Platform and Services
- Managed Services & Collocation Data Centers
- Business Analytics & Intelligence
- Business Collaboration Systems
- Business Advisory Services

BCN provides the platform for project Implementers and providers; and facilitates increased competition, lowering prices and increasing product offerings.
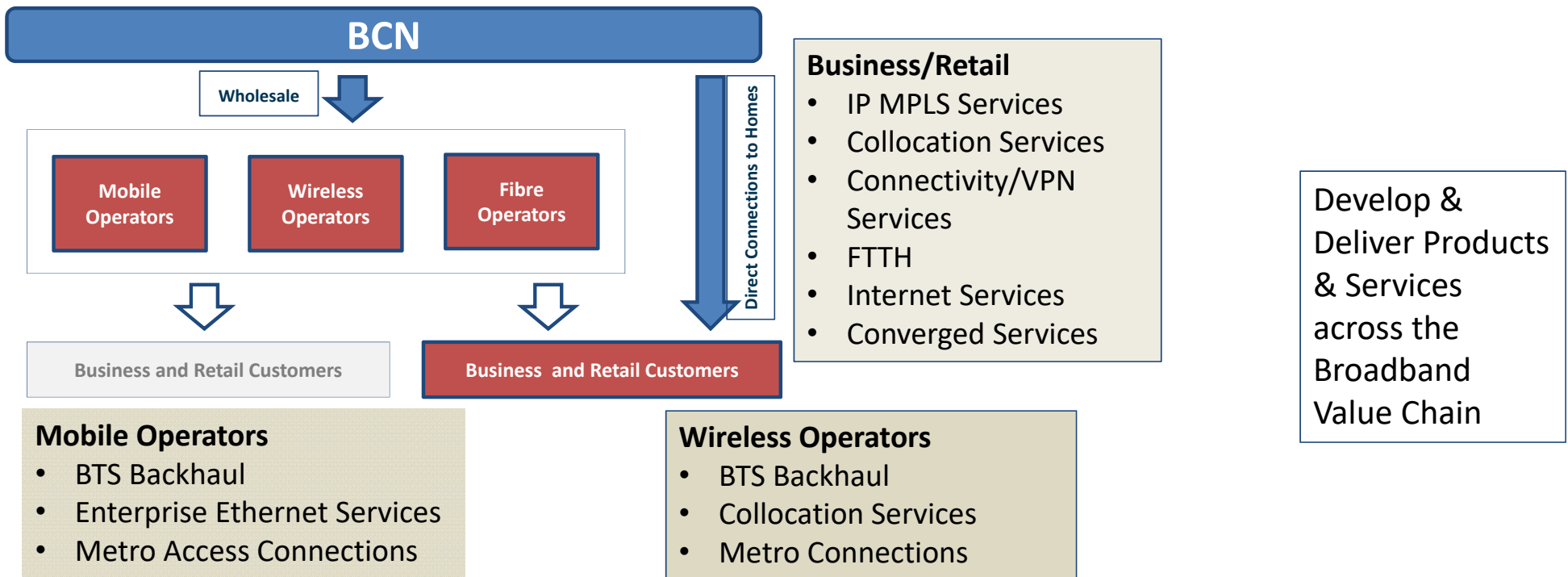
Recent Users of Our Platform/Services include City Wi-fi Operators, Security Agencies, CCTV Operators, ISPs etc

Business Model

BCN

Wholesale

Direct Connections to Homes

| Mobile Operators | Wireless Operators | Fibre Operators |

Business and Retail Customers

Business and Retail Customers

Business/Retail
- IP MPLS Services
- Collocation Services
- Connectivity/VPN Services
- FTTH
- Internet Services
- Converged Services

Develop & Deliver Products & Services across the Broadband Value Chain

Mobile Operators
- BTS Backhaul
- Enterprise Ethernet Services
- Metro Access Connections

Wireless Operators
- BTS Backhaul
- Collocation Services
- Metro Connections

Credit: AfriNIC

- https://www.akamai.com/us/en/about/our-thinking/state-of-the-internet-report/state-of-the-internet-ipv6-adoption-visualization.jsp

- https://www.icann.org/resources/pages/ipv6-initiative-2017-02-28-en

- https://newgtlds.icann.org/en/

- https://newgtlds.icann.org/en/announcements-and-media/case-studies

- https://www.ultratools.com/tools/ipv6Info

Thank You

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