Who am I?

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- Uganda Internet eXchange Point (UIXP)
- African IXP Association (AFIX)
- Internet eXchange Federation (IX-F)
- A few other hats
What is AFIX?

The African IXP Association (AFIX) is a group of Internet exchange point operators from across Africa, brought together by a shared need to coordinate and exchange knowledge.

AFIX aims to foster an enabling environment for IXPs, help them maximize their value, improve connectivity within the continent, and increase the Internet’s value for all.
What is AFIX?

- Launched in 2012 at AfPIF in Johannesburg
  - Member of the Internet eXchange Federation (IX-F) since 2014

- Currently 38 IXPs in 29 countries out of 55 (AU)
  - Oldest: JINX (1996)
  - Newest: Madagascar, Djibouti, Togo

- We host bi-annual meetings at AIS and AfPIF
- We host a private mailing list for IXP operators
- We research and publish data about our region
- We host a website with useful information
  - URL: [http://www.af-ix.net](http://www.af-ix.net)
Growth in Africa

African IXPs: Total Number of Active IXPs by Year

Source: African IXP Association (2016)

AfPIF launched

AXIS project 2012-15
Traffic Carried by IXPs

- No traffic data-sets are fully comprehensive
- Not all IXPs have and/or publish traffic statistics
- Inconsistent accounting of peak traffic statistics (e.g. monthly vs. daily)
- Some IXPs carry significant transit traffic
Connected Networks

African IXPs: Total Number of Networks Connected

Source: African IXP Association (2016)

AFIX Benchmark Survey
Michuki Mwangi survey
Governance Models

African IXPs: Governing Entity Types


- ISP association
- Private not-for-profit
- Government
- Academic
- Informal
Facilities

African IXPs: Facility Neutrality

African IXPs: Facility Type Breakdown
Source: African IXP Association (2016)

YMMV
Facilities

- The quality of IXP facilities has greatly improved over time
- IXPs in carrier neutral DCs had the best amenities on average
- Reality: YMMV
Staffing

African IXPs: Full or Part-time Staff
Data from 30/37 IXPs / Source: African IXP Association (2016)

13 Full-time staff only
12 Both
5 Part-time staff only

African IXPs: Paid or Volunteer Staff
Data from 30/37 IXPs / Source: African IXP Association (2016)

11 Paid staff only
6 Both
13 Volunteer staff only
Contracts and Fees

African IXPs: Formal Contract Required to Join?
Data from 23/37 IXPs / Source: African IXP Association (2016)

African IXPs: Fees
Data from 33/37 IXPs / Source: African IXP Association (2016)
House Rules

African IXPs: Regional Peering Environment


- Layer 3 (typically mandatory multi-lateral)
- Mandatory multi-lateral (all networks are forced to peer with each other)
- Bi-lateral only (networks peer at their own discretion)
- Multi-lateral (route server available but usage is not mandatory)
Value Added Services

- **VAS is more common:**
  - 66% had some in 2008
  - 90% had some in 2016

- **More Root DNS nodes:**
  - 3 in 2008
  - 21 in 2016

- **Looking Glasses nearly doubled 2015-2016**
Additional Observations

- Increasing network diversity at IXPs
  - More content, government, and enterprise networks

- Most IXPs have websites (30/38) w/ ccTLD but:
  - Many are poor quality; don’t list members or networks
  - Only 12 out of 37 have public traffic stats

- Some IXPs do not have internal stats
  - Michuki survey found 7/12 had stats in 2008
Thank you!

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- Visit the AFIX website
  - af-ix.net