Cross Border Connectivity

William Stucke
William@qpop.co.za

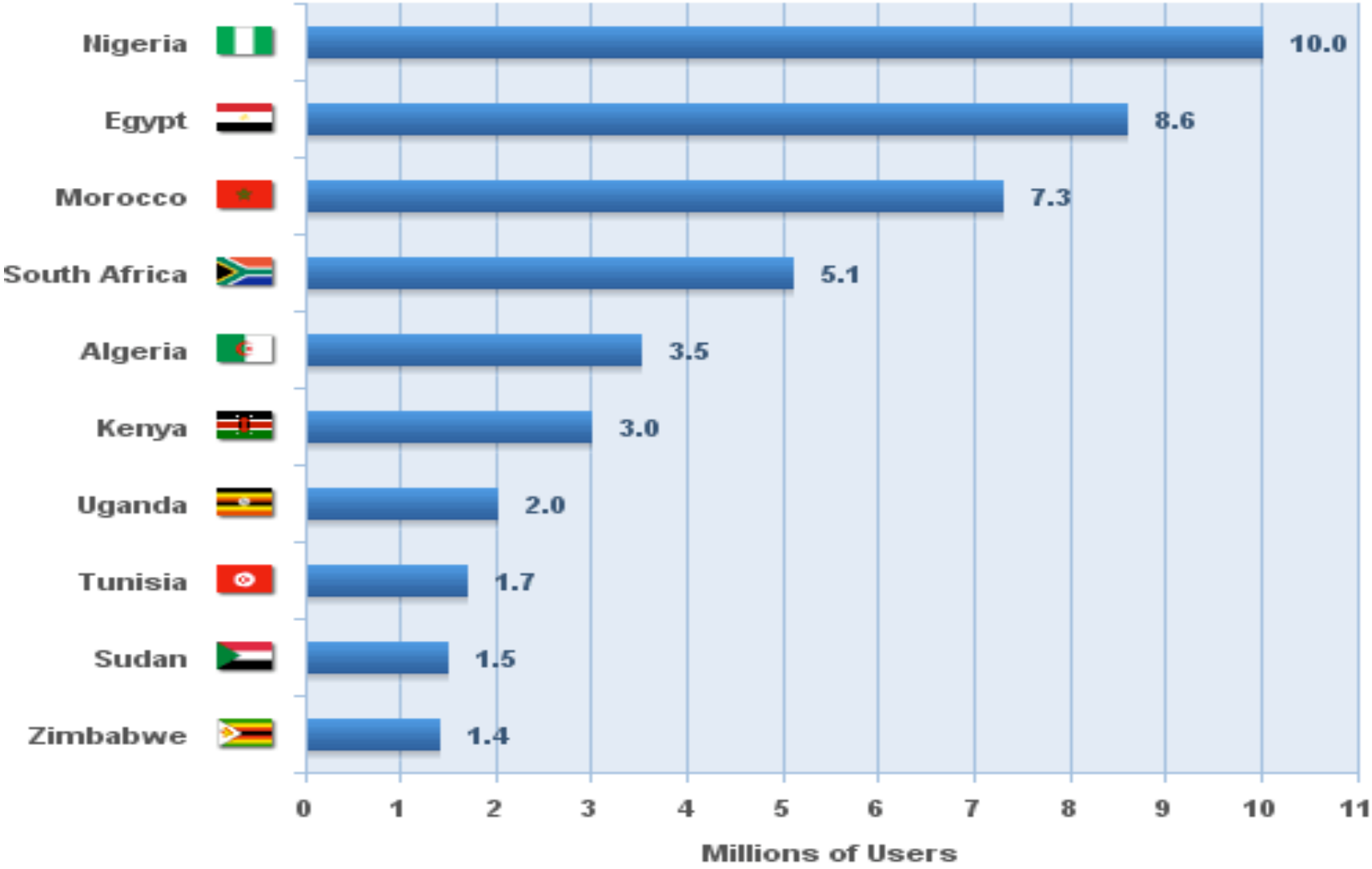
What is the Internet?

- **The I**nternet is a network of interconnected networks
- About 200,000 networks make up the one, single, only, global **I**nternet
- An ISP only ever has a very small fraction of all the web pages on his own network
- An ISP only has a very small fraction of all email addresses on his own network
- An ISP only has a very small fraction of all subscribers on his own network (eyes)
- An ISP is actually selling access to **other people's networks**, when he sells access to "The Internet"
- This means that it's critical that ISPs cooperate with each other, at the same time as they compete.
- An **IXP** – Internet Exchange Point – is a critical piece of Internet infrastructure. ISPs cooperate to exchange traffic at an IXP, like JINX

Bigger Picture

- International Peering and Transit
- Submarine cables
- National backbone
- Metro networks
- Last Mile connectivity
- IXP Connections
- Cross Border connections

Africa Top 10 Internet Countries
March 2008



Source: Internet World Stats - www.internetworldstats.com

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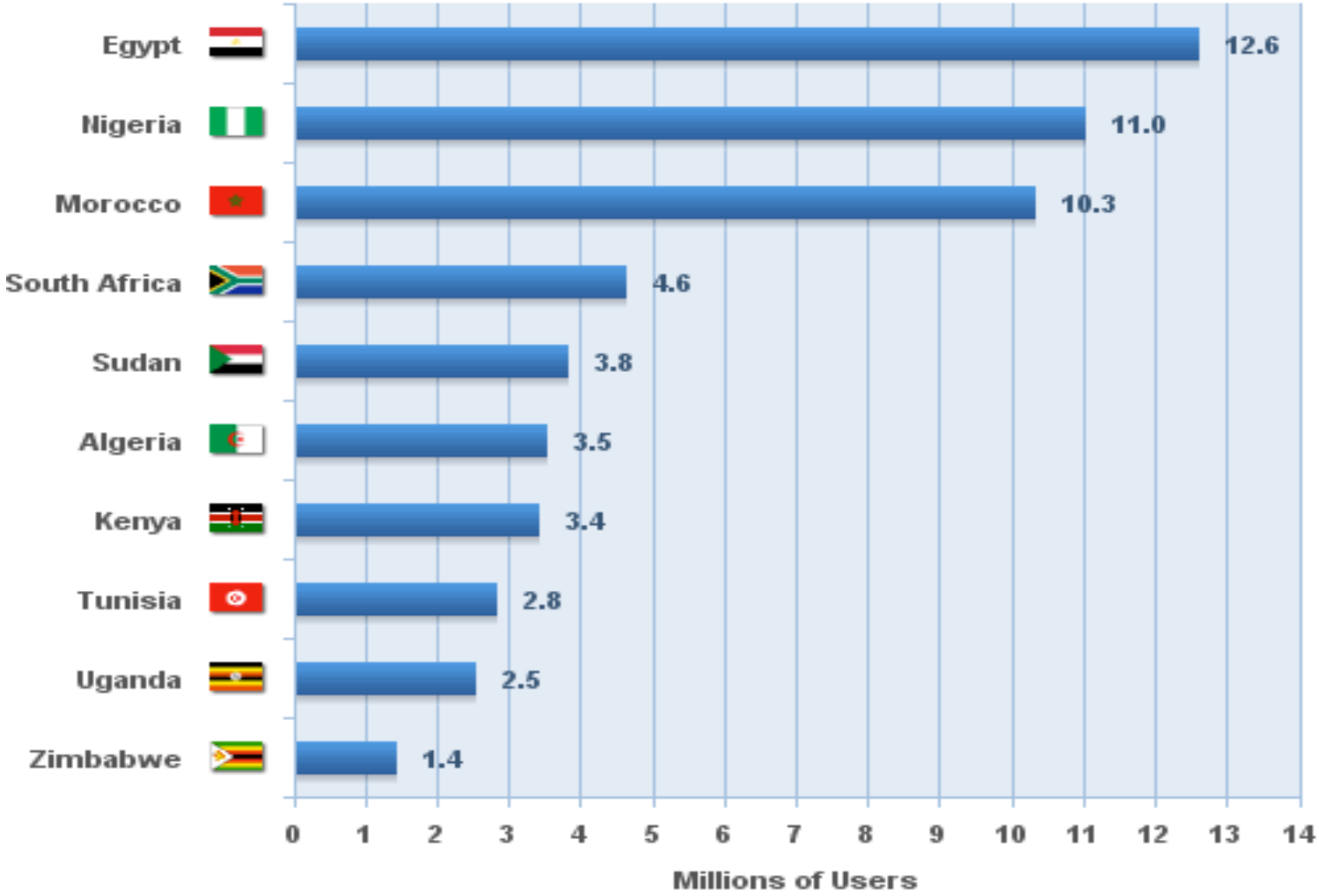
Africa Top 10 Internet Countries
June 2009



Source: Internet World Stats - www.internetworldstats.com - June 2009
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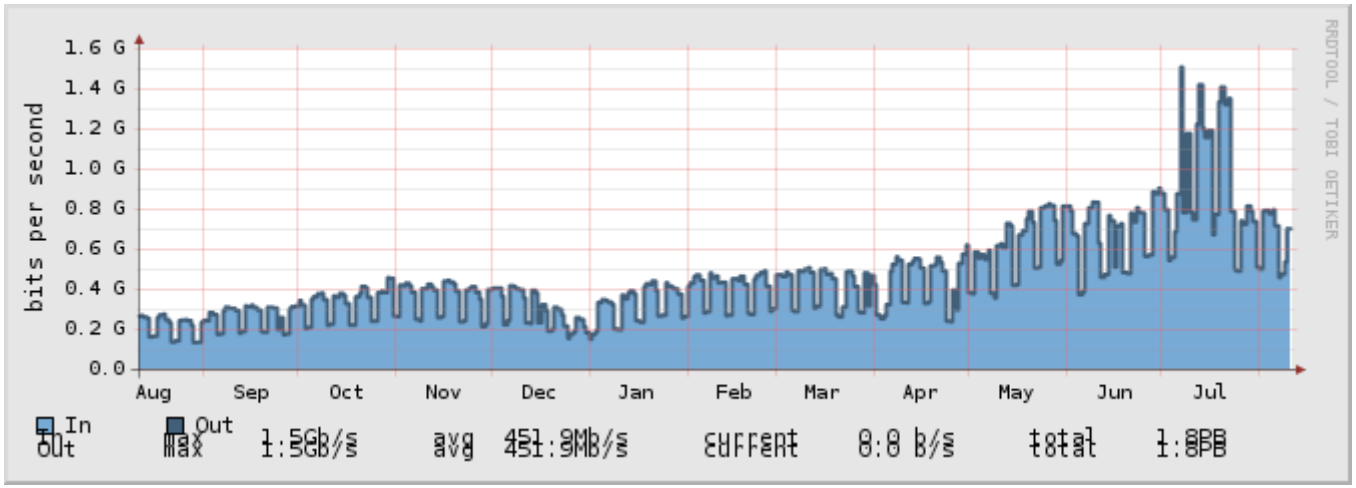
Peering at a Local IXP

- Over 20 IXPs in Africa now, with a number of countries having more than 1
- JINX is of interest:
  - 23 Peers
  - > 1 Gbps of traffic exchanged
  - Open peering policy: no need to be an ISPA member - but not all peers are open!
- Cost of terrestrial carrier services remains an issue

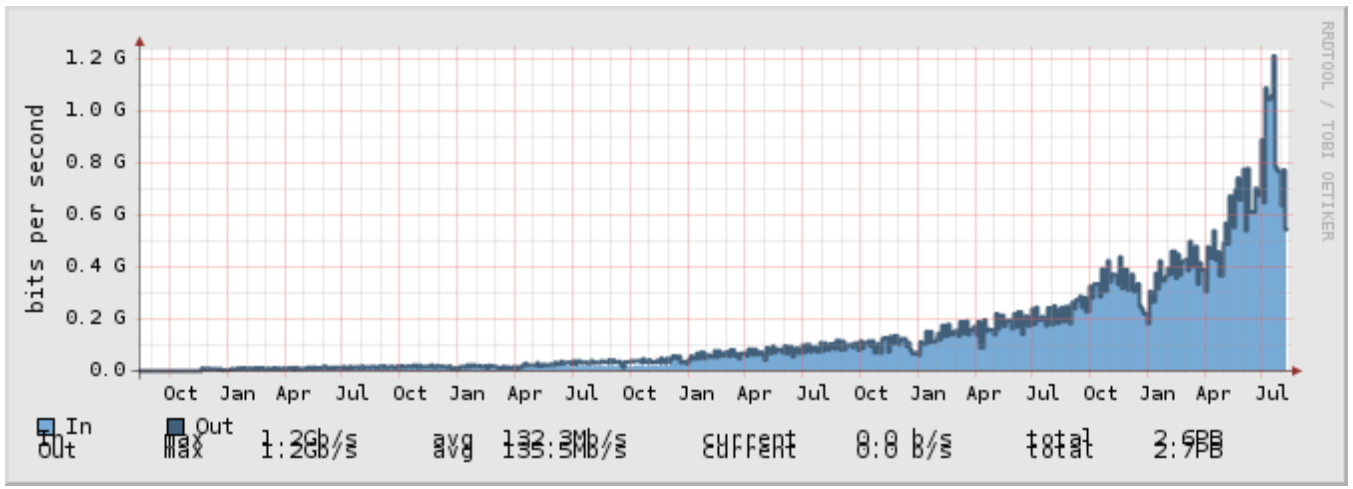
JINX Traffic

http://stats.jinx.net.za/showtotal.php

- 1 Year



- 5 Year



EGYPT
CR-IX
NIGERIA
IbIX
GHANA
GIXP
CÔTE D'IVOIRE
CI-IXP
UGANDA
UiXP
KENYA
KIXP
DEM. REP. OF THE CONGO
KINIX
TANZANIA
TIX
AIXP
RWANDA
RINEX
ANGOLA
IXP-Ang
MOZAMBIQUE
Moz-IX
ZIMBABWE
ZINX
BOTSWANA
BINX
SWAZILAND
SZIXP
SOUTH AFRICA
JINX

Regulatory Issues

- Selling Services: Need a licence
- Buying Services: No licence required, usually
- Crossing the border – can be fun
  - Buy services from incumbent Telco
  - Lay fibre to border
  - Getting across “no man’s land”
  - Lay fibre all the way?

Peering at a Foreign IXP

- Carrier Services across the border
  - Your side
  - Other side
- IXP membership / rules
- Peering agreements
- Licensing issues

Regional IXPs

- Politically popular everyone says “We’re building a Regional IXP!”
- Connectivity is key
- See 2006 paper: http://www.afrispa.org/dpages/PositionPapers/RegionalExchanges.pdf

Why connect to another Country?

- Local traffic delivered more directly
- Peering
- Quality of Service
- Redundancy