

KENET, UbuntuNet Alliance and the Internet Measurements Lab (MLAB) Platform

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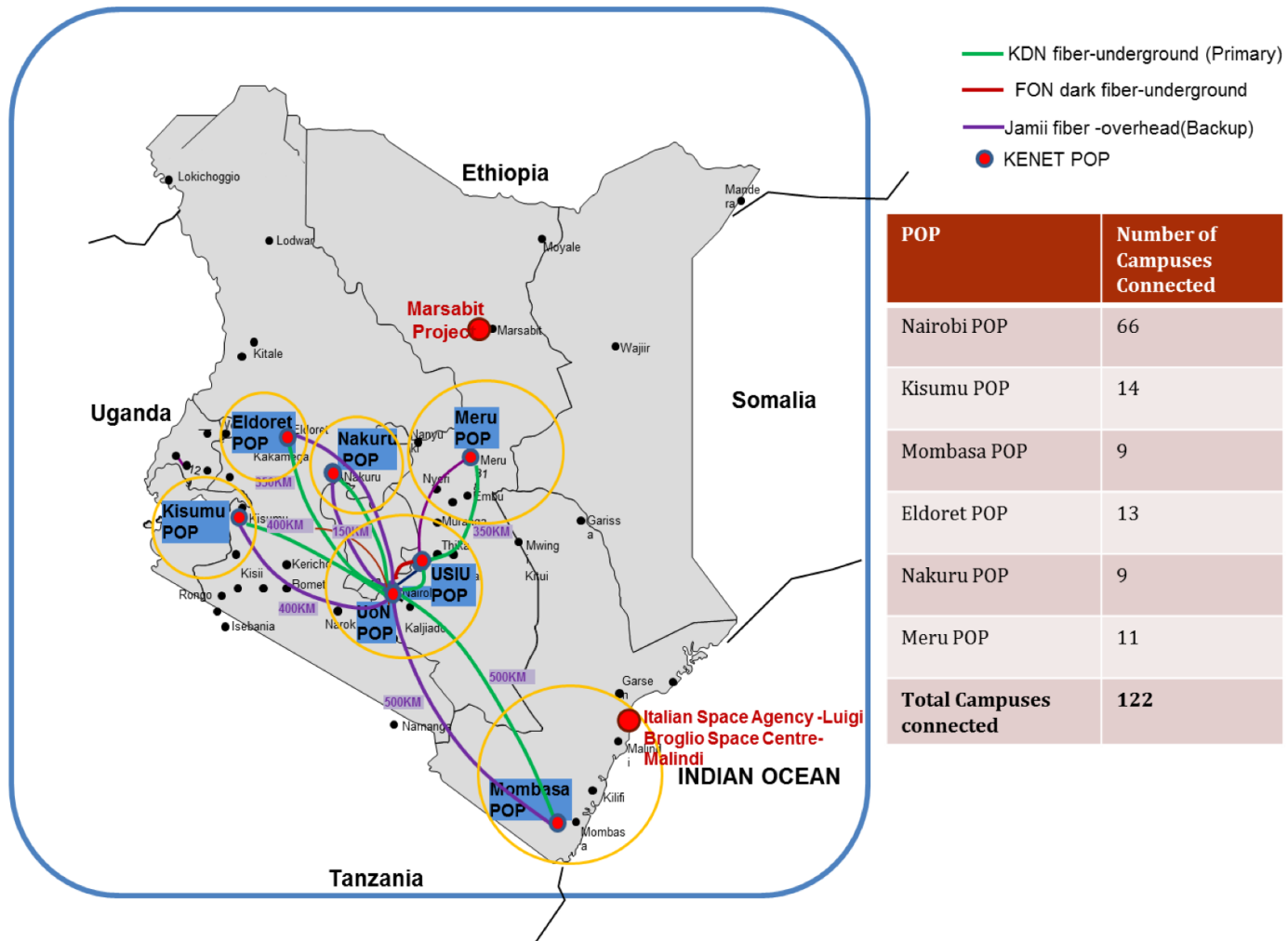
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Board Member, UbuntuNet Alliance (regional REN)

KENET – National Research & Education Network of Kenya

- Licensed Private Educational Operator since 2002
 - Special license category
- Not-for-profit membership organization
 - Public + Private Universities, Local + Int'l Research Institutes, Technical colleges, Government affiliated bodies (80 members + 130 campuses connected)
- Governed by a Board of Trustees
 - 5 Vice Chancellors, PS in charge of education, Regulator CEO, and CEO of Research Institute
- Founder Member of the UbuntuNet Alliance, Eastern and Southern REN

KENET Network of 130 Campuses as August 2013



NREN Infrastructure and Sources of Funding in Africa

- NREN Network infrastructure =
 - Int'l / regional links + national distribution network + campus networks
- Who has financed different segments of KENET?
 - *Int'l links - GoK / World Bank + Supplier Financing (3 x STM-4 IRUs + 1 STM-1)*
 - *Distribution Network – Government + Leased Line Providers + Institutions (Up 20 Gb/s last mile capacity as of August 2013)*
 - *Campus ICT investments –Institutions (95%) + KENET + Google GASP*



UbuntuNet Backbone

- 14 NREN members in Eastern/Southern Africa
- EU/UA funded Africa Backbone
 - Phase 1 is Kigali <> Kampala <> Nairobi < > Dar < > Maputo <> Mtunzini < > Nairobi (STM-4 links)
 - Nairobi < > Amsterdam (peer with GEANT, AMSIX, and IP transit)
- Aggregates Traffic demands to/from Akamai + Google + R&E + other local content in Africa

KENET as an NREN

- **Aggregates HE Demand** for bandwidth and leased lines
 - Increasing buyers power of the higher education sector and reducing costs
 - KENET beneficiary of supplier-financed IRUs
- **Aggregates Internet traffic from Higher ED AS**
 - KENET generates up to 1 Gb/s of Google cache traffic
 - 1 Gb/s connection to KIXP
- **Develops High-end ICT talent** – technical + project management
 - Capacity building for KENET and member institutions
- **Builds advanced research infrastructures** and community in different areas
 - Africa Science Gateway and federated services (KENET CA, iDP, EDUROAM)
 - ICT/Internet, Educational technology, Medicine, and Agriculture

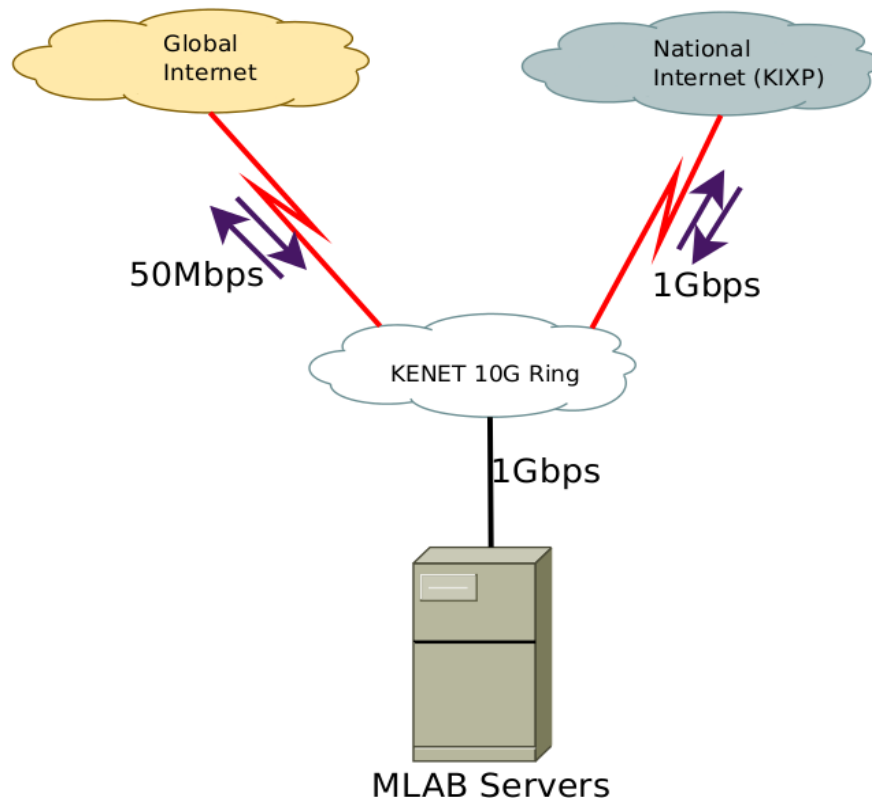
Measurement Lab (MLAB)

- What Is It?
 - Open, distributed platform for researchers to deploy measurement tools
 - Open data
- Some Measurement Tools
 - NDT (Network Diagnostic Tool) – Speed & Diagnostics
 - NPAD (Network Path & Applications Diagnostics)
 - Identifies performance problems on the end-to-end path
 - Neubot – Gathers data for network neutrality
 - ShaperProbe – Identifies traffic shaping in the path
 - Glasnost – Identifies application-specific traffic shaping, Deep

packet inspection on the path

Nairobi MLAB Node @ KENET (2013)

Measurement Lab



- Three (3) Physical Servers
- 1Gbps KIXP Connection
- 50Mb/s International Capacity
- IPv4/IPv6 Support
- KENET Technical Usage?
 - Leased line / links
 - commissioning tests
- Promote use by consumer organizations, regulator, and the emerging Internet research community

Kenya Statistics – Download Throughput

Public Data

▼ Broadband performance usin...

Download throughput

Network-limited time ratio

Number of tests

Packet retransmission

Percentage of tests in co...

Clear

▼ Compare by Country ▼

All Locations

▶ Afghanistan

▶ Aland Islands

▶ Albania

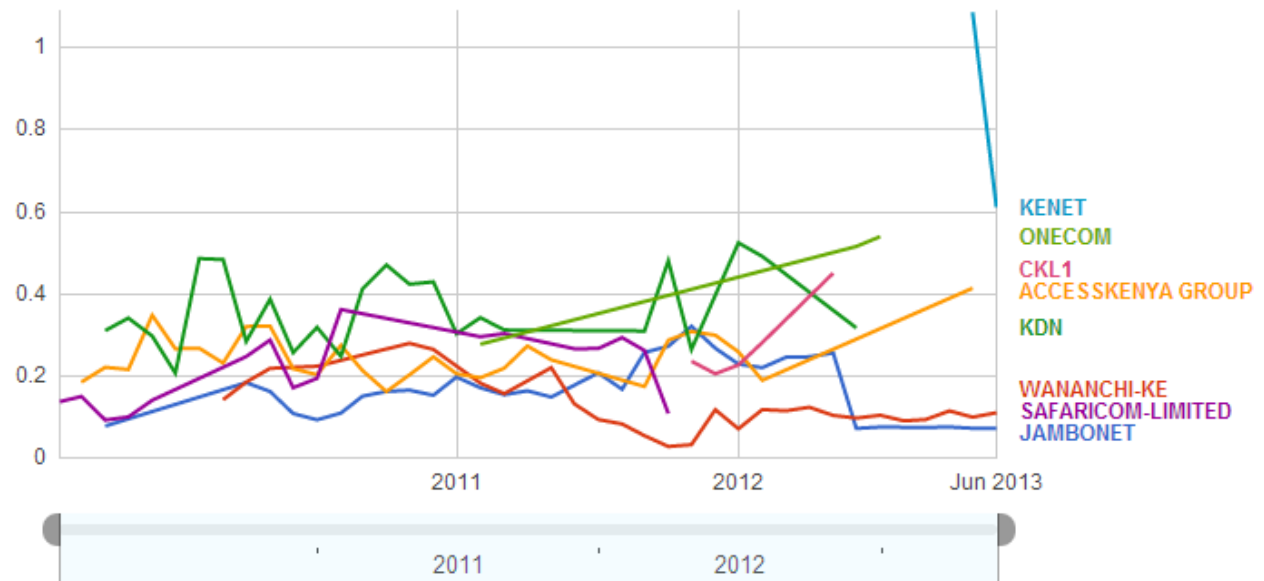
▶ Algeria

▶ Andorra

Clear selections

▶ Location

Download throughput ?



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Kenya Statistics – Uplink Throughput

Public Data

Packet retransmission
 Percentage of tests in co...
 Receiver window scale
 Receiver-limited time ratio
 Round Trip Time
Upload throughput

Clear

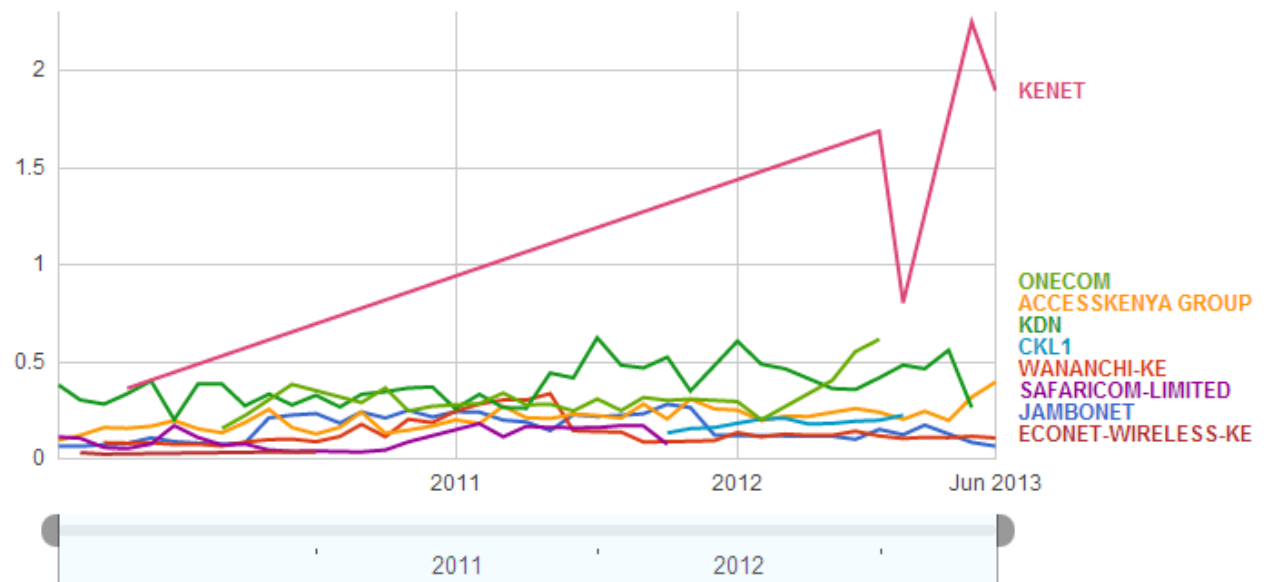
Compare by Country

- All Locations
- Afghanistan
- Aland Islands
- Albania
- Algeria
- Andorra

Clear selections

Location

Upload throughput ?



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Download Stats – Africa Selected

Public Data

Broadband performance usin...

Download throughput

Network-limited time ratio

Number of tests

Packet retransmission

Percentage of tests in co...

Clear

Compare by

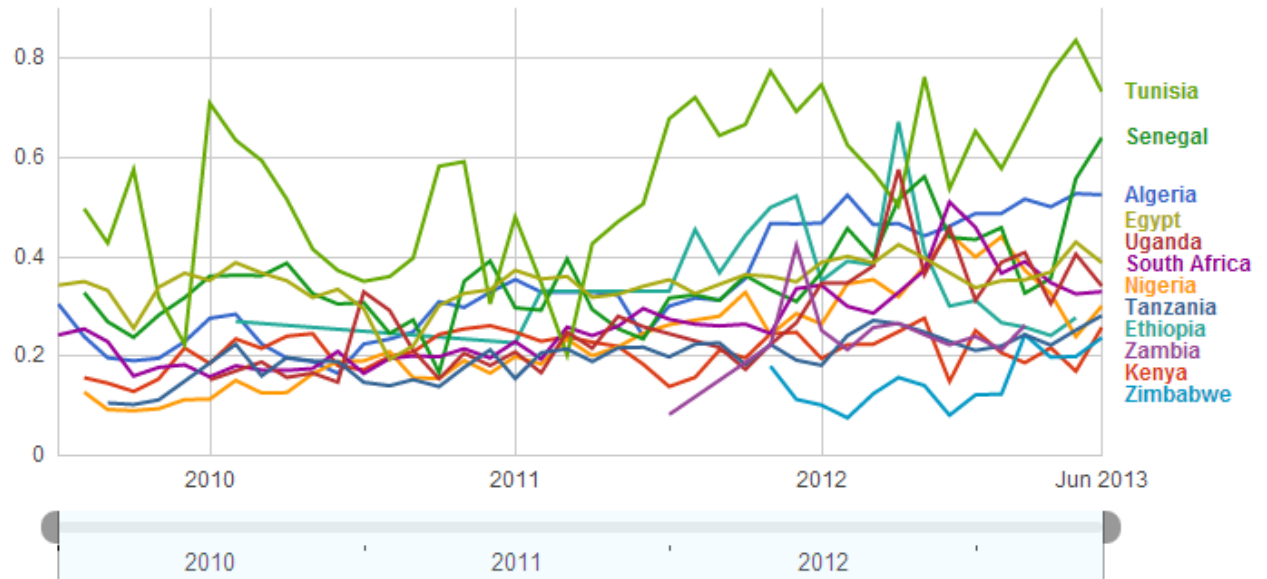
Country

- Ecuador
- Egypt
- El Salvador
- Equatorial Guinea
- Eritrea
- Estonia
- Ethiopia

Clear selections

Location

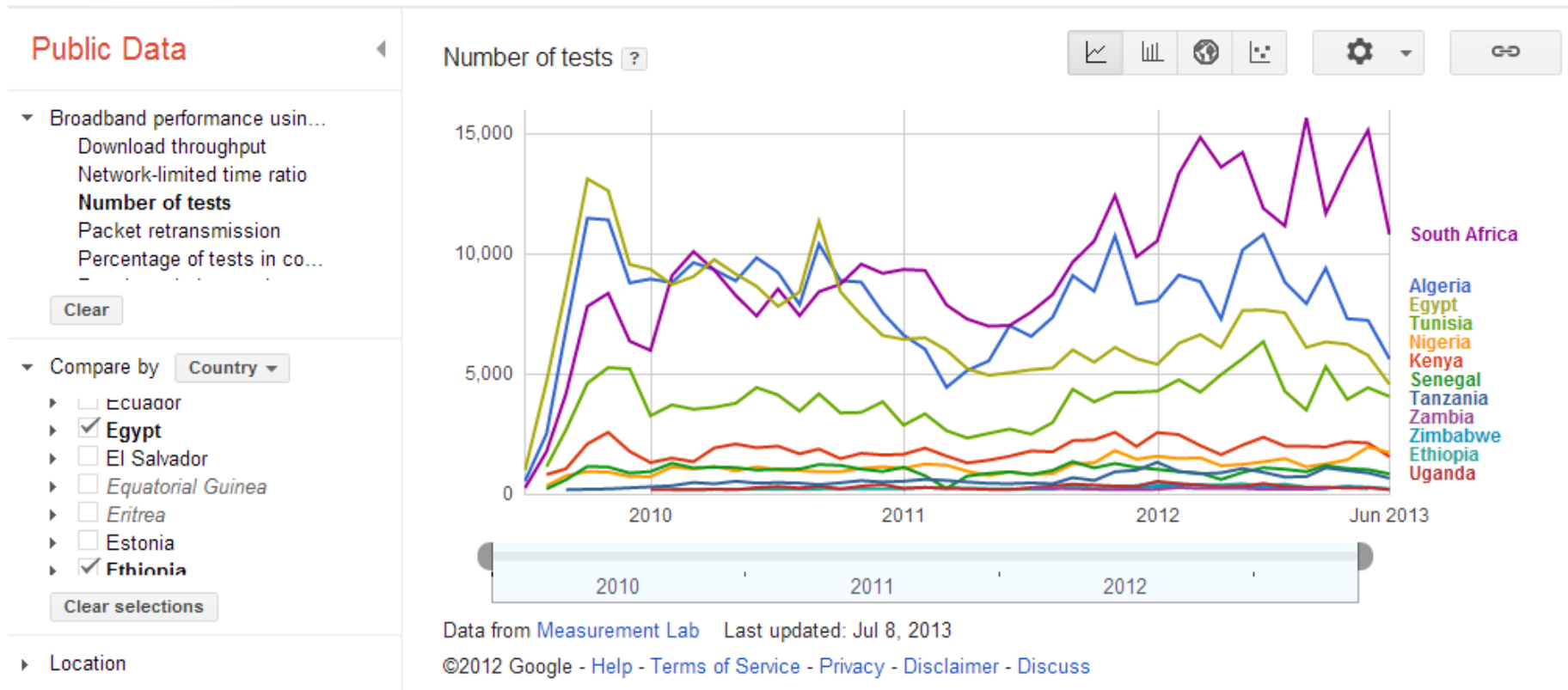
Download throughput ?



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Top Testers – Africa Selected



Thank You

Q&A