Traffic trends in Africa
AfPIF 2018, Cape Town
Who are we?

- 10% Internet requests everyday
- 2.8B Monthly unique visitors
- 151+ Data centers globally
- 10M+ websites, apps & APIs in 150 countries
- 10M Requests/second
~10 million Internet applications faster in...
# Measurements of the Speed of Light

<table>
<thead>
<tr>
<th>Date</th>
<th>Investigator</th>
<th>Method</th>
<th>Estimate Kilometers/Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>1667</td>
<td>Galileo Galilei</td>
<td>Covered Lanterns</td>
<td>333.5</td>
</tr>
<tr>
<td>1676</td>
<td>Ole Roemer</td>
<td>Jupiter's Moons</td>
<td>220,000</td>
</tr>
<tr>
<td>1726</td>
<td>James Bradley</td>
<td>Stellar Aberration</td>
<td>301,000</td>
</tr>
<tr>
<td>1834</td>
<td>Charles Wheatstone</td>
<td>Rotating Mirror</td>
<td>402,336</td>
</tr>
<tr>
<td>1838</td>
<td>François Arago</td>
<td>Rotating Mirror</td>
<td></td>
</tr>
<tr>
<td>1849</td>
<td>Armand Fizeau</td>
<td>Rotating Wheel</td>
<td>315,000</td>
</tr>
<tr>
<td>1862</td>
<td>Leon Foucault</td>
<td>Rotating Mirror</td>
<td>298,000</td>
</tr>
<tr>
<td>1868</td>
<td>James Clerk Maxwell</td>
<td>Theoretical Calculations</td>
<td>284,000</td>
</tr>
<tr>
<td>1875</td>
<td>Marie-Alfred Cornu</td>
<td>Rotating Mirror</td>
<td>299,990</td>
</tr>
<tr>
<td>1879</td>
<td>Albert Michelson</td>
<td>Rotating Mirror</td>
<td>299,910</td>
</tr>
<tr>
<td>1888</td>
<td>Heinrich Rudolf Hertz</td>
<td>Electromagnetic Radiation</td>
<td>300,000</td>
</tr>
<tr>
<td>1889</td>
<td>Edward Bennett Rosa</td>
<td>Electrical Measurements</td>
<td>300,000</td>
</tr>
<tr>
<td>1890s</td>
<td>Henry Rowland</td>
<td>Spectroscopy</td>
<td>301,800</td>
</tr>
<tr>
<td>1907</td>
<td>Edward Bennett Rosa and Noah Dorsey</td>
<td>Electrical Measurements</td>
<td>299,788</td>
</tr>
<tr>
<td>1923</td>
<td>Andre Mercier</td>
<td>Electrical Measurements</td>
<td>299,795</td>
</tr>
<tr>
<td>1926</td>
<td>Albert Michelson</td>
<td>Rotating Mirror (Interferometer)</td>
<td>299,798</td>
</tr>
<tr>
<td>1928</td>
<td>August Karolus and Otto Mittelstaedt</td>
<td>Kerr Cell Shutter</td>
<td>299,778</td>
</tr>
<tr>
<td>1932 to 1935</td>
<td>Michelson and Pease</td>
<td>Rotating Mirror (Interferometer)</td>
<td>299,774</td>
</tr>
<tr>
<td>1947</td>
<td>Louis Essen</td>
<td>Cavity Resonator</td>
<td>299,792</td>
</tr>
<tr>
<td>1949</td>
<td>Carl I. Aslakson</td>
<td>Shoran Radar</td>
<td>299,792.4</td>
</tr>
<tr>
<td>1951</td>
<td>Keith Davy Froome</td>
<td>Radio Interferometer</td>
<td>299,792.75</td>
</tr>
<tr>
<td>1973</td>
<td>Kenneth M. Evenson</td>
<td>Laser</td>
<td>299,792.457</td>
</tr>
<tr>
<td>1978</td>
<td>Peter Woods and Colleagues</td>
<td>Laser</td>
<td>299,792.4588</td>
</tr>
</tbody>
</table>
Continental presence

Open (8):
- Djibouti
- Angola
- Johannesburg, Cape Town, Durban
- Mauritius
- Kenya
- Egypt

Coming (14):
- Ghana
- Egypt
- Algeria
- Madagascar
- Morocco
- Tunisia
- Tanzania
- Zimbabwe
- Uganda
- Côte d’Ivoire
- Cameroon
- La Reunion
- DRC
- Nigeria
- Tunisia
Cloudflare measurements
Evolution of traffic when edge nodes are deployed
Average latencies to Europe

Low latencies from western coastal countries

Central countries have higher latencies due to distance to submarine cables and limited interconnection options
Where is African traffic mostly being served from

Nothing surprising here:
French speaking countries are served from France
English speaking countries are served from London
New trend: some countries break ties and start serving traffic from closer European countries: Portugal, Spain, and Greece
Amazing how much of the African Internet traffic goes through Europe, with high latency and high costs as a result. #IETF100 #GAIA #needmorepeering
Our own tests using RIPE Atlas confirm that most inter-ISP traffic is routed through Europe.
Edge deployment is much needed

- Higher latencies than anywhere else in the world
- Because of the longer distances. Africa is huge.
- But also because of the limited inland interconnections
- A continent that still essentially relies on its connections to Europe

Initiatives like One Africa Network will help building that ecosystem
Our technicians from @liquidtelecom in ‘No mans land’. The space between borders. Fixing fibre that works across borders. This is how we keep Africa’s Digital Future running. SomewhereinAfrica.
The content
Where is content hosted?

10 millions web properties flow through our servers, sitting between the users and the hosting providers.

We have a unique view of where the content is hosted.
Looking for African hosted content

A popular Moroccan content hosted on Afrinic IPs

| inetnum:     | 41.77.112.0 - 41.77.119.255 |
| netname:     | GENIOUS-v4                  |
| descr:       | Genious Communications      |
| country:     | MA                          |
| org:         | ORG-GC6-AFRINIC             |
| admin-c:     | HA11-AFRINIC                |
| tech-c:      | LOH1-AFRINIC                |
| status:      | ALLOCATED PA                |
| mnt-by:      | AFRINIC-HM-MNT              |
| mnt-lower:   | GENIOUS-MNT                 |
| source:      | AFRINIC # Filtered          |
| parent:      | 41.0.0.0 - 41.255.255.255   |
Too good to be true

jerome@edge01.jnb01> traceroute 41.77.116.1
traceroute to 41.77.116.1 (41.77.116.1), 30 hops max, 52 byte packets
1  ae-2-113.er-01-jnb.za.seacomnet.com (105.22.32.217)  1.245 ms  1.555 ms  1.218 ms
2  ce-0-2-0-0.cr-02-jnb.za.seacomnet.com (105.16.28.2)  157.321 ms ce-0-3-0-0.cr-01-jnb.za.seacomnet.com (105.16.29.1) 164.310 ms ce-0-3-0-0.cr-02-jnb.za.seacomnet.com (105.16.29.2) 162.336 ms
    MPLS Label=24190 CoS=0 TTL=1 S=1
    MPLS Label=24019 CoS=0 TTL=1 S=1
4  xe-0-0-0-4.cr-01-lhr.uk.seacomnet.com (105.16.13.38)  159.904 ms  158.913 ms  159.625 ms
    MPLS Label=24009 CoS=0 TTL=1 S=1
5  xe-0-0-1-0.br-01-lhr.uk.seacomnet.com (105.16.35.254)  156.852 ms  156.714 ms  157.387 ms
6  ldn-b5-link.telia.net (213.248.97.177)  164.961 ms  156.711 ms  156.984 ms
7  ldn-bb3-link.telia.net (213.155.132.194)  156.698 ms  156.988 ms  156.874 ms
8  nyk-bb4-link.telia.net (62.115.136.185)  225.922 ms  227.830 ms *
9  ldn-bb4-link.telia.net (62.115.134.138)  235.410 ms motl-b1-link.telia.net (62.115.134.53)  233.169 ms  233.357 ms
    MPLS Label=6038 CoS=0 TTL=1 S=1
10 po-50-60.csr2.mtl8.globo.tech (67.215.0.168)  245.656 ms  246.012 ms  245.715 ms

Hosted in Montreal

Unexpected high latency
A very unusual distribution

On all content hosted on Afrinic IPs, less than 50% is actually hosted in African countries. Hosting providers in Europe, Canada and Asia advertise Afrinic IP space on behalf of African companies.
What about IPv6?
We are seeing a steady increase over the last four years.

Sierra Leone is the country who grew the most at around 8% per month.

Algeria only increased by 2% per month.

The mean of all those countries is 6.2% per month, which is also the Internet traffic growth of South Africa.
Comparing with Europe, USA and Canada, it will take 51 months for Africa to reach today’s traffic levels similar to these two countries and continent.

If Europe, USA and Canada keep their current 4% growth rate, it will take approximately 8 to 12 years for Africa to catch up and surpass.

Thank you

Jerome Fleury      jf@cloudflare.com
Louis Poinsignon   louis@cloudflare.com