Africa: Regional Insights

Ripe 2016
**Africa – Small Market BIG Opportunities**

- Over a billion people - of which 40% are reachable by fibre
- Mobile users set to double in the next 5 Years reaching 60% penetration
- Improved Metro Connectivity averaging at 100 Mbps in key hubs: Johannesburg, Cape Town, Durban, Lagos, Nairobi, Accra
- In Larger economies two-thirds of businesses with 50+ staff have access to broadband

<table>
<thead>
<tr>
<th></th>
<th>TIER 1 TELECOs</th>
<th>CARRIER NEUTRAL DATA CENTRES</th>
<th>FIBRE / CABLE COMPANIES</th>
<th>IT / CLOUD SERVICE PROVIDER / ISPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESTIMATED NUMBER OF DCs</td>
<td>≈50+</td>
<td>≈7</td>
<td>≈5</td>
<td>≈70+</td>
</tr>
<tr>
<td>ESTIMATED SHARE OF DC WHITE SPACE</td>
<td>47%</td>
<td>≈20%</td>
<td>≈7%</td>
<td>≈26%</td>
</tr>
<tr>
<td>EXAMPLES</td>
<td>MTN, Telkom, Vodacom</td>
<td>Teraco, Rack Centre, Kooba</td>
<td>MainOne, Liquid Telecom, Broadbased</td>
<td>Internet Solutions, BCX, T-Systems, CWG</td>
</tr>
</tbody>
</table>
And Changing Quickly... In the News

Winston won’t win this time:

• South Africa’s Largest ISP, Telkom, now known as Openserve (AS5713) has finally opened it’s doors and ready to peer with you as of today!!

• Let me know if you need an introduction

More Cables:

• Finally the cables system between Angola and Brazil have commenced!
• Angola Cables and NEC have paired up to build 40Tbps of capacity which is expected to be ready to play with mid 2018
Africa a Young IXP market

- 54 countries in Africa (AU)
- 34 IXPs in 26 countries
- Oldest IXP: 1996
- Newest IXP: 2016 (Gabon-IX)
- IXP Traffic: 160 Gbps+
- Largest: 90 Gbps (South Africa)
- AF-IX Association 3 years old

http://www.af-ix.net/
Varied commercial models per country

<table>
<thead>
<tr>
<th>Fees</th>
<th>IXP A USD</th>
<th>IXP B USD</th>
<th>IXP C USD</th>
<th>IXP D</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership</td>
<td>1250</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>312.5</td>
</tr>
<tr>
<td>10Mbps Port</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>100Mbps Port</td>
<td>250</td>
<td>220</td>
<td>0</td>
<td>385</td>
<td>213.75</td>
</tr>
<tr>
<td>1Gbps Port</td>
<td>750</td>
<td>670</td>
<td>0</td>
<td>500</td>
<td>480</td>
</tr>
<tr>
<td>10Gbps</td>
<td>2500</td>
<td>832</td>
<td>0</td>
<td>655</td>
<td>996.75</td>
</tr>
</tbody>
</table>

- Low capacity ports still available at 90% of exchanges;
- Port fees vary and can be as high as Europe with less value
- Can still get away with high port fees due to high transit costs... Good for the internet growth in Africa?
Finally we have SOME Capacity
Africa Intra-connectivity... Working together

Share of Africa Int'l Internet Bandwidth by Region, 2011 vs 2015

- U.S. & Canada
- Middle East
- Asia
- Africa
- Europe
Still Small capacity due to Price

Country-to-Country Routes to Europe vs Within Africa 2015

- 155 Mbps - 1 Gbps
- 1 Gbps - 10 Gbps
- 10 Gbps - 25 Gbps
- > 25 Gbps

Number of Routes by Capacity

- 2011
- 2015
Transit pricing is declining but still high

Median STM-1 IP Transit Prices in Africa, Q2 2015
Lining up with the Major routes
**African Hubs – a Modern Marketplace**

The world's 2nd fastest growing economic region and its growing population

- **Southern Africa**: 165mil
- **Eastern Africa**: 300mil
- **Northern Africa**: 226mil
- **Central Africa**: 155mil
- **Western Africa**: 360mil

**SADC Example of a Growing Community: Up and to the right!**

- **2011 – 2015 CAGR**: 44.5%
- **2011**: 879
- **2012**: 1302
- **2013**: 1652
- **2014**: 3625
- **2015**: 5528
African Internet – Free vs Restricted

- **Restricted**
  - Sudan
  - Ethiopia
  - Saudi Arabia
  - Iran
  - China
  - Cuba
  - Belarus

- **Partly Free**
  - Nigeria
  - Angola
  - Zimbabwe
  - Malawi
  - Uganda
  - Rwanda
  - Egypt
  - Libya
  - Tunisia
  - Morocco

- **Free**
  - South Africa
  - Kenya

Note: Sudan and Ethiopia along with Saudi Arabia, Iran, China, Cuba and Belarus are the most censored countries for internet users. South Africa and Kenya are among the freest countries for internet users.
Mobile Penetration driving Growth

Global IP traffic (EB per month) – CAGR 2013-18

Middle East and Africa: 38%
Central and Eastern Europe: 23%
Asia Pacific: 21%
Latin America: 21%
North America: 20%
Western Europe: 18%

Mobile Penetration by Region

SSA: 64%, Emerging Europe: 131%, Asia Pacific: 103%, Latin America: 104%, North America: 103%, MENA: 114%, Western Europe: 131%
Africa – Highly concentrated

3 COUNTRIES: KENYA, NIGERIA & SOUTH AFRICA REPRESENT 95% OF TOTAL WHITE SPACE IN AFRICA

A mapping of sub-Saharan Africa’s data centre white space capacity (sqm) - 2015

KENYA ≈ 2000sqm
NIGERIA ≈ 6000sqm
SOUTH AFRICA ≈ 40 000sqm
### Global Comparison

<table>
<thead>
<tr>
<th>DC FACILITIES</th>
<th>IT POWER IN MW</th>
<th>WHITE SPACE SQM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Realty</td>
<td>131 DC’s</td>
<td>800 MW</td>
</tr>
<tr>
<td>Equinix</td>
<td>105 DC’s</td>
<td>370 MW</td>
</tr>
<tr>
<td>Telehouse</td>
<td>44 DC’s</td>
<td>400 MW</td>
</tr>
<tr>
<td>Interxion</td>
<td>39 DC’s</td>
<td>109 MW</td>
</tr>
<tr>
<td>TelegeityGroup</td>
<td>40 DC’s</td>
<td>113 MW</td>
</tr>
</tbody>
</table>

*Source: Company Webpages*
What are the Next Hotpots?

- Tanzania
- Côte d’Ivoire
- Ghana
- Nigeria
Growth Opportunities

Market Contribution to Africa Colocation Supply – Sq. m - 2015E

African Colocation White Space – Five Year Projections*

*Estimated space immediately available for leasing (not shell capacity)

Africa New Data Centers – Sample Projects & Plans – Indicative Only

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>COMPANY</th>
<th>PROJECT</th>
<th>TIMING</th>
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</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>Kooba</td>
<td>New data center planned for Nairobi/Limuru</td>
<td>2016</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Kooba</td>
<td>Dar es Salam</td>
<td>2016-17</td>
</tr>
<tr>
<td>Nigeria</td>
<td>Globacom</td>
<td>Ibadan</td>
<td>NA</td>
</tr>
<tr>
<td>Nigeria</td>
<td>MainOne</td>
<td>Sagamu</td>
<td>NA</td>
</tr>
<tr>
<td>Mozambique</td>
<td>Vaninga</td>
<td>Beira, Pemba/Tete</td>
<td>2016</td>
</tr>
</tbody>
</table>
## The Economic Drive

<table>
<thead>
<tr>
<th>CITY</th>
<th>ESTIMATED GDP ($ bn)</th>
<th># OF MULTITENANT DC WITH &gt;250 SQM WHITE SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannesburg</td>
<td>141</td>
<td>&gt;10</td>
</tr>
<tr>
<td>Lagos</td>
<td>120</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Cape Town</td>
<td>70</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Durban</td>
<td>60</td>
<td>&gt;3</td>
</tr>
<tr>
<td>Ibadan</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Nairobi</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>Dar es Salam</td>
<td>5.60</td>
<td>0</td>
</tr>
<tr>
<td>Abidjan</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Kano</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Kinshasa</td>
<td>7.5</td>
<td>N/A**</td>
</tr>
<tr>
<td>Accra</td>
<td>5</td>
<td>N/A**</td>
</tr>
</tbody>
</table>

***Sources: TZS, NBS, Stats SA, World Bank, KNBS, Departement des Statistiques de Cote-d’Ivoire***
## Summary: Benchmarking

<table>
<thead>
<tr>
<th></th>
<th>Enterprise Addressable Market Size/GDP</th>
<th>Key Verticals</th>
<th>Tech Startup Ecosystem</th>
<th>Electric Power Availability</th>
<th>Availability of Affordable Metro &amp; DLD Fiber</th>
<th>Availability of Affordable International Fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannesburg</td>
<td></td>
<td>Financial Services, Tourism, Mining, Media, Tech</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagos</td>
<td></td>
<td>Financial Services, Manufacturing, Tech, Media</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cape Town</td>
<td></td>
<td>Financial Services, Tourism, Tech, Media</td>
<td></td>
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</tr>
<tr>
<td>Nairobi</td>
<td></td>
<td>Financial Services, Tourism, Tech, Media</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abidjan</td>
<td></td>
<td>Financial Services, Tech</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibadan/Oyo State</td>
<td></td>
<td>Trade, Media, Tech, Academic Research</td>
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</tr>
<tr>
<td>Dar es Salaam</td>
<td></td>
<td>Financial Services, Tourism, Tech, Media</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
What to watch out for?

- Corruption
- Poor quality construction
- Slow uptake from major multinationals
- Political instability
- Currency instability
- Variable standards
- Power infrastructure
Thank you – Questions?

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