Open Telecom Data

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https://manypossibilities.net
The Internet is a kind of super power
...it is not quite turning out how we imagined it.
... but the genie is not going back in the bottle.
We Need to Better Understand the Challenge

- Fibre
- Towers
- Spectrum
- Pricing
Available fibre maps lack detail.
Some are better than others
AfTerFibre map represents seven years of scrounging data

https://afterfibre.nsrc.org
Access to comprehensive fibre maps can prevent duplication, promote investment, identify coverage gaps.
Good Practice Exists!

In South Africa, Dark Fibre Africa publishes a comprehensive map of their fibre network.
Open Telecom Data

- Fibre
- Towers
- Spectrum
- Pricing
Population Coverage: 97.6%
Unserved Population: 896K

Based on GSMA data
Population Coverage: 81%
Unserved Population: 6.5M
Welcome to the GSMA 'Mobile Coverage Maps' platform, developed by the Connected Society programme.

Reliable population mobile coverage data is the starting point for enabling the digital economy. Access to this data is vital in order to:
Mobile Coverage Maps

Cell Size
Mobile Cell Size in South Africa

Cumulative distribution of cell radius in South Africa
## Some anomalies

<table>
<thead>
<tr>
<th>Country</th>
<th># wards where more population is covered by 3G than by 2G</th>
<th>Total population covered by 3G but not 2G</th>
<th># wards where more population is covered by 4G than by 2G</th>
<th>Total population covered by 4G but not 2G</th>
<th># wards where more population is covered by 4G than by 3G</th>
<th>Total population covered by 4G but not 3G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>15</td>
<td>44,330</td>
<td>4</td>
<td>2,265</td>
<td>16</td>
<td>44,909</td>
</tr>
<tr>
<td>Côte d'Ivoire</td>
<td>10</td>
<td>55,507</td>
<td>28</td>
<td>192,893</td>
<td>58</td>
<td>593,419</td>
</tr>
<tr>
<td>Liberia</td>
<td>18</td>
<td>3,302</td>
<td>40</td>
<td>13,359</td>
<td>121</td>
<td>106,654</td>
</tr>
<tr>
<td>Nigeria</td>
<td>63</td>
<td>330,940</td>
<td>13</td>
<td>74,532</td>
<td>34</td>
<td>93,250</td>
</tr>
<tr>
<td>Rwanda</td>
<td>0</td>
<td>0</td>
<td>37</td>
<td>13,750</td>
<td>240</td>
<td>1,086,040</td>
</tr>
<tr>
<td>Tanzania</td>
<td>34</td>
<td>49,787</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>832</td>
</tr>
<tr>
<td>Uganda</td>
<td>272</td>
<td>335,631</td>
<td>21</td>
<td>10,877</td>
<td>15</td>
<td>15,537</td>
</tr>
<tr>
<td>Zambia</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>412</td>
<td>819,498</td>
<td>143</td>
<td>307,676</td>
<td>486</td>
<td>1,940,641</td>
</tr>
</tbody>
</table>

Data science for bridging the digital divide
16-17 July 2019
Canadian Tower Map Detail

- Operator
- Location
- Frequency
- Height
- Power

EastLink transceivers at N44.3635 W64.2953

<table>
<thead>
<tr>
<th>Freq (MHz)</th>
<th>BW (kW)</th>
<th>Power (W)</th>
<th>Azim (°)</th>
<th>Elevation (°)</th>
<th>Elevation (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2100</td>
<td>5</td>
<td>398</td>
<td>320</td>
<td>30</td>
<td>18</td>
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<tr>
<td>2100</td>
<td>5</td>
<td>398</td>
<td>320</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>2100</td>
<td>5</td>
<td>398</td>
<td>220</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>2100</td>
<td>10</td>
<td>40</td>
<td>320</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>2100</td>
<td>10</td>
<td>40</td>
<td>220</td>
<td>30</td>
<td>18</td>
</tr>
</tbody>
</table>
WHAT IS INDIA'S FIRST OPEN NETWORK?

In 2015, Project Leap took the first brave step in building a truly transparent network. It is now

Airtel India
The Network That Covers Uganda.
Open Telecom Data

- Fibre
- Towers
- Spectrum
- Pricing
SPECTRUM ASSIGNMENTS
Prototyping a new comparative visualisation of spectrum assignments around the world
Source code: https://github.com/open-telecom-data/spectrum-assignments/

1800 MHz Band

Botswana
- Mascom
- Orange
- BeMobille

Unassigned

Unassigned

Burkina Faso
- Onatel
- Orange
- Telecel
- Guard Band
- Onatel
- Orange
- Telecel

Unassigned

Unassigned

Cabo Verde
- CV Movel
- Unitel Mais

Unassigned

Unassigned

Cameroon
- Orange
- NeXtel
- MTN
- Guard Band
- Orange
- NeXtel
- MTN

Cote d’Ivoire
- Orange
- Inge
- Nov
- Guard Band
- Orange
- Inge
- Nov

Data science for bridging the digital divide
16-17 July 2019
Regulator has set aside small amounts of GSM spectrum for rural underserved areas.

In indigenous communities like Nuyoó, where almost every family has members who have migrated for work, low-cost phone calls are seen as an essential service.
Spectrum information portal

Please view our [guide to using Ofcom's System Information System (SIS)](guide) to understand how to use the portal.

Please direct any feedback on your experience of the spectrum information portal to: [spectrumportalfeedback@ofcom.org.uk](mailto:spectrumportalfeedback@ofcom.org.uk)

For the best experience, expand to full screen (click on the button in the bottom right corner).

Data files

View the spectrum information portal data files:

- Transfer Notification Register (CSV)
- Wireless Telegraphy Register (CSV)
Open Telecom Data

- Fibre
- Towers
- Spectrum
- Pricing
Article 22: Publication of a reference interconnect offer

The reference interconnect offers approved by the national regulatory authority shall be made available on the dominant operators' websites and shall be accessible by a web link available on the national regulatory authority's website.

THE HIGH CONTRACTING PARTIES,

MINDFUL of Articles 7, 8 and 9 of the ECOWAS Treaty as amended establishing the Authority of Heads of State and Government and defining its composition and functions;
1.4.2 Offre de transit IP au niveau des POP

<table>
<thead>
<tr>
<th>Capacité (Mbps)</th>
<th>Tarif en FCFA/mois/Mbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 à 1000</td>
<td>20 000</td>
</tr>
<tr>
<td>Plus de 1000</td>
<td>18 000</td>
</tr>
</tbody>
</table>

Frais d’accès : 500 000 FCFA

Les équipements colocalisés concernés doivent avoir au maximum les caractéristiques ci-après :

<table>
<thead>
<tr>
<th>Volume (V)</th>
<th>V ≤ 1000 cm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poids sur Pylône (P)</td>
<td>P ≤ 5kg</td>
</tr>
<tr>
<td>Consommation en énergie (E)</td>
<td>E ≤ 20kwh/mois</td>
</tr>
</tbody>
</table>
PUBLIC NOTICE - TELECOMMS AND ICT PRICES
Corrections to previously flighted advert on Table 1(c) and Figure 2 (a) & (b)

TRENDS OF PRICES IN THE BOTSWANA TELECOMMUNICATIONS AND ICT MARKET 2011 – 2014

In line with the Communication Regulatory Authority Act (No 19 of 2012) and pursuant to the BTA Directive No 1 of 2011, BOCRA wishes to share with the public, trends in the prices of telecommunication and Internet services at both wholesale and retail levels. The services referred to in this publication are offered by the 4 major public operators, that is, Botswana Fibre Networks (BOFINET), Botswana Telecommunications Corporation Limited (BTCL), Mascom Wireless Botswana and Orange Botswana. Trends indicate that prices have been reducing over the 3-year period of 2011 to 2014 especially for data Internet services.

Prices for Value Added Network Services (VANS or IPSs) providers will be issued in the July 2014 publication.

The information is shared with consumers to advise on the state of prices of telecommunication and ICT services as at May 2014. BOCRA shall monitor movements in the ICT prices and ensure that the end consumer benefits from the falling prices.

WHOLESALE PRICES

Over the 3 years BOFINET approved the following wholesale tariffs:

- National Leased lines which affect prices of both voice and data services;
- Internet Bandwidth, which affects prices for data services;
- International Private Leased Circuits, which affect prices of carrying telecommunication services across borders; and
- Mobile termination rates, which affect prices of mobile voice calls across mobile network operators (Off Net Calls)

WHOLESALE INTERNET BANDWIDTH PRICES PER MONTH (BWP)

The following are sample prices of Wholesale Internet Bandwidth by BTCL and BOFINET:

<table>
<thead>
<tr>
<th>Capacity (Mbps)</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>Image Reduction Over 3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14,925.32</td>
<td>8,220.89</td>
<td>5,640.28</td>
<td>3,020.76</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>29,710.22</td>
<td>16,279.01</td>
<td>11,168.87</td>
<td>6,030.34</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>73,810.78</td>
<td>35,580.61</td>
<td>27,100.99</td>
<td>14,998.06</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td>133,608.51</td>
<td>67,342.31</td>
<td>42,086.33</td>
<td>23,844.26</td>
<td>79</td>
</tr>
<tr>
<td>10</td>
<td>138,679.43</td>
<td>75,166.96</td>
<td>51,571.33</td>
<td>29,690.59</td>
<td>79</td>
</tr>
<tr>
<td>20</td>
<td>248,207.23</td>
<td>136,605.05</td>
<td>93,723.59</td>
<td>58,213.74</td>
<td>77</td>
</tr>
<tr>
<td>30</td>
<td>351,556.82</td>
<td>201,763.48</td>
<td>138,428.22</td>
<td>86,485.23</td>
<td>75</td>
</tr>
<tr>
<td>40</td>
<td>444,771.18</td>
<td>264,791.90</td>
<td>181,671.13</td>
<td>114,154.34</td>
<td>74</td>
</tr>
<tr>
<td>50</td>
<td>540,804.22</td>
<td>328,881.23</td>
<td>225,642.18</td>
<td>142,130.77</td>
<td>74</td>
</tr>
<tr>
<td>60</td>
<td>629,395.20</td>
<td>385,881.17</td>
<td>265,435.36</td>
<td>169,862.74</td>
<td>73</td>
</tr>
<tr>
<td>70</td>
<td>712,413.87</td>
<td>442,467.73</td>
<td>303,572.78</td>
<td>197,374.05</td>
<td>72</td>
</tr>
<tr>
<td>80</td>
<td>789,921.16</td>
<td>495,713.65</td>
<td>340,104.22</td>
<td>224,609.00</td>
<td>72</td>
</tr>
<tr>
<td>90</td>
<td>862,182.00</td>
<td>546,889.58</td>
<td>375,078.18</td>
<td>251,697.88</td>
<td>71</td>
</tr>
<tr>
<td>100</td>
<td>928,429.34</td>
<td>595,463.76</td>
<td>408,514.84</td>
<td>278,515.01</td>
<td>70</td>
</tr>
<tr>
<td>150</td>
<td>1,359,227.30</td>
<td>869,427.64</td>
<td>596,540.58</td>
<td>476,353.59</td>
<td>63</td>
</tr>
</tbody>
</table>

Table 1(c): PRICE COMPARISON IN BWP - BTCL AND BOFINET WHOLESALE INTERNET
(Correction to previously flighted tables)

<table>
<thead>
<tr>
<th>Mbps</th>
<th>BOFINET Current Prices per month (BWP)</th>
<th>BTCL Current Prices per month (BWP)</th>
<th>BOFINET Effective July 1, 2014</th>
<th>BTCL Effective July 1, 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>36,693.00</td>
<td>29,690.39</td>
<td>12,162.00</td>
<td>13,394.85</td>
</tr>
<tr>
<td>20</td>
<td>73,387.00</td>
<td>58,231.47</td>
<td>24,233.00</td>
<td>26,364.46</td>
</tr>
<tr>
<td>30</td>
<td>110,880.00</td>
<td>86,485.23</td>
<td>36,485.00</td>
<td>39,227.76</td>
</tr>
<tr>
<td>40</td>
<td>146,774.00</td>
<td>114,164.34</td>
<td>48,613.00</td>
<td>51,878.45</td>
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<tr>
<td>50</td>
<td>183,467.00</td>
<td>142,150.77</td>
<td>60,807.00</td>
<td>64,653.45</td>
</tr>
<tr>
<td>60</td>
<td>211,050.00</td>
<td>169,667.24</td>
<td>70,435.00</td>
<td>77,507.60</td>
</tr>
<tr>
<td>70</td>
<td>247,286.00</td>
<td>197,374.05</td>
<td>82,175.00</td>
<td>89,894.30</td>
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<td>80</td>
<td>282,613.00</td>
<td>224,650.90</td>
<td>93,914.00</td>
<td>102,396.15</td>
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<td>251,697.88</td>
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<tr>
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<td>117,392.00</td>
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<td>764,862.74</td>
<td>343,940.00</td>
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<tr>
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<td>1,656,874.00</td>
<td>1,139,981.23</td>
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<td>571,939.45</td>
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<tr>
<td>600</td>
<td>1,952,911.00</td>
<td>1,280,326.22</td>
<td>668,884.00</td>
<td>667,190.89</td>
</tr>
</tbody>
</table>

Figure 2 (a): BTCL AND BOFINET CURRENT WHOLESALE INTERNET BANDWIDTH PRICE

Figure 2 (b): PRICE COMPARISON IN BWP - BTCL AND BOFINET WHOLESALE INTERNET BANDWIDTH PRICE

NEW PRICES EFFECTIVE JULY 2014
Open Telecom Data

- Fibre
- Towers
- Spectrum
- Pricing

Opportunity for common policies and data standards for public telecom data
How to Bring About Change

Spread good practice

Engage regulators

Engage funders