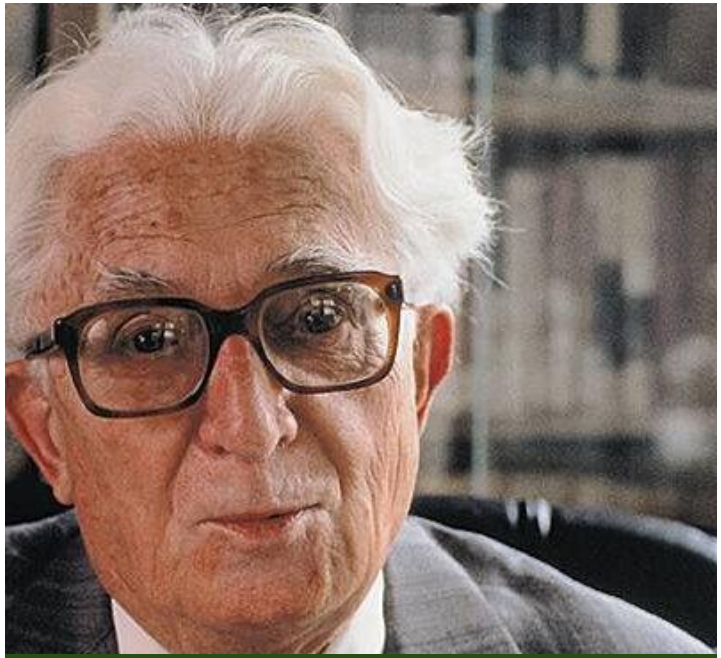
Policy and Regulatory Considerations

For Community Networks

Fernand Braudel

We don’t live in a single economy



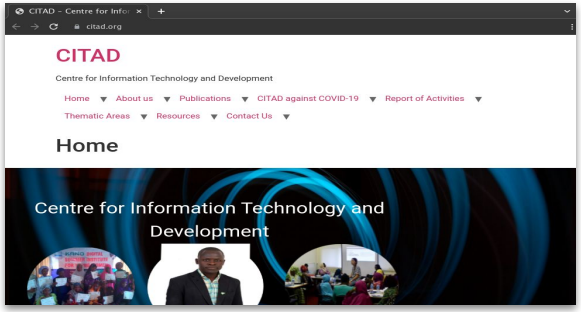
Fernand Braudel

Global Economy
Large companies, financial institutions, the State: serves global markets

Local Market Economy
Small businesses, self-employment: serves local needs

Non-Market Economies
Few market economy activities and mainly informal activities: serves a subsistence economy

Global Economy	Local Market Economy	Non Market Economy
Large companies, financial institutions, the State: serves global markets	Small businesses, self-employment: serves local needs	Few market economy activities and mainly informal activities: serves a subsistence economy



MTN Operations in Africa

Uganda (96%)‡
No 1 operator
55,9% market share
Population 42,9 million
EBITDA R1,8 billion**
Contribution to group EBITDA 4%
Capex R0,9 billion**
Subscribers#
10,7 million
Data revenue*
up 41,1%
(10% of revenue)

Cameroon (70%)‡
No 1 operator
53,7% market share
Population 24,1 million
EBITDA R1,3 billion**
Contribution to group EBITDA 3%
Capex R1,0 billion**
Subscribers#
7,1 million
Data revenue*
up 21,1%
(15% of revenue)

Ivory Coast (59%)‡
No 2 operator
33,8% market share
Population 24,3 million
EBITDA R2,3 billion**
Contribution to group EBITDA 5%
Capex R1,2 billion**
Subscribers#
10,9 million
Data revenue*
up 87,5%
(10% of revenue)

South Africa (100%)‡
No 2 operator
31,2% market share
Population 56,7 million
EBITDA R14,4 billion**
Contribution to group EBITDA 33%
Capex R11,5 billion**
Subscribers#
29,5 million
Data revenue*
up 25,0%
(33% of revenue)

Nigeria (79%)‡
No 1 operator
42,1% market share
Population 190,9 million
EBITDA R14,0 billion**
Contribution to group EBITDA 32%
Capex R9,0 billion**
Subscribers#
52,3 million
Data revenue*
up 86,6%
(12% of revenue)

Ghana (98%)‡
No 1 operator
55,1% market share
Population 28,9 million
EBITDA R4,1 billion**
Contribution to group EBITDA 9%
Capex R2,2 billion**
Subscribers#
15,7 million
Data revenue*
up 50,6%
(25% of revenue)

MTN Group 2022 EBITDA margin

45.3%

https://africa.businessinsider.com/local/markets/mtn-group-half-year-2022-financial-statements/vgq8hwl

Jar of Stones - a metaphor

Global operators fill about half of the jar

Smaller operators don't necessarily need to scale individually but rather scale in number of operators

Cooperatives and common pool resource models may create sustainable access where commercial models fail.

Accessible and Affordable Licensing

ISP and CN Competitiveness

- ISPs and CNs play a critical role in differentiating services e.g. uncapped fixed wireless services vs metred PAYG services

- ISPs and CNs are also typically closer to their customers and better able to understand the specific barriers that hold back uptake in their region

Non-commercial Service Providers

- Municipal Networks (Public WiFi)
- University Networks or NRENs
- Community Centres
- Public Access (Libraries)
- Intranets
- Telecommunication Cooperatives
- Community Networks

Licensing, Fees, & Taxation

Licensing, fees, and taxation can vary dramatically for small scale operators across jurisdictions.

Small Scale Operators	Kenya	Mexico	South Africa	Brazil	Argentina	United Kingdom	United States	New Zealand	Canada	Uganda	Nigeria	Ghana	Tanzania
Infrastructure License	Tier 3 NFP license 0.4% or US$1500	Reseller license (no annual fee)	Class ECNS license US$875	Multimedia Licence	Community Network license	Not required (Free)	Not required (Free)	Not required (Free)	Not required (Free)	Public Infrastructure Provider Licence US$10,000	Internet Services License US$1,300	Internet Service Provider US$1337	Network Facilities (District) License US$3450
Service License	ASP license 0.4% or US$740		Class ECS License US$875							Public Service Provider Licence (Capacity Resale) US$3,000			Network Services (District) US$5750
Exemptions	Community Network Service Provider (Non-Profit) 50$	Exemption for social purpose	License exemption available. Act under review.	License exemption for operators with < 5000 subscribers	towns < 5000 inhabitants					Communal Access Provider License US$3,000			

South Africa

Licence-exemptions

- Service provision: ECS. Exempted if: non-profit, reseller, ancillary services.
- Infrastructure: ECNS. Exempted if: small or private network.
- Spectrum: Usage of license exempt-spectrum

Benefits of the exemptions

- No fees, no contribution to the fund or other bureaucracy

Certificate issued by the Commissioner of Companies & Intellectual Property Commission on Monday, March 17, 2014 at 13:43

Certificate of Registration

CR10 Registration Number: 2014 / 002051 / 24
Enterprise Name: ZENZELENI TELECOMMUNICATIONS NETWORK PRIMARY CO-OPERATIVE LIMITED

Companies and Intellectual Property Commission
a member of the dti group

REPUBLIC OF SOUTH AFRICA
CO-OPERATIVES ACT, 2005

CERTIFICATE OF REGISTRATION
OF A CO-OPERATIVE
(SECTION 7)

I hereby certify that

ZENZELENI TELECOMMUNICATIONS NETWORK PRIMARY CO-OPERATIVE LIMITED

was registered on

5/2/2014

under Section 7 of the Co-Operatives Act, 2005 (Act 14 of 2005),
with registration number

2014 / 002051 / 24

as a Primary Co-Operative with a limited liability.
Its constitution was also registered on the same date.

I further certify that

ZENZELENI TELECOMMUNICATIONS NETWORK PRIMARY CO-OPERATIVE LIMITED

is with effect from 5/2/2014 entitled to commence business.

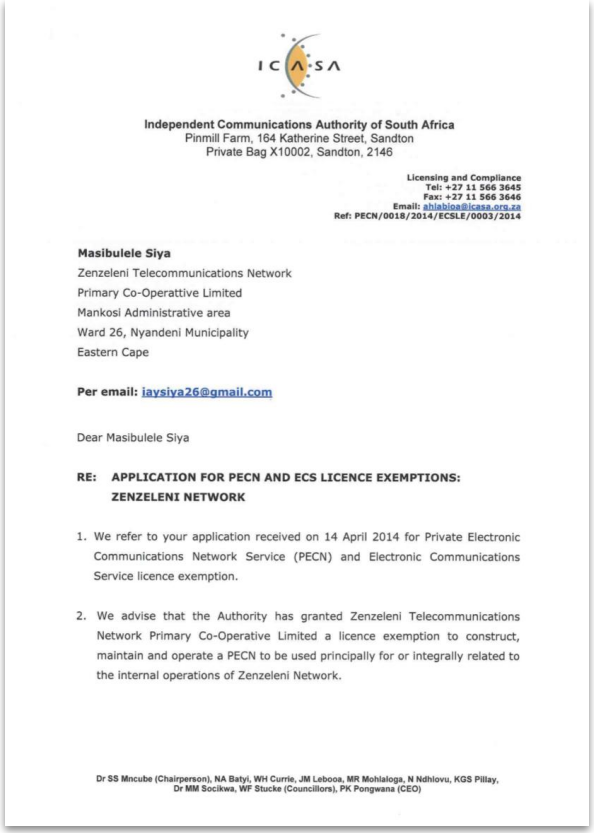
REGISTRAR OF CO-OPERATIVES

Page 2 of 2

Physical Address
the dti Campus - Block F
77 Meintjies Street
Sunnyside 0001

Postal Address: Co-operatives
Private Bag x237
Pretoria
0001

Docex: 256
Web: www.cipc.co.za
Contact Centre: 086 100 2472 (CIPC)
Contact Centre (International): +27 12 394 9500



Independent Communications Authority of South Africa
Pinmill Farm, 164 Katherine Street, Sandton
Private Bag X10002, Sandton, 2146

Licensing and Compliance
Tel: +27 11 566 3645
Fax: +27 11 566 3646
Email: ahlabioa@icasa.org.za
Ref: PECN/0018/2014/ECSLE/0003/2014

Masibulele Siya
Zenzeleni Telecommunications Network
Primary Co-Operattive Limited
Mankosi Administrative area
Ward 26, Nyandeni Municipality
Eastern Cape

Per email: iaysiya26@gmail.com

Dear Masibulele Siya

RE: APPLICATION FOR PECN AND ECS LICENCE EXEMPTIONS: ZENZELENI NETWORK

1. We refer to your application received on 14 April 2014 for Private Electronic Communications Network Service (PECN) and Electronic Communications Service licence exemption.

2. We advise that the Authority has granted Zenzeleni Telecommunications Network Primary Co-Operative Limited a licence exemption to construct, maintain and operate a PECN to be used principally for or integrally related to the internal operations of Zenzeleni Network.

Dr SS Mncube (Chairperson), NA Batyi, WH Currie, JM Lebooa, MR Mohlaloga, N Ndhlovu, KGS Pillay, Dr MM Sosikwa, WF Stucke (Councillors), PK Pongwana (CEO)

Kenya

Community Network Operator License (2021)

Unified License Framework

The Authority has in place a Unified Licensing Framework (ULF), which is technology and service neutral. The ULF market is structured into three main licenses:

1. Network Facilities Provider.
2. Application Service Provider.
3. Content Service Provider.

National Network Facilities Provider
For deployment of infrastructure nationally
- **Tier 1** - Annual fee: the higher of 0.4% of turnover or Ksh 4M (USD 37K) National
- **Tier 2** - Annual fee: the higher of 0.4% of turnover or Ksh 800K (USD 7500) Regional
- **Tier 3** - Annual fee: the higher of 0.4% of turnover or Ksh 160K (USD 1500) County
- **Community Network Operator License**
  KSh 5,000 per year (USD 50)

International Network Facilities Provider
- Submarine Cable Landing License
- International Gateway License

Non-Infrastructure Based Service Providers
- Application Service Provider (Includes MVNOs, Vehicle Tracking, ccTLDs)
- Content Service Provider
- Electronic Certification Service Provider

Terminal Equipment Providers
- Telecom Terminal Equipment Contractors
- Telecommunications Technical Personnel

Private Very Small Aperture Terminal (VSAT)

https://www.ca.go.ke/wp-content/uploads/2021/10/Community-Network-and-Service-Provider-CNSP-License.pdf

Access to Wireless Spectrum

Two Types of Wireless Access

	Licensed	Unlicensed
Technology	2G, 3G, LTE, 5G, etc	WiFi, Bluetooth, etc
Protection from Interference	License	Technology / Rules
Power Output	High	Low
Value Created	Billions $	Billions $
Cost of Technology	Coming down	Very inexpensive

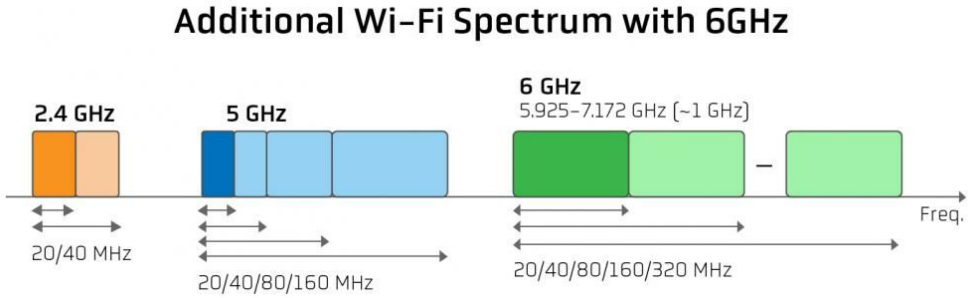
License Exempt Spectrum for PtP & PtMP

		Kenya	Mexico	South Africa	Brazil	Argentina	United Kingdom	United States	New Zealand	Canada	Uganda	Nigeria	Ghana	Tanzania
2400 – 2483.5	EIRP	100mW	2W in PtP 1W in PtMP	100mW	4W	4W		4W in PtMP. PtP of 1 dBm less in TxPower per 3 dBi increase in antenna gain above 6 dBm	100mW	4W in PtMP and no limit in PtP		1W	100mW	200mW
	Tx Power		500mW PtP 250mW PtMP		1W	1W		1W		1W				
Registration required?		No	No	No	No	No	No	No	No	No	?	?	No	?
5150 – 5250	EIRP	200mW	200mW	200mW	200mW	200mW	200mW	4W in PtP 53 in PtMP	1W	200mW indoor only	200mW	200mW	200mW	200mW
	Tx Power		50mW			50mW		1W						
5250 – 5350	EIRP	200mW	1W	100mW	200mW	4W	200mW	1W	1W	1W	200mW	200mW	200mW	200mW
	Tx Power		250mW			1W		250mW		250mW				
5470 – 5650	EIRP	1W	1W	1W	1W	4W	1W	1W	1W	1W	1W	4W (Licensed)	1W	1W
	Tx Power	250mW	250mW		250mW	1W		250mW		250mW				
5650 – 5725	EIRP	1W	1W	1W	1W	4W	1W	1W	1W	1W	1W	4W (Licensed)	1W	1W
	Tx Power	250mW	250mW		250mW	1W		250mW		250mW				
5725 – 5850	EIRP	1W	4W	4W (200w PtP)	4W	4W (200W PtP)	4W light license	4W in PtMP and no limit in the Antenna Gain in PtP	200W for PtP	4W in PtMP and no limit in PtP	4W in PtMP PtP of 1	4W (no limit in gain for PtP)	4W	1W
	Tx Power		1W	1W	1W	1W		1W		1W		1W		
Registration required?		Yes	No	No		No	5725-5850	No	No	No		No	No	

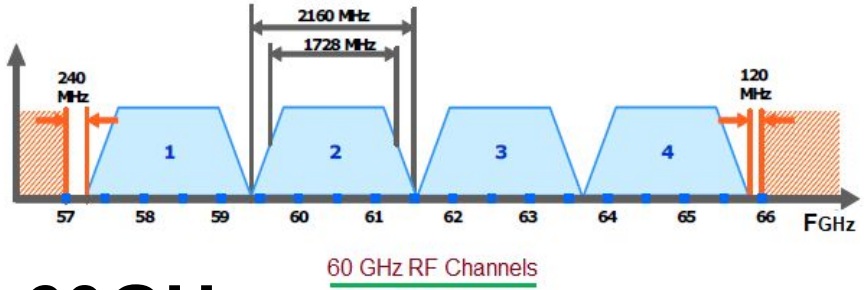
License Exempt Spectrum for PtP & PtMP

Other frequencies

Other frequency bands designated for ISM use have tremendous potential to increase broadband capacity and affordability for small-scale operators.



6GHz



60GHz

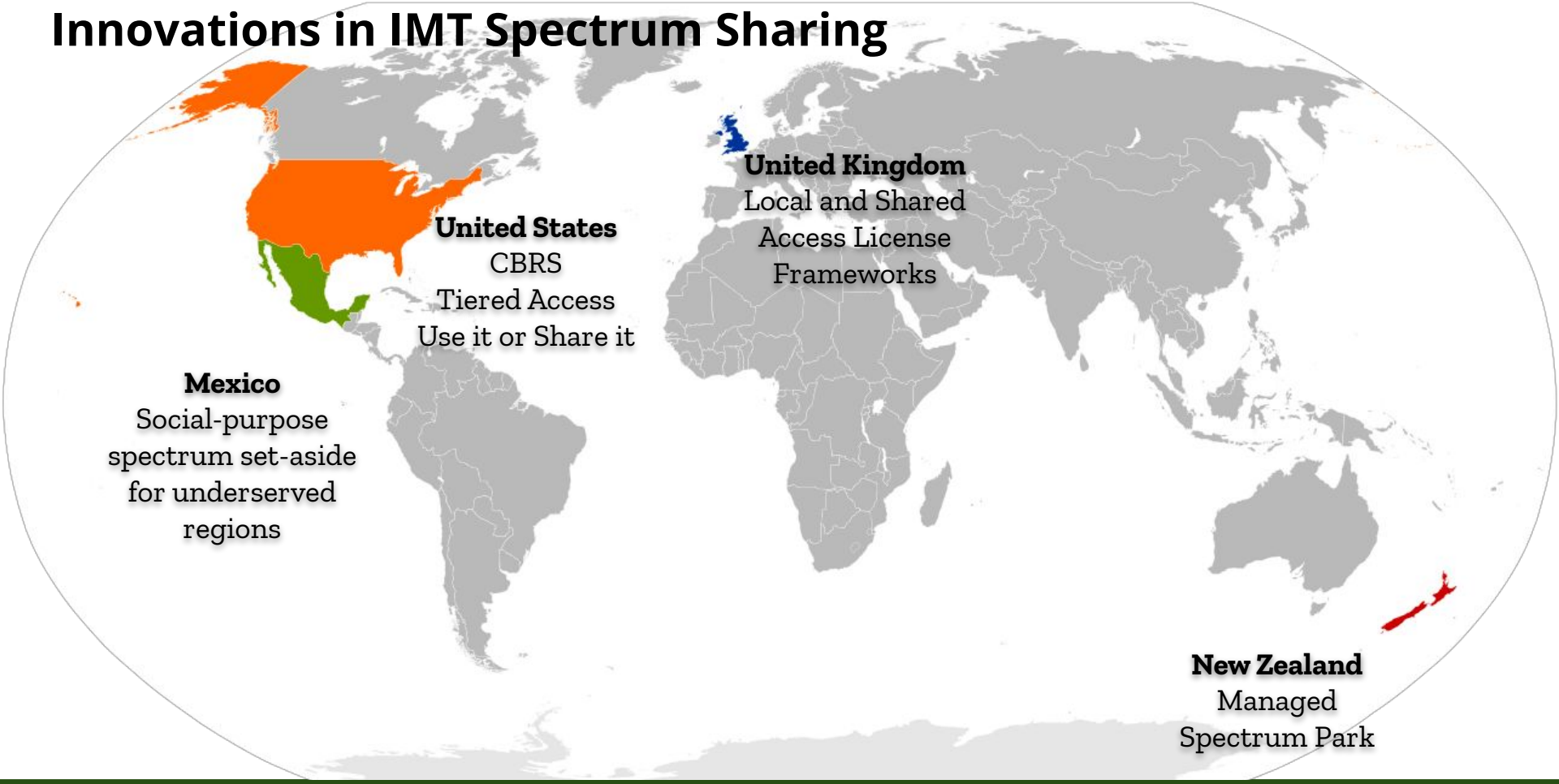
Licensed spectrum and spectrum auctions

Country	Year	Spectrum	Price	# successful bidders
Nigeria	2014	2.3GHz (30MHz)	**$23,000,000**	1
Ghana	2015	800MHz (20MHz)	**$67,500,000**	1
Nigeria	2016	2.6GHz (60MHz)	**$96,000,000**	1
Mozambique	2013	800MHz (10MHz)	**$30,000.000**	0
Tanzania	2018	800MHz (10MHz)	**$20,000,000**	2
Mozambique	2018	800MHz (10MHz)	**$83,000,000**	3

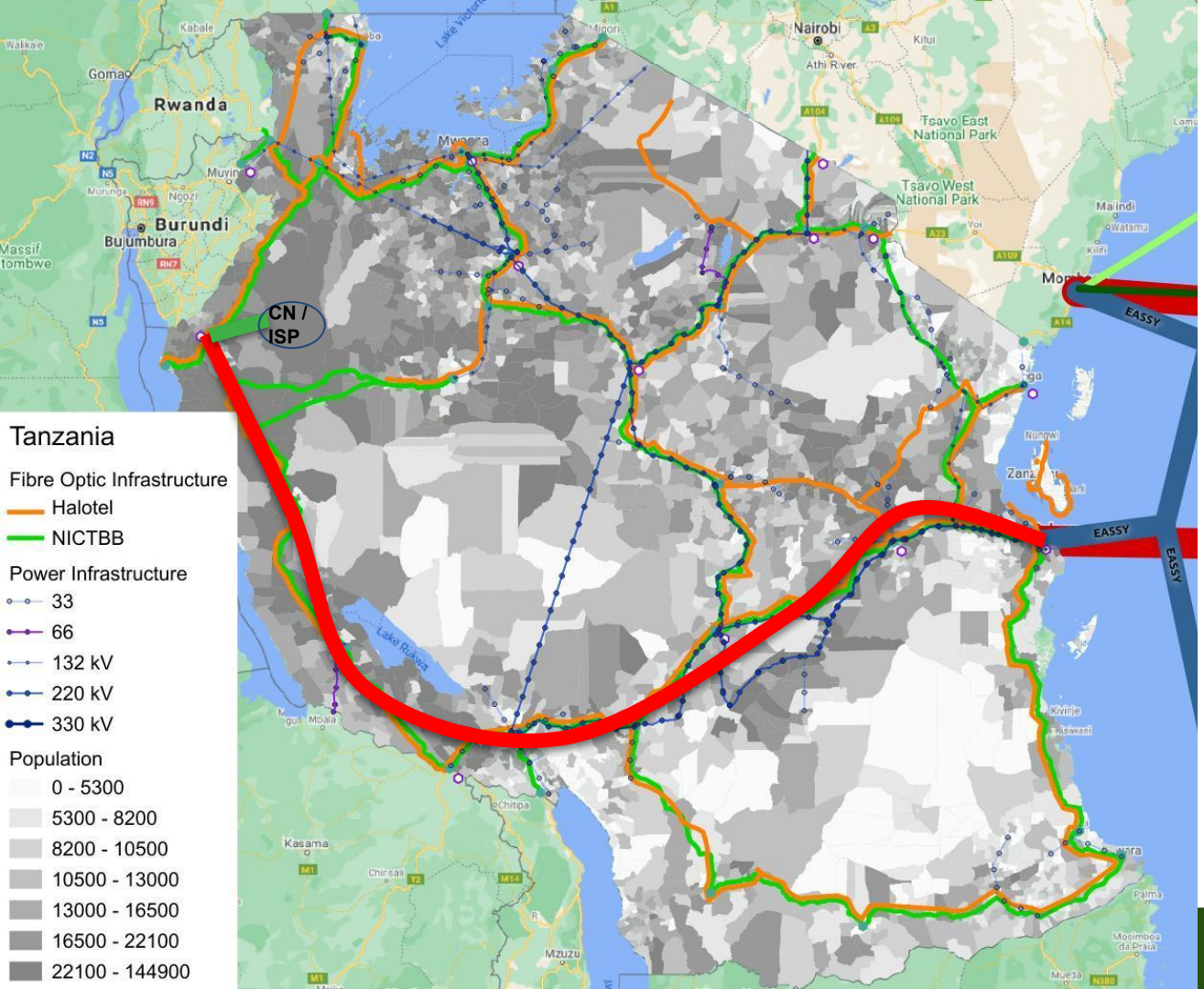
Spectrum Auctions have the unfortunate side effect of locking Small Operators Out of the Market

Local and Shared Access IMT spectrum addresses can unlock access for small operators

Innovations in IMT Spectrum Sharing



Access to Backhaul



Sustainable Access To Backhaul

Ongoing network costs are often the single biggest sustainability factor for CNs.

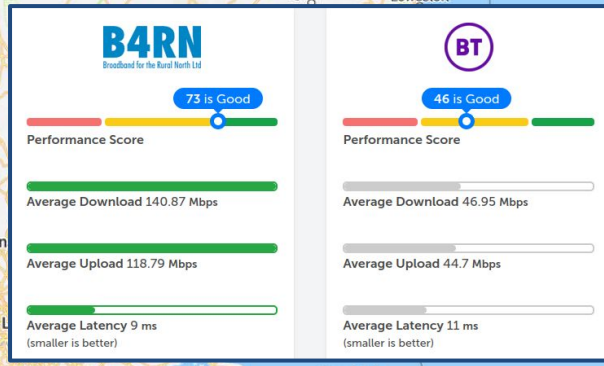
- Cost of reaching a fibre Point of Presence e.g. PtP wireless
- Cost of fibre increases with distance from Dar Es Salaam
- International transit/peering available in Dar Es Salaam

The first action undertaken by B4RN in building their network was to lease ‘dark fibre’ to an IXP in Manchester because they knew the cost of backhaul would be critical to their business model

B4RN

Broadband for the Rural North Ltd

- rural cooperative
- > 12,000 connected properties
- 1Gbps symmetric service
- over 50 local staff, hundreds of volunteers
- 65% of all properties
- > £7m in local investment
- 5,000 community investors



In Planning
Live on B4RN

A Penny Black Broadband Strategy

- In the early 1800s postage was charged by distance and number of sheets
- Rowland Hill, a school teacher, was convinced a single price stamp that would guarantee postage anywhere in the UK would transform the postal system
- In 1839, 76M letters posted in UK
- In 1840, after the introduction of the Penny Post, 168M letters
- Ten years later 347M letters
- Democratised access to the postal system

EdgeConnect | Chorus

https://sp.chorus.co.

CHORUS

Products & services | Tools | Processes | Training

Overview | Price & Offers | Tech Specs | Resources

Networks connectivity › EdgeConnect

EdgeConnect

Peer with your favourite Internet Exchange

Overview

Peering is fundamental for you, your end customers, and the providers of the content that your customers view and enjoy every day. We're working with New Zealand's Internet Peering Exchanges to make peering possible over your existing UFB handovers, making it easier than ever before.

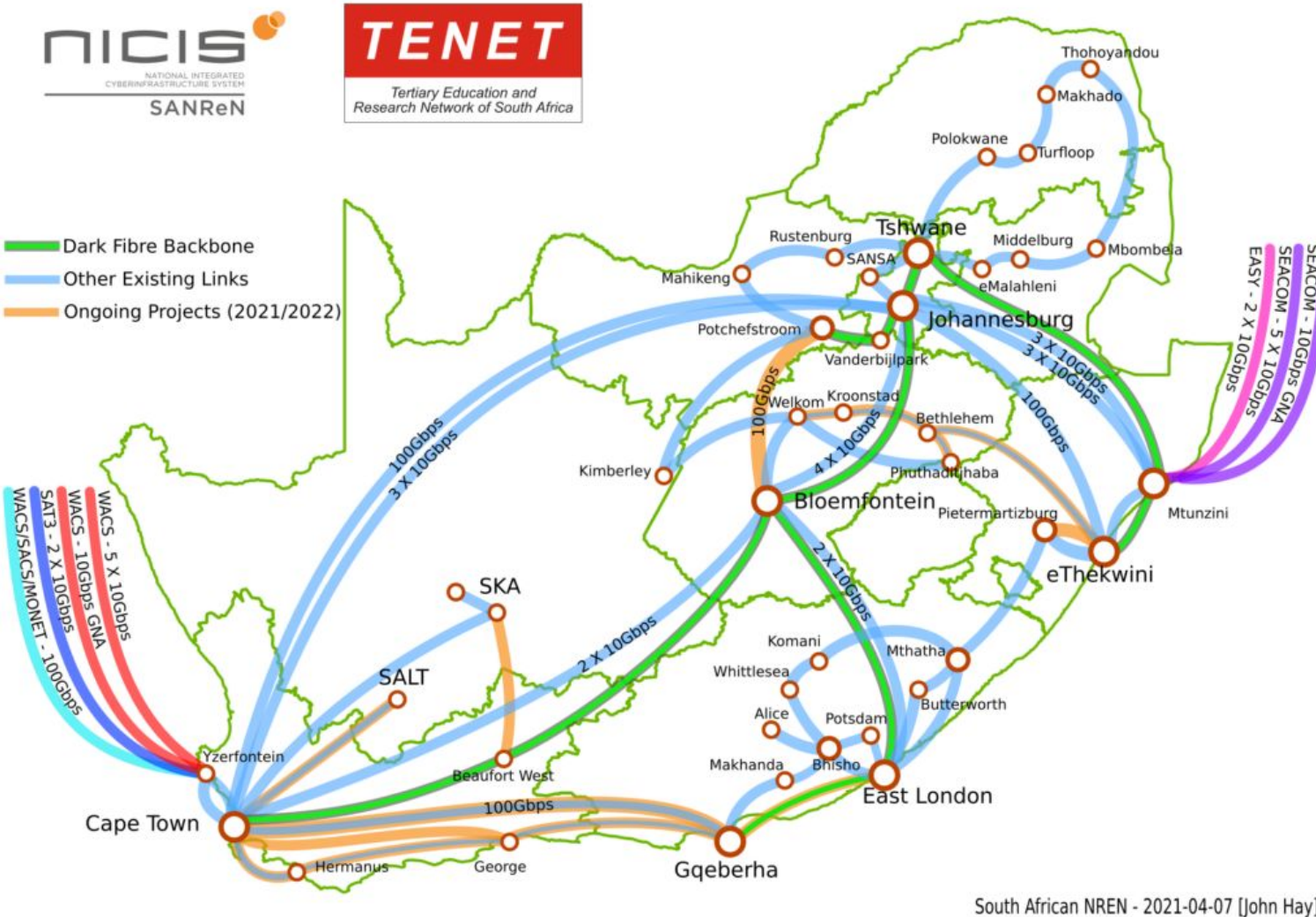
Chorus EdgeConnect is a collaboration between NZIX and Chorus which enables Chorus customers to reach NZIX exchanges (currently only AKL-IX) over Chorus UFB handovers.

By establishing a special VLAN (SVID/CVID combination) on your Chorus UFB Handover you will be able to communicate with other NZIX members on the same exchange, whether they are physically on NZIX exchange

The Future Is Already Here

TENET - South African National Research & Education Network (NREN)

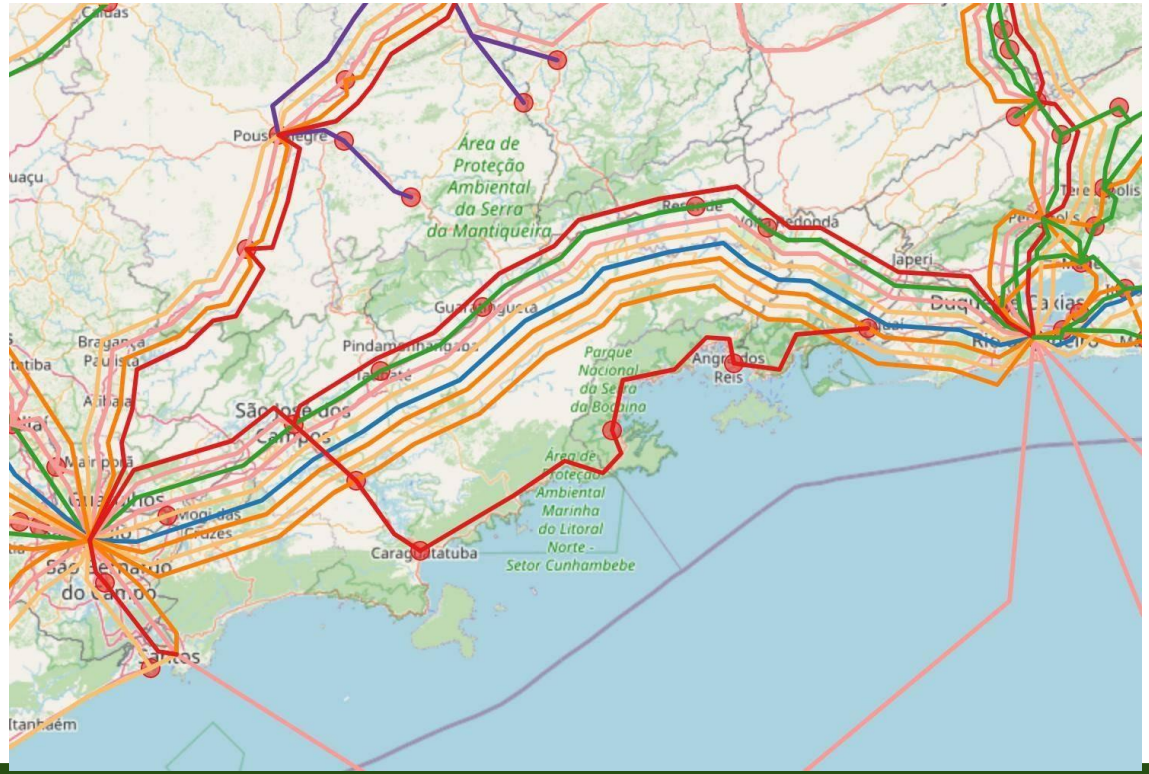
A Community Network for Universities



Transparency and Open Data

More transparency is needed

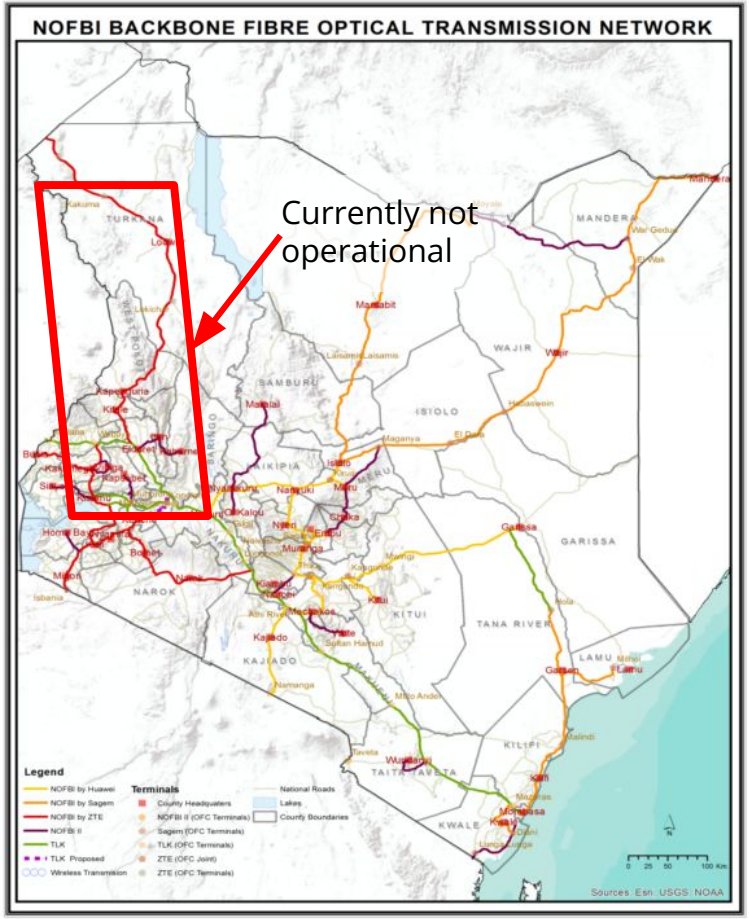
- Understanding the true extent of national fibre infrastructure is a challenge, even for regulators and governments
- Multiple operators may report ‘owning’ fibre but may in fact have capacity on the same cable



Map of fibre networks from Sao Paulo to Rio de Janeiro

Open data benefits all

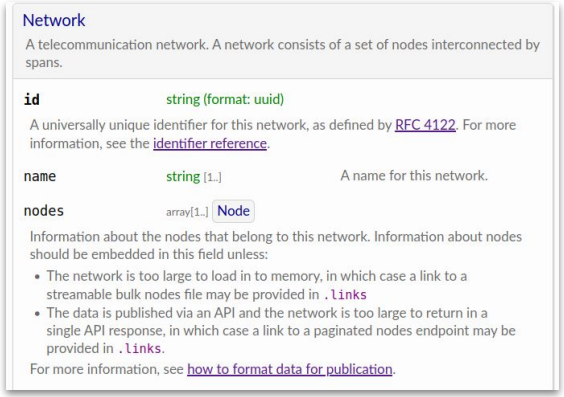
- Opportunities for small ISPs, rural operators in particular.
- More strategic information for investors
- Levelling the playing field in terms of information sharing and building trust
- Better evidence of the socio-economic impact of their networks
- Better network analysis tools



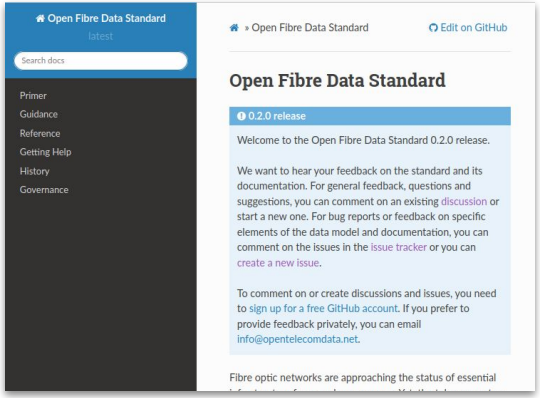
Multistakeholder initiative

The World Bank, the International Telecommunications Union (ITU), Mozilla Corporation, the Internet Society (ISOC), Liquid Intelligent Technologies, CSquared, and Digital Council Africa are partnering to promote the collaborative development of open data standards for describing telecommunications infrastructure. The first challenge we have taken on is that of terrestrial fibre optic infrastructure.

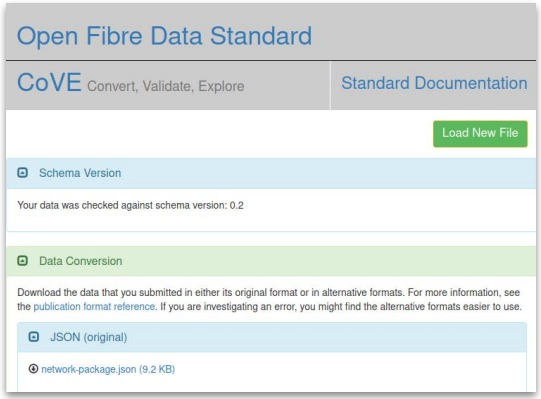
The Open Fibre Data Standard (OFDS) is a standard for publishing data on fibre optic broadband infrastructure.



Open Fibre Definition



Documentation

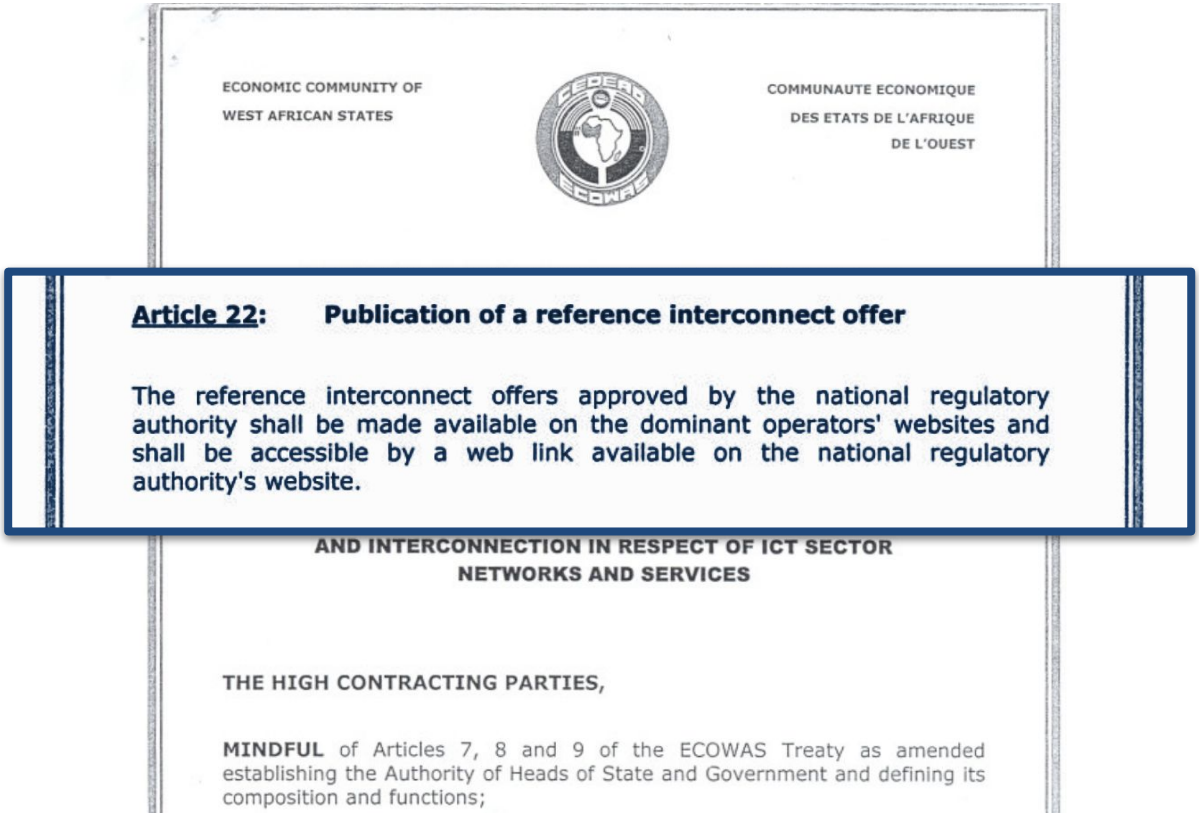


Open Source tools

More information at https://github.com/Open-Telecoms-Data/open-fibre-data-standard

Pricing Transparency

Within the *Economic Community of West African States* there is an agreement to publish reference interconnection offers from dominant operators



ECONOMIC COMMUNITY OF
WEST AFRICAN STATES

COMMUNAUTE ECONOMIQUE
DES ETATS DE L'AFRIQUE
DE L'OUEST

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.

AND INTERCONNECTION IN RESPECT OF ICT SECTOR
NETWORKS AND SERVICES

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;

Pricing Transparency

In Benin, the state-owned backbone operator publishes a standard rate card for transit and interconnection.

REPUBLIQUE DU BENIN

BENIN TELECOMS

OFFRE D'INTERCONNEXION POUR LES EXPLOITANTS DE RESEAUX ET SERVICES DE COMMUNICATION ELECTRONIQUES OUVERTS AU PUBLIC

1.4.2 Offre de transit IP au niveau des POP

Capacité (Mbps)	Tarif en FCFA/mois/Mbps
100 à 1000	20 000
Plus de 1000	18 000

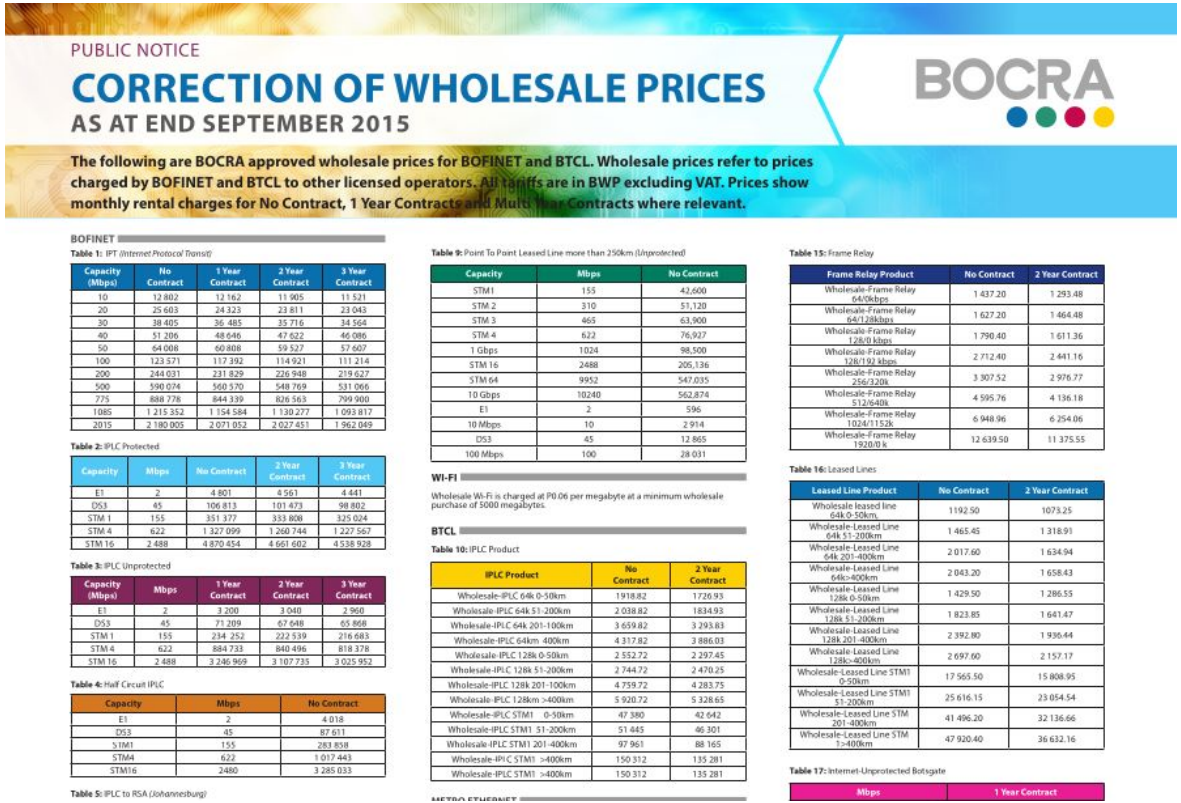
Frais d'accès : 500 000 FCFA

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

Volume (V)	$V \leq 1000\ cm^3$
Poids sur Pylône (P)	$P \leq 5kg$
Consommation en énergie (E)	$E \leq 20kwh/mois$

Pricing Transparency

In Botswana, BOCRA have published a standard rate card for access to Bofinet. Not every year though.



PUBLIC NOTICE

CORRECTION OF WHOLESALE PRICES
AS AT END SEPTEMBER 2015

BOCRA

The following are BOCRA approved wholesale prices for BOFINET and BTCL. Wholesale prices refer to prices charged by BOFINET and BTCL to other licensed operators. All tariffs are in BWP excluding VAT. Prices show monthly rental charges for No Contract, 1 Year Contracts and Multi Year Contracts where relevant.

BOFINET

Table 1: IPT *(Internet Protocol Transit)*

Capacity (Mbps)	No Contract	1 Year Contract	2 Year Contract	3 Year Contract
10	12 802	12 162	11 905	11 521
20	25 603	24 323	23 811	23 043
30	38 405	36 485	35 716	34 564
40	51 206	48 646	47 622	46 086
50	64 008	60 808	59 527	57 607
100	123 571	117 392	114 921	111 214
200	244 031	231 829	226 948	219 627
500	590 074	560 570	548 769	531 066
775	888 778	844 339	826 563	799 900
1085	1 215 352	1 154 584	1 130 277	1 093 817
2015	2 180 005	2 071 052	2 027 451	1 962 049

Table 2: IPLC Protected

Capacity	Mbps	No Contract	2 Year Contract	3 Year Contract
E1	2	4 801	4 561	4 441
DS3	45	106 813	101 473	98 802
STM 1	155	351 377	333 808	325 024
STM 4	622	1 327 099	1 260 744	1 227 567
STM 16	2 488	4 870 454	4 661 602	4 538 928

Table 3: IPLC Unprotected

Capacity (Mbps)	Mbps	1 Year Contract	2 Year Contract	3 Year Contract
E1	2	3 200	3 040	2 960
DS3	45	71 209	67 648	65 868
STM 1	155	234 252	222 539	216 683
STM 4	622	884 733	840 496	818 378
STM 16	2 488	3 246 969	3 107 735	3 025 952

Table 4: Half Circuit IPLC

Capacity	Mbps	No Contract
E1	2	4 018
DS3	45	87 611
STM1	155	283 858
STM4	622	1 017 443
STM16	2480	3 285 033

Table 5: IPLC to RSA *(Johannesburg)*

Table 9: Point To Point Leased Line more than 250km *(Unprotected)*

Capacity	Mbps	No Contract
STM1	155	42,600
STM 2	310	51,120
STM 3	465	63,900
STM 4	622	76,927
1 Gbps	1024	98,500
STM 16	2488	205,136
STM 64	9952	547,035
10 Gbps	10240	562,874
E1	2	596
10 Mbps	10	2 914
DS3	45	12 865
100 Mbps	100	28 031

WI-FI

Wholesale Wi-Fi is charged at P0.06 per megabyte at a minimum wholesale purchase of 5000 megabytes.

BTCL

Table 10: IPLC Product

IPLC Product	No Contract	2 Year Contract
Wholesale-IPLC 64k 0-50km	1918.82	1726.93
Wholesale-IPLC 64k 51-200km	2 038.82	1834.93
Wholesale-IPLC 64k 201-100km	3 659.82	3 293.83
Wholesale-IPLC 64km 400km	4 317.82	3 886.03
Wholesale-IPLC 128k 0-50km	2 552.72	2 297.45
Wholesale-IPLC 128k 51-200km	2 744.72	2 470.25
Wholesale-IPLC 128k 201-100km	4 759.72	4 283.75
Wholesale-IPLC 128km >400km	5 920.72	5 328.65
Wholesale-IPLC STM1 0-50km	47 380	42 642
Wholesale-IPLC STM1 51-200km	51 445	46 301
Wholesale-IPLC STM1 201-400km	97 961	88 165
Wholesale-IPLC STM1 >400km	150 312	135 281
Wholesale-IPLC STM1 >400km	150 312	135 281

METRO ETHERNET

Table 15: Frame Relay

Frame Relay Product	No Contract	2 Year Contract
Wholesale-Frame Relay 64/0kbps	1 437.20	1 293.48
Wholesale-Frame Relay 64/128kbps	1 627.20	1 464.48
Wholesale-Frame Relay 128/0 kbps	1 790.40	1 611.36
Wholesale-Frame Relay 128/192 kbps	2 712.40	2 441.16
Wholesale-Frame Relay 256/320k	3 307.52	2 976.77
Wholesale-Frame Relay 512/640k	4 595.76	4 136.18
Wholesale-Frame Relay 1024/1152k	6 948.96	6 254.06
Wholesale-Frame Relay 1920/0 k	12 639.50	11 375.55

Table 16: Leased Lines

Leased Line Product	No Contract	2 Year Contract
Wholesale leased line 64k 0-50km,	1192.50	1073.25
Wholesale-Leased Line 64k 51-200km	1 465.45	1 318.91
Wholesale-Leased Line 64k 201-400km	2 017.60	1 634.94
Wholesale-Leased Line 64k>400km	2 043.20	1 658.43
Wholesale-Leased Line 128k 0-50km	1 429.50	1 286.55
Wholesale-Leased Line 128k 51-200km	1 823.85	1 641.47
Wholesale-Leased Line 128k 201-400km	2 392.80	1 936.44
Wholesale-Leased Line 128k>400km	2 697.60	2 157.17
Wholesale-Leased Line STM1 0-50km	17 565.50	15 808.95
Wholesale-Leased Line STM1 51-200km	25 616.15	23 054.54
Wholesale-Leased Line STM 201-400km	41 496.20	32 136.66
Wholesale-Leased Line STM 1>400km	47 920.40	36 632.16

Table 17: Internet-Unprotected Botsgate

Mbps	1 Year Contract

https://www.bocra.org.bw/sites/default/files/Tarrif%20Pdf%27s/CORRECTION_OF_WHOLESALE_PRICES_AS_AT_END_SEPTEMBER_2015.pdf

Policy and Regulatory Considerations for Community Networks

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