



How to run an IXP on the first 5 years?

AfPIF 2024 – Darwin Da Costa | DE-CIX

Disclaimer

- >> This presentation is related to a real use-case from a market with 10M inhabitants and 3 operational IXPs;
- >> Results or practices applied on this use-case can or can not be applied in different African countries/regions;

Agenda

Who are we?

- . DE-CIX general overview / DE-CIX Lisbon Outlook

Country Interconnection Outlook

- . Subsea Cables, Datacenters

Use-case about building & operating an IXP on the first 5 years

- . Challenges & Opportunities on operating multiple IXPs in a small sized market
- . Importance of multi-DC strategy

Peering Management

- . Importance of having proper ROAs to avoid filtering
- . Importance of using BGP communities

ACIX & AF-CIX

- . ACIX & AF-CIX

Q&A

Welcome, bem-vindo

DE-CIX Lisbon Use-Case

Study Publication – May 2024 >>



DE-CIX – Global leading operator of Internet & Cloud Exchanges, Carrier & data center neutral

55

Internet & Cloud Exchanges

600+

Cities with access

3,300+

Connected networks

50+

Cloud Service Providers

143+

Tbit capacity

North America

Chicago, Dallas, New York,
Phoenix, Richmond, Seattle,
Mexico City, Querétaro

EMEA

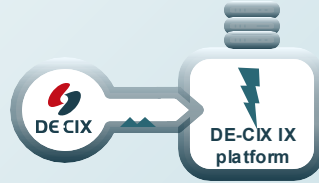
Amsterdam, Aqaba, Athens, Baghdad, Barcelona, Berlin, Bucharest,
Copenhagen, Dubai, Dusseldorf, Esbjerg, Frankfurt, Hamburg, Helsinki,
Istanbul, Karachi, Kinshasa, Kristiansand, Lagos, Leipzig, **Lisbon**,
Madrid, Marseille, Munich, Oslo, Palermo, Prague, Ruhr region, Sofia,
Stockholm*, Warsaw

Asia Pacific

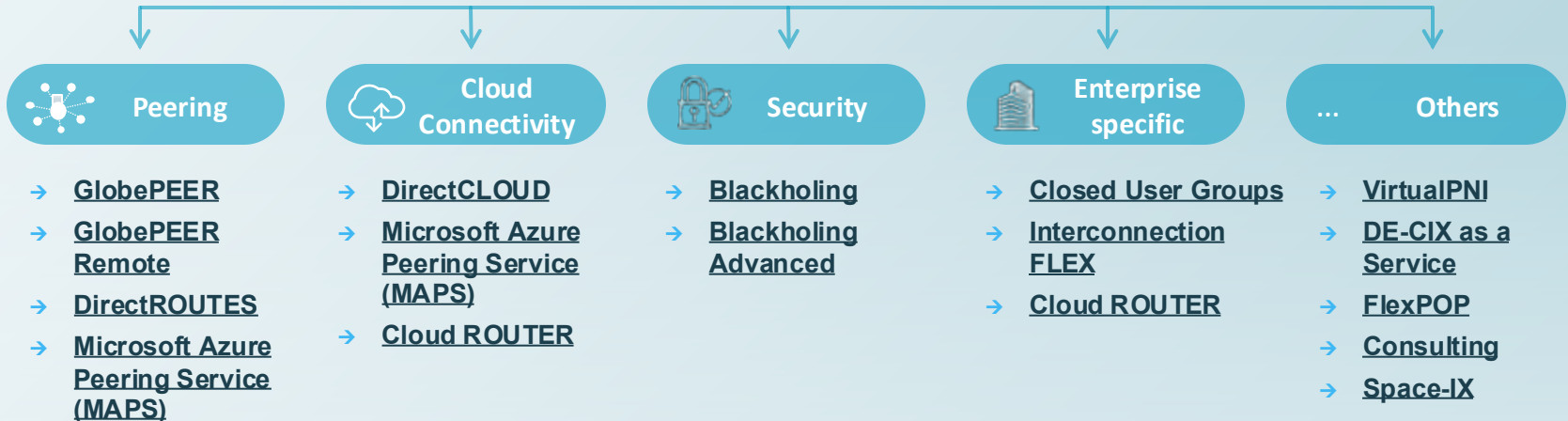
Brunei, Chennai, Delhi,
Hyderabad, Karachi*, Kuala
Lumpur, Kolkata, Jakarta,
Johor Bahru, Manila,
Mumbai, Osaka, Penang,
Singapore, Tokyo

DE-CIX – Running on multi-award-winning platforms & offer a portfolio of Peering & Cloud services

Platform Apollon



Multiple interconnection services across the same access



DE-CIX Lisbon

RFS 2019 – Today, the largest IX in Portugal

>> 3 enabled sites

Equinix LS1, Start Campus SIN01, Altice LDV01

>> 61 ASNs - connected networks

8 local (13%), 36 uniques, 35 internationals (non-EU)

>> 90.44 Gbit/s peak

>> Connected with the rest of the DE-CIX ecosystem

Lisbon

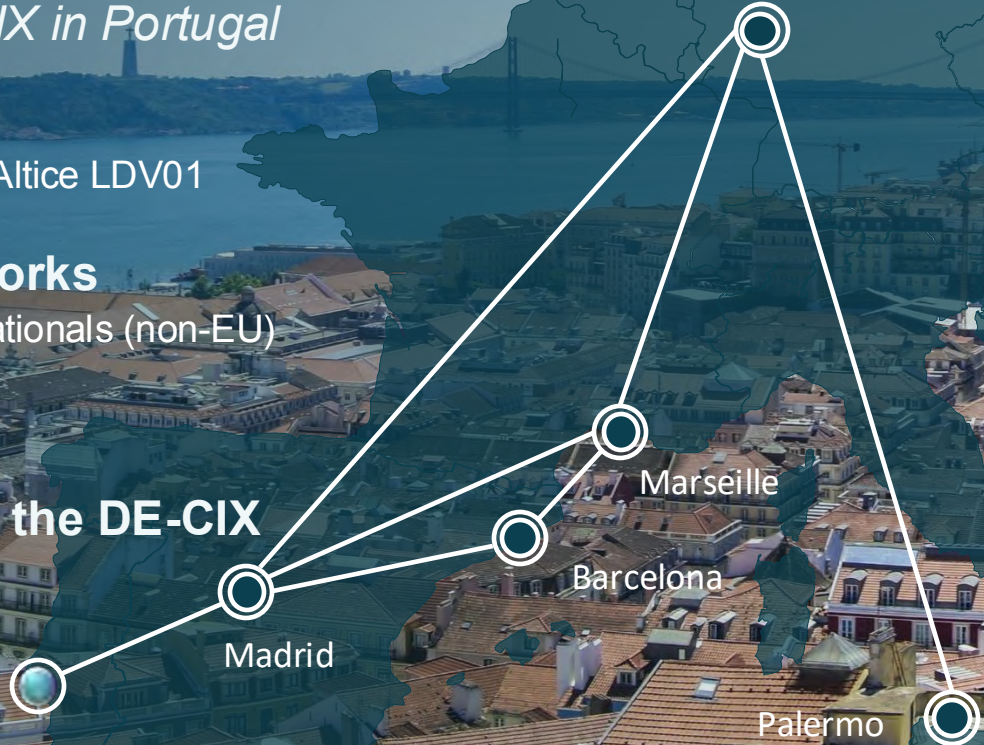
Madrid

Barcelona

Marseille

Palermo

Frankfurt



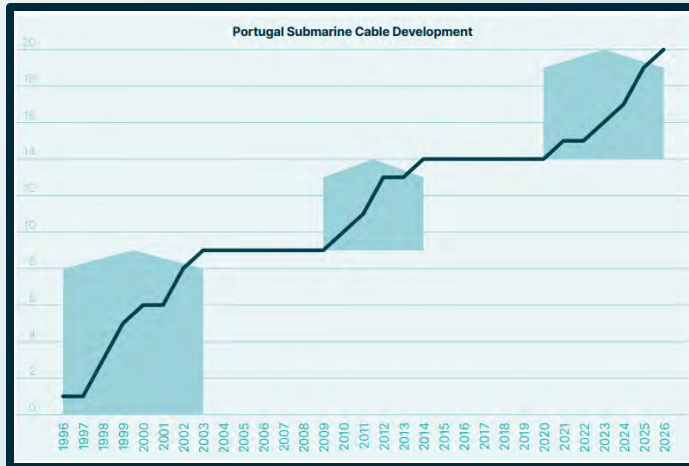
Portugal Interconnection Outlook



Subsea Cables landscape ...

**3 major CLS +15 active subsea cables
+4 to come by 2025**

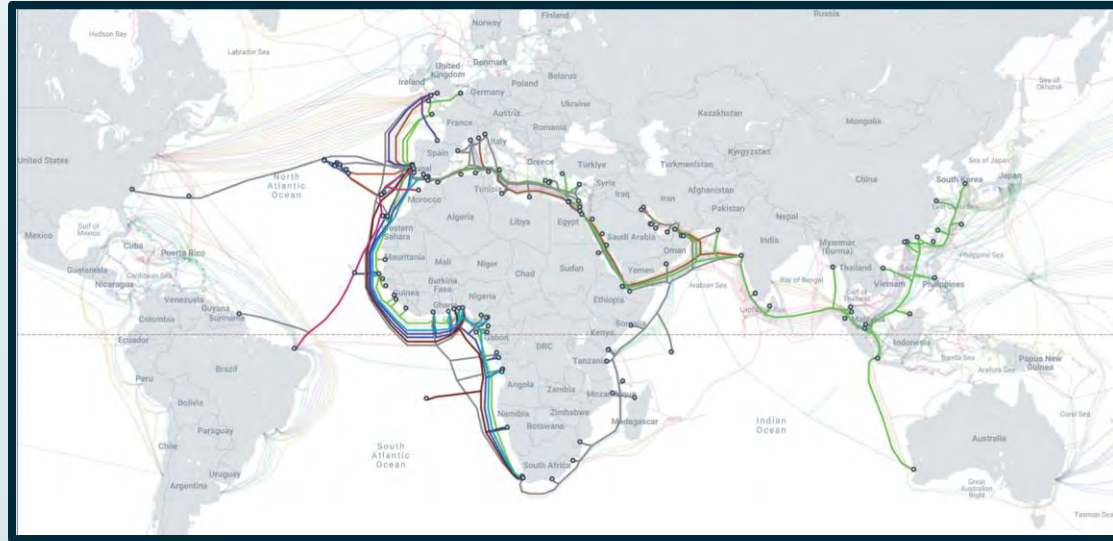
3 active exchange points in Lisbon city



While the period from 2012 to 2020 witnessed yet another pause in new cable initiatives, with just one cable being developed within the Azores Island group, the drought was broken in 2021 with the establishment of an unprecedented link between Europe and South America through the new EllaLink initiative connecting Portugal to Brazil. Following this milestone, 2023 marked the introduction of another significant link between Portugal, the west coast of Africa, and South Africa, thereby reinforcing and enhancing the Africa-Europe connectivity ecosystem.

Subsea Cables landscape ...

The country has a clear strategy which can be applied by others to cope with the digital evolution & demand



3 fundamental pillars:

1

an established Internet Exchange (IX)

achieving globally competitive roundtrip times and keeping locally destined traffic local

2

a distributed & diverse interconnection ecosystem

of both local and international network providers and data center operators

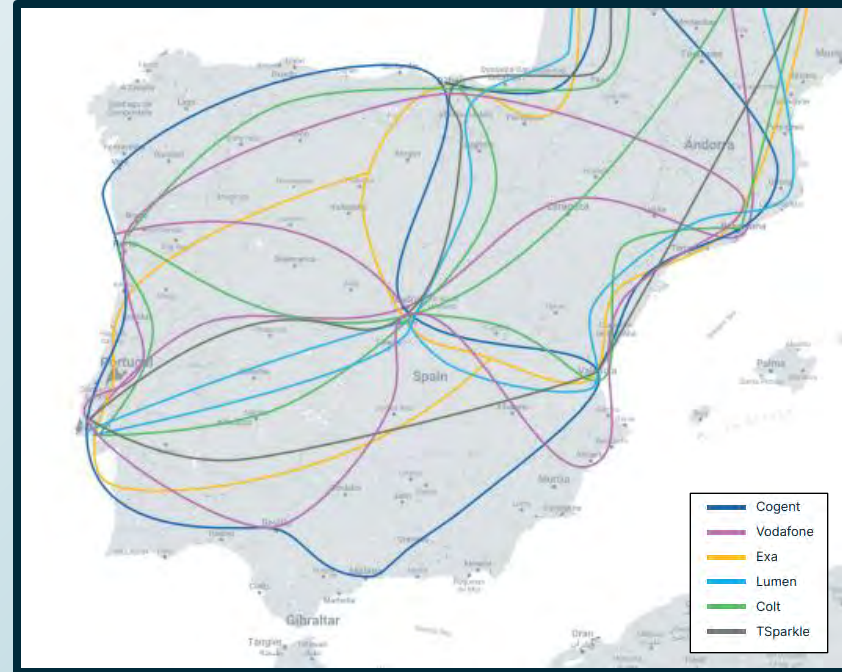
3

the ability to offer redundancy, resiliency & options

that are becoming paramount to serving different market segments and network needs?

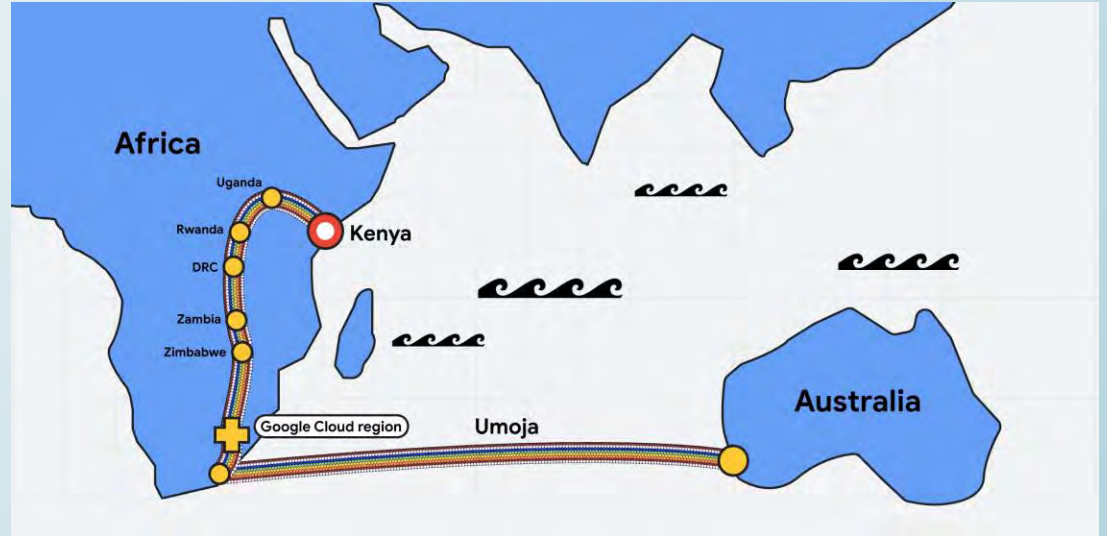
National & Regional Connectivity...

Portugal is
**an aggregation point
for intercontinental Internet data flows
and act as a crossroad for global Internet
connectivity**

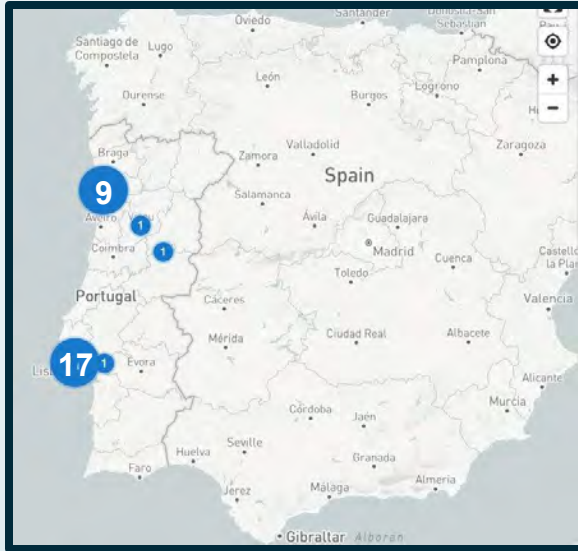


- ▶ **Extensive submarine cable network** connecting Portugal to the global Internet ecosystem
 - ▶ **Significant terrestrial links** connecting Portugal to the rest of mainland Europe
 - ▶ **12 links between Portugal & Spain**, mostly also reaching further into **France & beyond**
- >> More resilient & redundant pathways. More options for network operators**

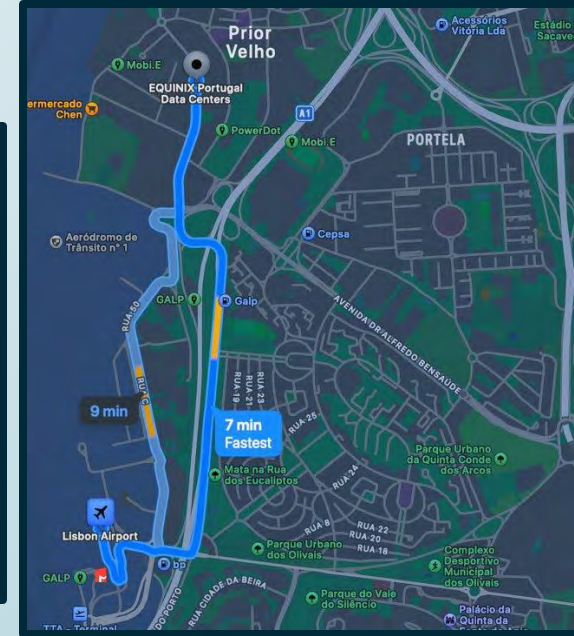
This reminds me about this!!



Data Center Landscape...



Market	Data Centers
Lisbon	17
Porto	9
Barreiro	1
Alentejo	1
Carnaxide	1
Covilha	1
Matosinhos	1
Viseu	1
Total Data Centers:	32



- ▶ Portugal has 32 datacenters
- ▶ Until 2023 there was only a single neutral Data Center

Democratic Republic of Congo Data Center Landscape...



Market	Data Centers
Kinshasa	3
Total Data Centers:	3

Raxio DR Congo +

Raxio Group
Limete Industriel, 9/11 12 ieme Rue
1004131 Kinshasa

RAXIO
The power of data centers

Open Access Data Centres Kinshasa +

Open Access Data Centres Limited
63, Avenue Colonel Mondjiba
7948 Gombe

GBSDC1 +

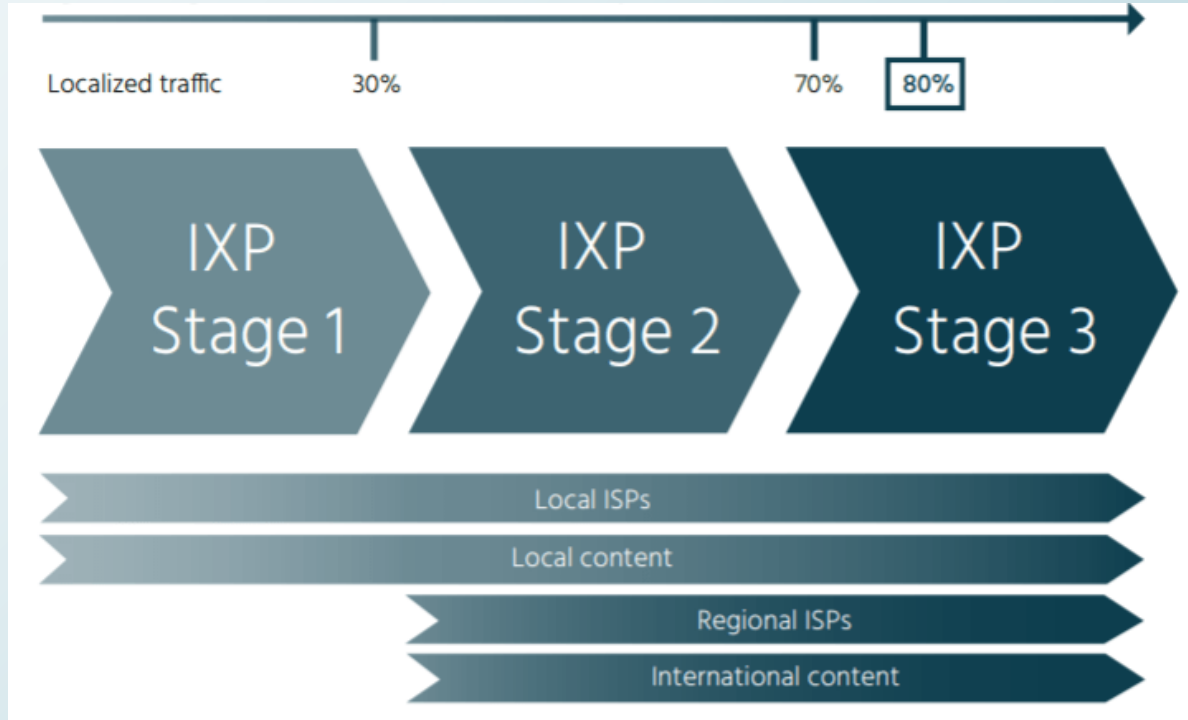
Global Broadband Solution
within City center
24300 Kinshasa

- ▶ The country has a few micro datacenters managed by Telco operators
- ▶ 2 neutral DCs coming up between 2024/2025 & **~105M inhabitants**

**Is there any formula for
success?**



Important note from Internet Society!!



Building & operating an IXP on the first 5 years

- Key take away

Challenges

- **Size** of the market
- Market **maturity** (peering)
- **Single Datacenter** operations
- **Convince** networks to connect
- **Community / Capacity** building

Opportunities


- Offer **additional services** than just peering
- **Expand our nodes** aside of the capital city-only
- Connecting **unique eyeballs** into the platform
- Leverage on the high **dense submarine cable** deployments

Why



is multi-data center strategy
important






 **Carlos Rodrigues**
@carlosefr

I felt a momentary disturbance in the Force, as if the two largest Internet Exchanges in Lisbon (DE-CIX and GigaPIX) were suddenly silenced.

gigapix.pt/en/technical/t...
de-cix.net/en/locations/l...

#portugal #hugops



The charts show traffic volume in Gbps. The top-left chart is for 2 days, the top-right for 2 days, the bottom-left for 1 month, and the bottom-right for 1 month. The y-axis for all charts ranges from 0 to 58.63 Gbps.

 **SIC Notícias** @SICNoticias - 58m

Relatos de constrangimentos começaram a surgir pouco antes das 16:00 desta terça-feira por parte de clientes da Meo, Nos e Vodafone, sobretudo relacionados com dificuldades no acesso à internet: bit.ly/42pHG6G

Uma avaria está também a causar transtorno aos clientes da... [Show more](#)

Falha

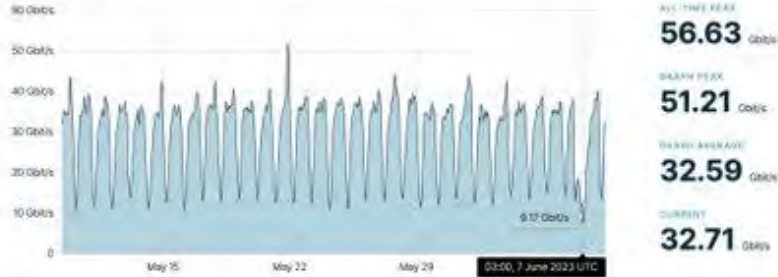
Falha elétrica afeta serviços de operadoras de telecomunicações

Clientes da Meo, Nos e Vodafone relatam sobretudo **dificuldades no acesso à internet**. Fonte ligada ao setor adianta à SIC Notícias que na origem podem estar falhas elétricas.



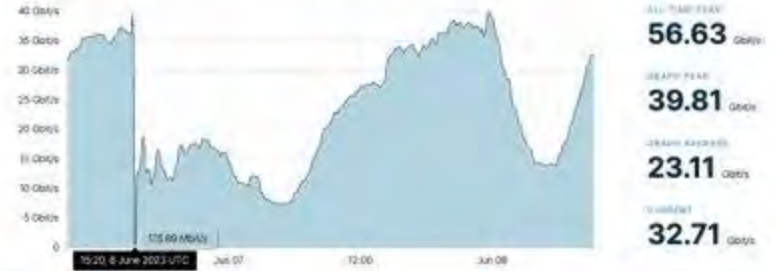
Traffic went down!

Traffic Lisbon - 1 month



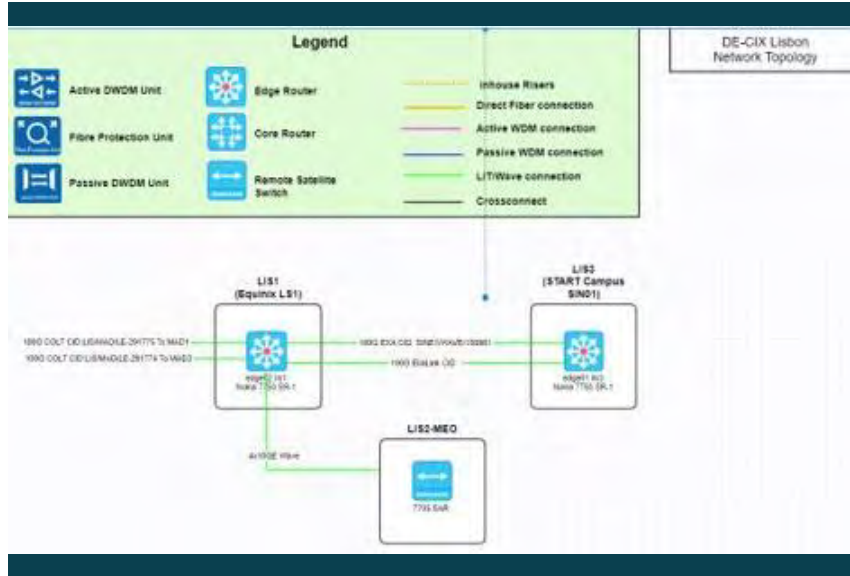
Please note: unavailability of or irregularities in the traffic statistics do not imply a service degradation or disruption.
If you have questions, please contact our customer service team.

Traffic Lisbon - 2 days



Please note: unavailability of or irregularities in the traffic statistics do not imply a service degradation or disruption.
If you have questions, please contact our customer service team.

Expanding was a clear need!



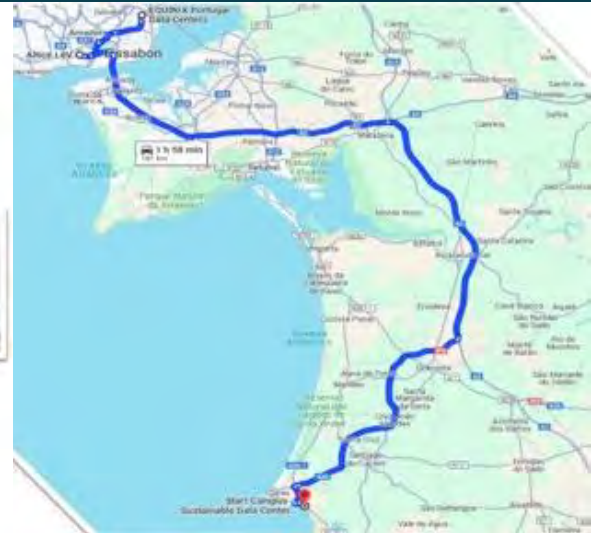
Equinix LIS1



Altice LdV LIS2



Start Campus LIS3



Peering Management

Why is peering management so important?

- To avoid prefixes filtering and not having your traffic or your customers traffic announced
- Create ROAs for the filtered prefixes with your respective RIR (regional internet registry).

A ROA is composed of

- . An origin AS;
- . A prefix max length;
- . A ROA name (optional);

<https://afrinic.net/support/rpki/create-add-rpki-roa>

We normally advise networks to...

- Activate “no bgp enforce-first-as” in your BGP config – this will enable xxx.yyy prefixes coming to you from the routeservers
- Check if DE-CIX (location) prefixes are having a high or the highest localpref value in your setup
- Activate your downstream BGP customers to also be sent to DE-CIX (location)
- Please enable IPv6 prefixes announcement



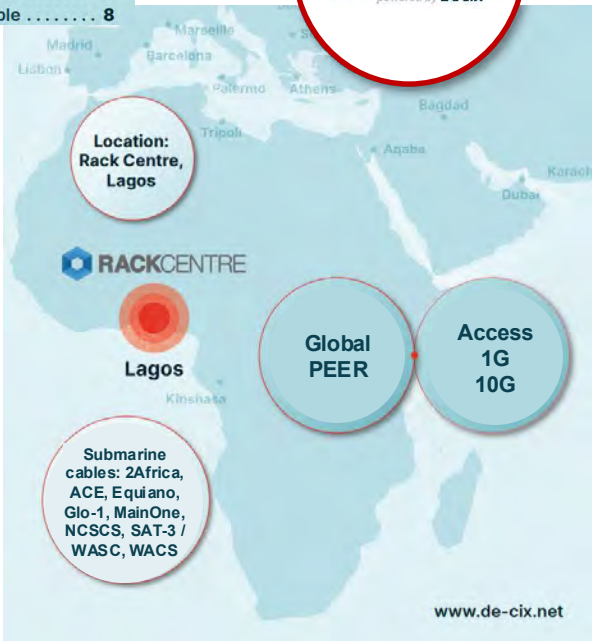
The screenshot shows a table titled "ROUTES FILTERED" with a "Network" column. It lists three filtered routes with their respective IRRDB lookup errors:

Network	IRRDB lookup error
102.128.74.0/24	IRRDB lookup: Unable to resolve prefix for origin AS
102.165.120.0/22	IRRDB lookup: AS-SET does not include origin AS
102.165.190.0/24	IRRDB lookup: Unable to resolve prefix for origin AS



Partners on the African Continent

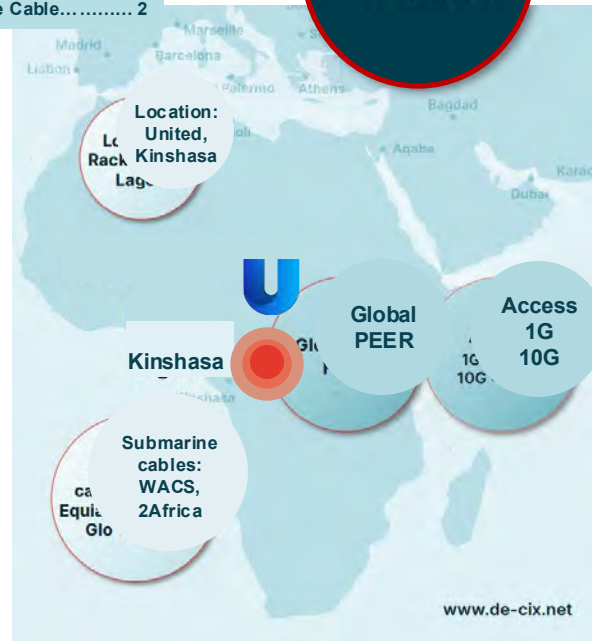
Nigeria
 Population 230M
 ASN 245
 Commercial DC 5
 Licensed ISP 245
 Submarine Cable 8



https://lg.de-cix.net/routeservers/rs1_los_ipv4

RFS: 2023
 Connected networks: +20
 Available Sites: 1

Rep. Dem. Congo
 Population.....105M
 ASN..... 53
 Commercial DC..... 2
 Licensed ISP..... 2
 Submarine Cable..... 2



https://lg.de-cix.net/routeservers/rs1_fih_ipv4

RFS: 2023
 Connected networks: +10
 Available Sites: 1



Questions?

Thank you!

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