

How to run an IXP on the first 5 years?

APIX#30 – 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 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

DE-CIX ASEAN

- . Partners overview

Q&A

Welcome, bem-vindo

DE-CIX Lisbon Use-Case

Study Publication – May 2024 >>



STUDY

Portugal: a global interconnection hub, a gateway to Europe, a gateway to the world

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

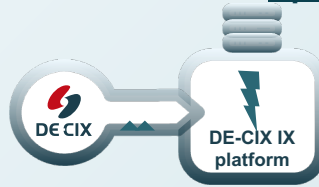
Amsterdam, Aqaba, Athens, Baghdad, Barcelona, Berlin, Bucharest,
Copenhagen, Dubai, Dusseldorf, Esbjerg, Frankfurt, Hamburg, Helsinki,
Istanbul, Karachi, Kinshasa, Kristiansand, Lagos, Leipzig, **Lisbon**,
Madrid, Marseille, Munich, Oslo, Palermo, Prague, Ruhr region, Sofia,
Stockholm*, Warsaw

Asia Pacific

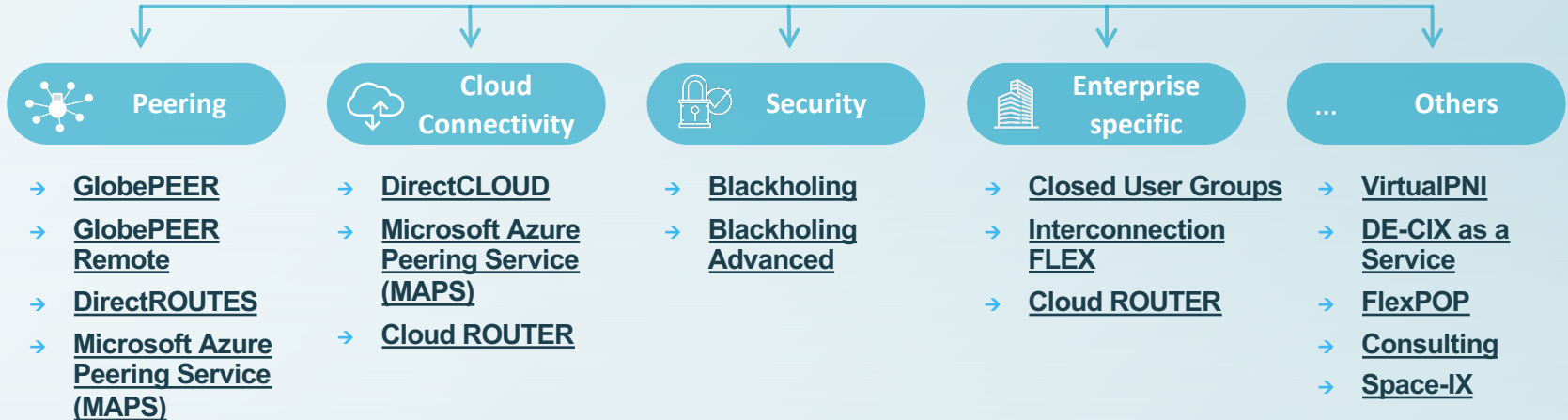
Brunei, Chennai, Delhi,
Hyderabad, Karachi*, Kuala
Lumpur, Kolkata, Jakarta,
Johor Bahru, Manila,
Mumbai, Osaka, Penang,
Singapore, Tokyo

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

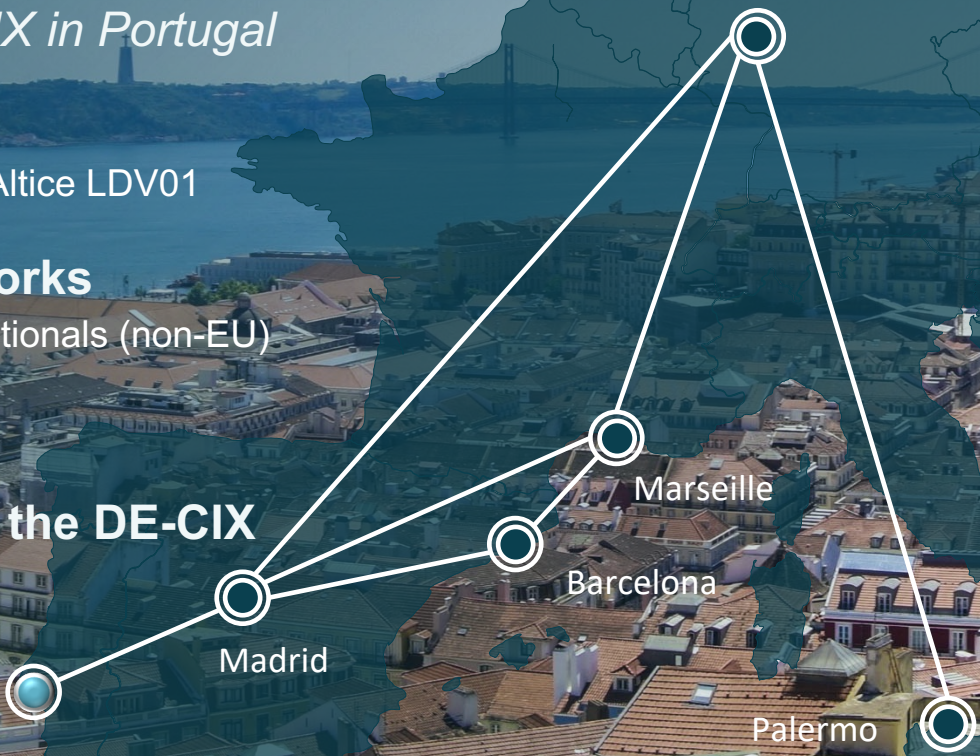
Madrid

Barcelona

Marseille

Palermo

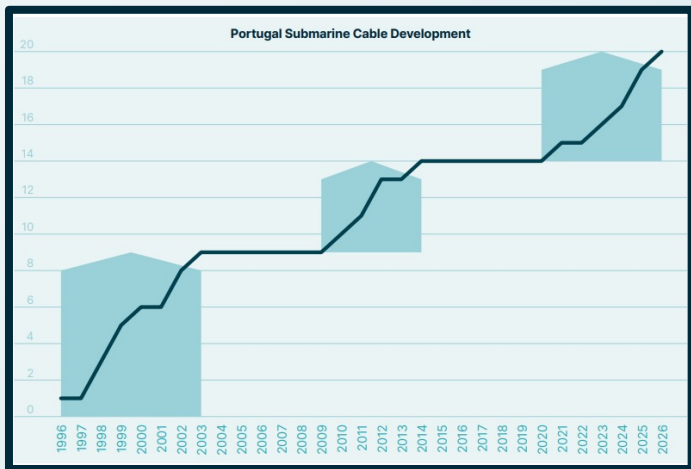
Frankfurt



Subsea Cables landscape ...

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

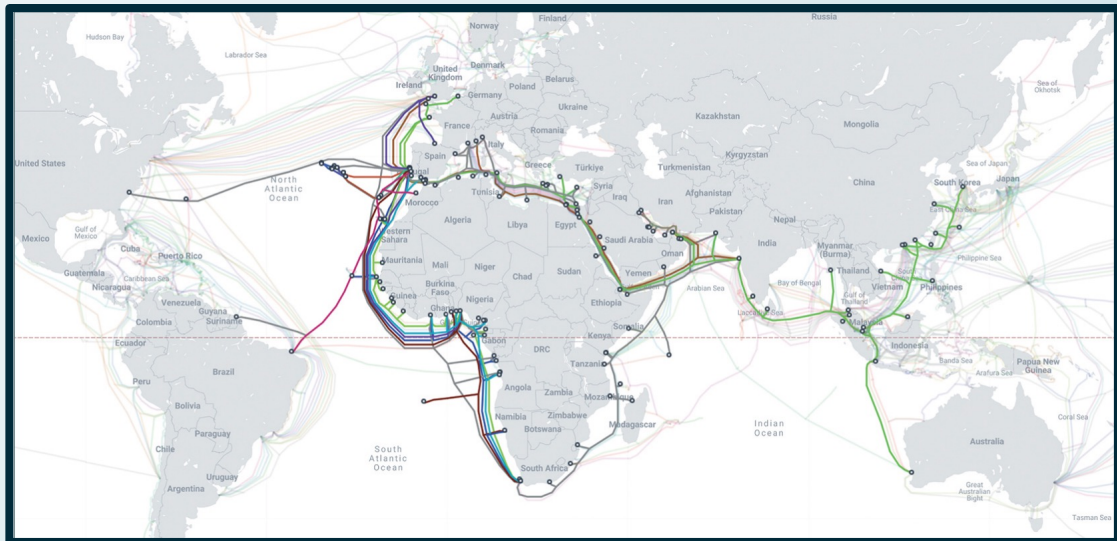
3 active exchange points in Lisbon city



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

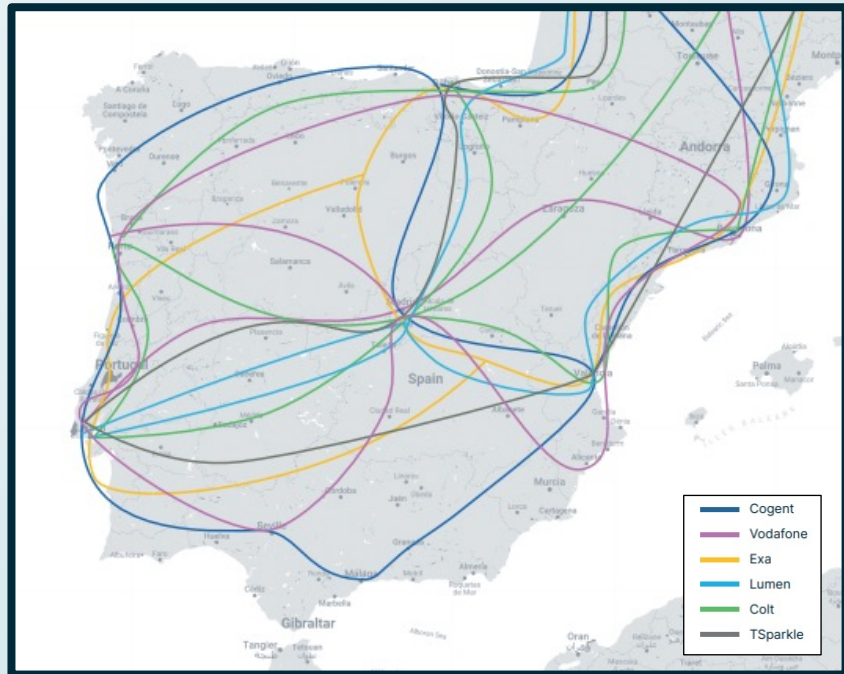
3

the ability to offer redundancy, resiliency & options

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

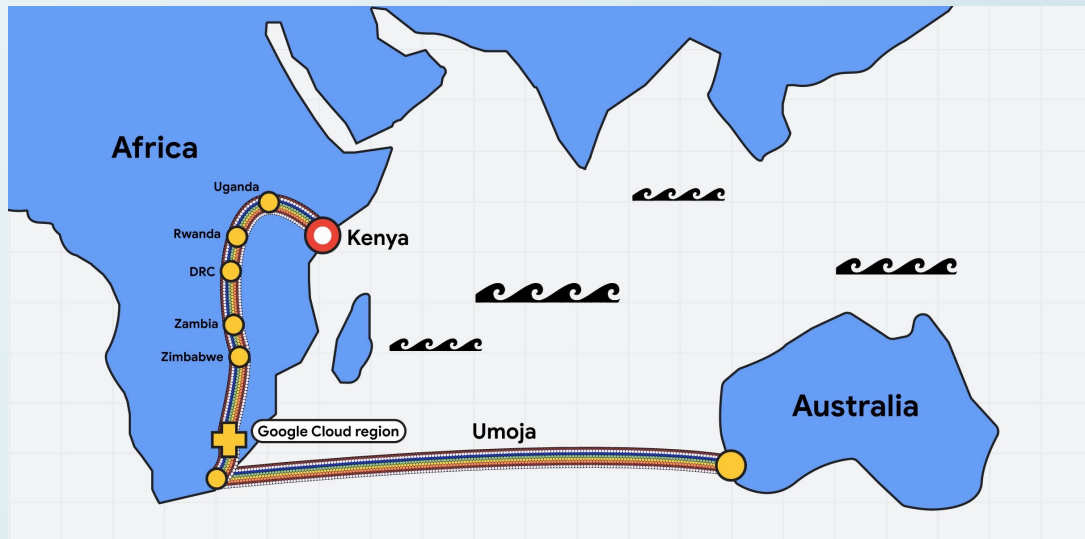
National & Regional Connectivity...

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**

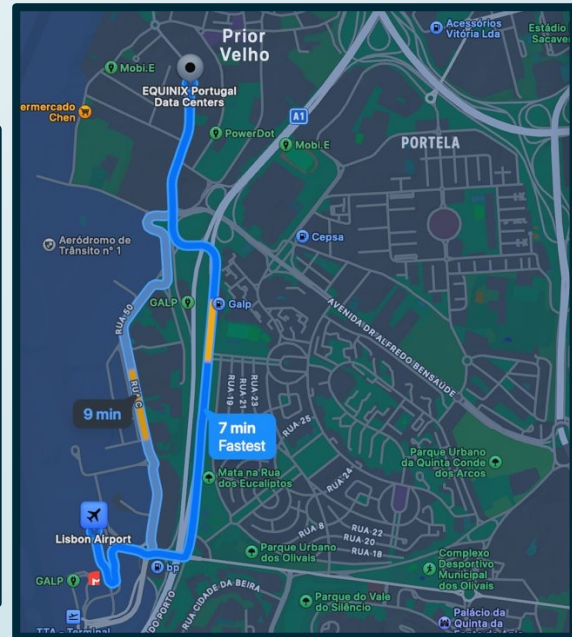
This reminds me about this!!



Data Center Landscape...



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

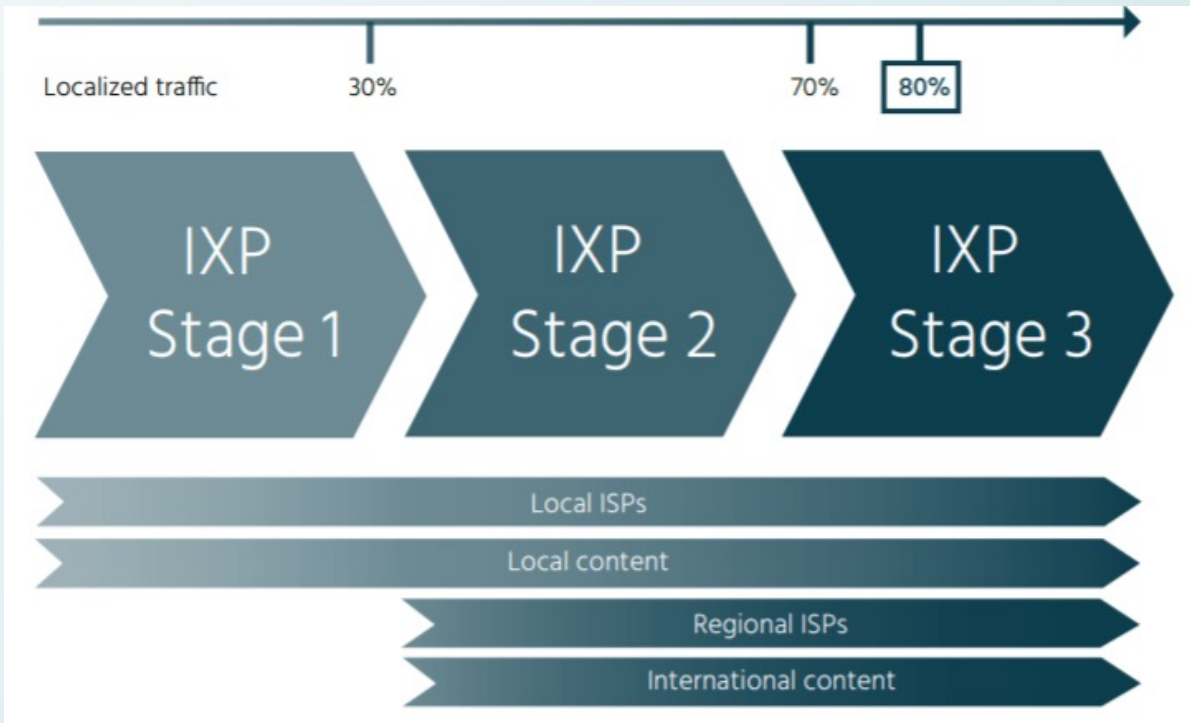


- ▶ Portugal has 32 datacenters
- ▶ Until 2023 there was only a single neutral Data Center

**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 figure displays four traffic graphs for Lisbon. The top-left graph shows traffic over 2 days, with a significant dip around 16:00. The top-right graph shows traffic over 1 month, with a similar dip. The bottom-left graph shows traffic over 2 days, with a significant dip around 16:00. The bottom-right graph shows traffic over 1 month, with a similar dip. The graphs are labeled 'Traffic Lisbon - 2 days' and 'Traffic Lisbon - 1 month'.

 **SIC Notícias** @SICNoticias · 56m

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](#)



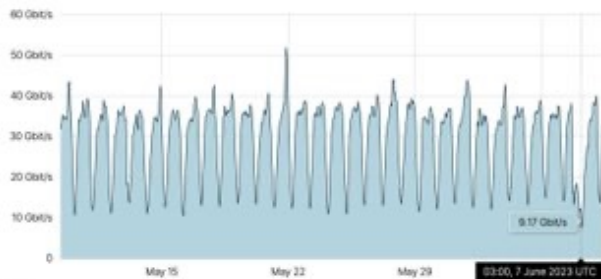
Falha elétrica afeta serviços de operadoras de telecomunicações

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.

1 10 34 6 665

Traffic went down!

Traffic Lisbon – 1 month



ALL-TIME PEAK
56.63 Gbit/s

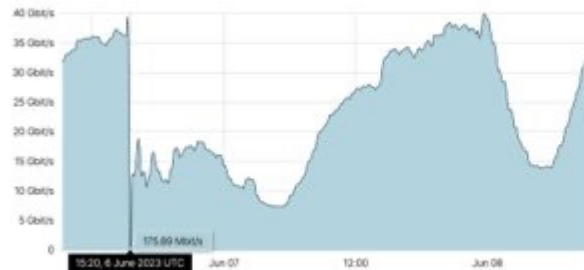
GRAPH PEAK
51.21 Gbit/s

GRAPH AVERAGE
32.59 Gbit/s

CURRENT
32.71 Gbit/s

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



ALL-TIME PEAK
56.63 Gbit/s

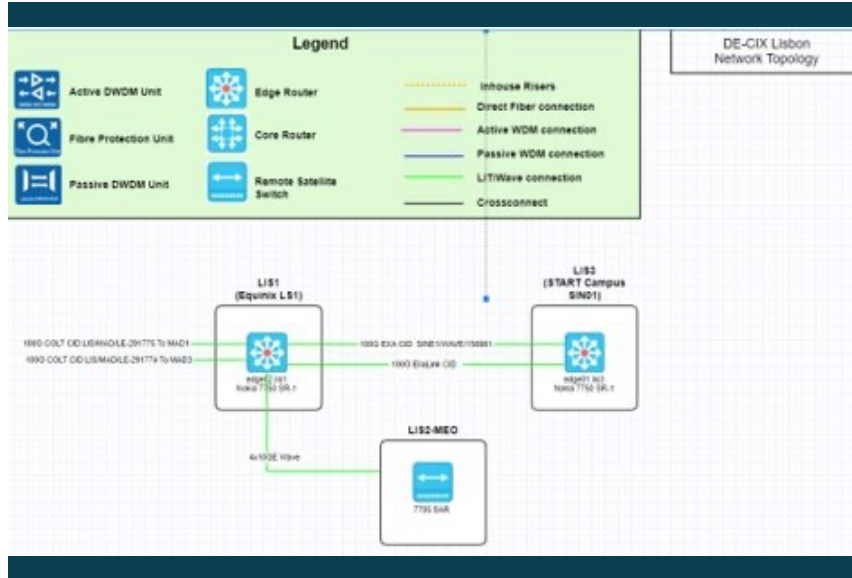
GRAPH PEAK
39.81 Gbit/s

GRAPH AVERAGE
23.11 Gbit/s

CURRENT
32.71 Gbit/s

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!



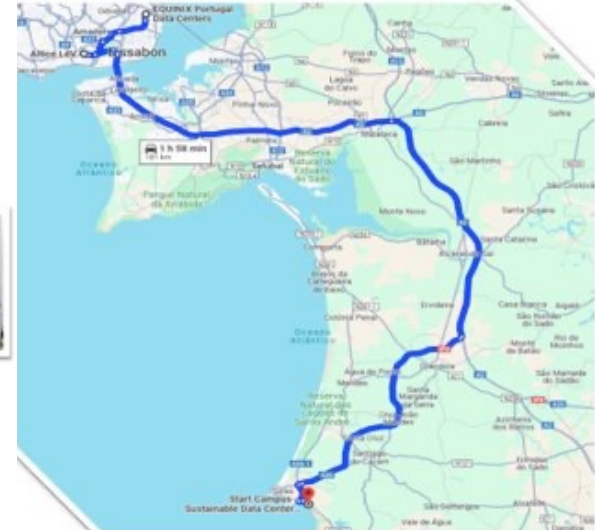
Equinix LIS1



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).

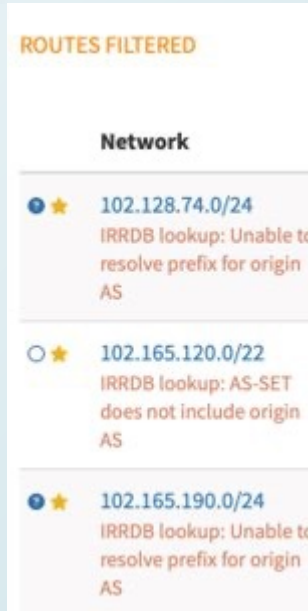
A ROA is composed of

- . 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 network prefixes with their respective IRRDB lookup status:

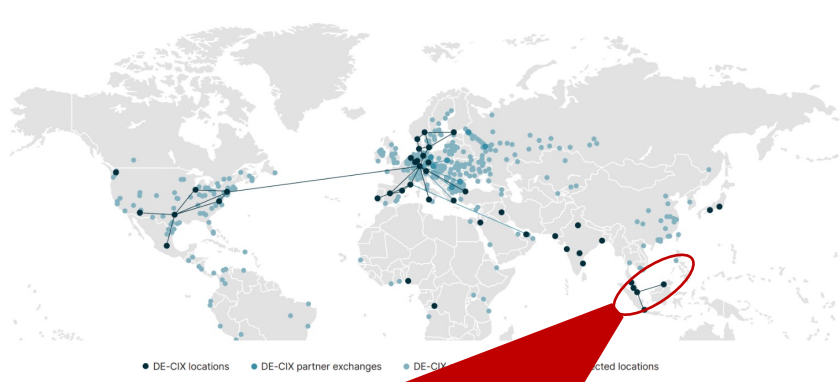
Network	IRRDB lookup status
102.128.74.0/24	Unable to resolve prefix for origin AS
102.165.120.0/22	AS-SET does not include origin AS
102.165.190.0/24	Unable to resolve prefix for origin AS

A 3D topographic map of Southeast Asia, showing the terrain of the region in shades of green and brown, set against a blue background representing the ocean. The map is viewed from an elevated perspective, highlighting the mountainous terrain of the region.

Partners on the ASEAN Continent

ASEAN Region *

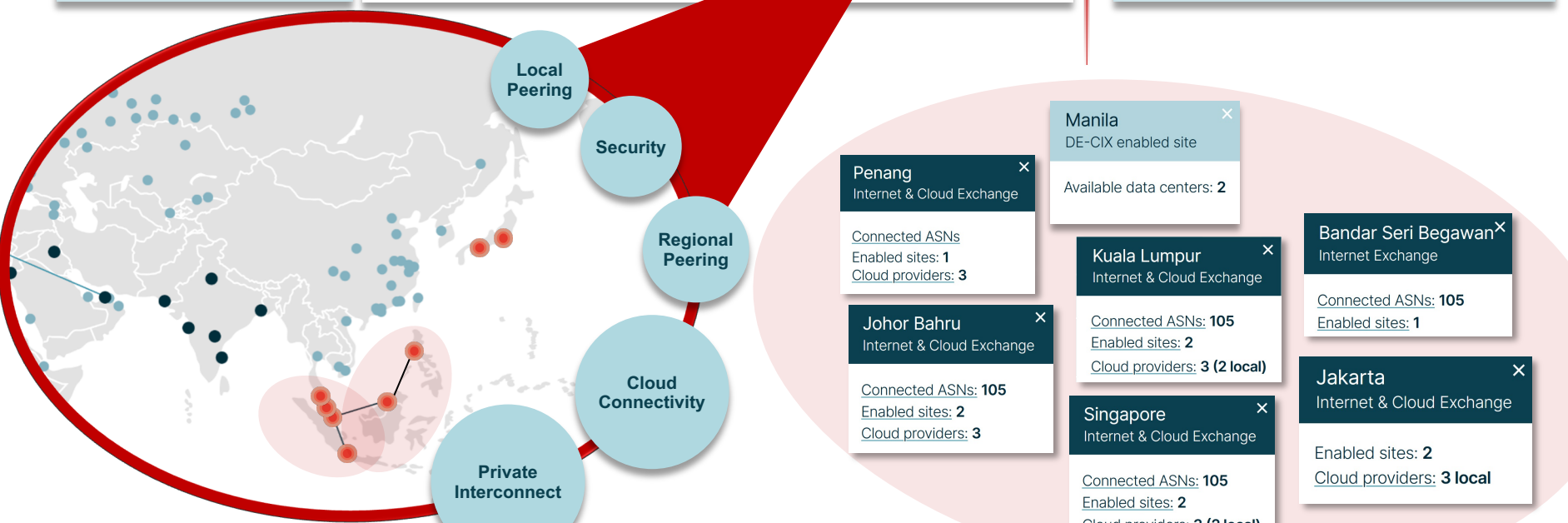
Population	673 M
ASNs	14 K
Commercial DCs	150+
Licensed ISPs	550+
Submarine Cables	30+



DE-CIX Asia:

- 7 Internet and Cloud Exchanges
- 100+ ASNs
- 30+ data centers
- 2+ Tbit connected capacity

+ Cloud Exchanges in Tokyo and Osaka



* Source: APNIC, Data Center Map, ASEAN academic report on submarine cables

Q&A

