

Um panorama do mercado da conectividade no nordeste brasileiro

Peter Wood

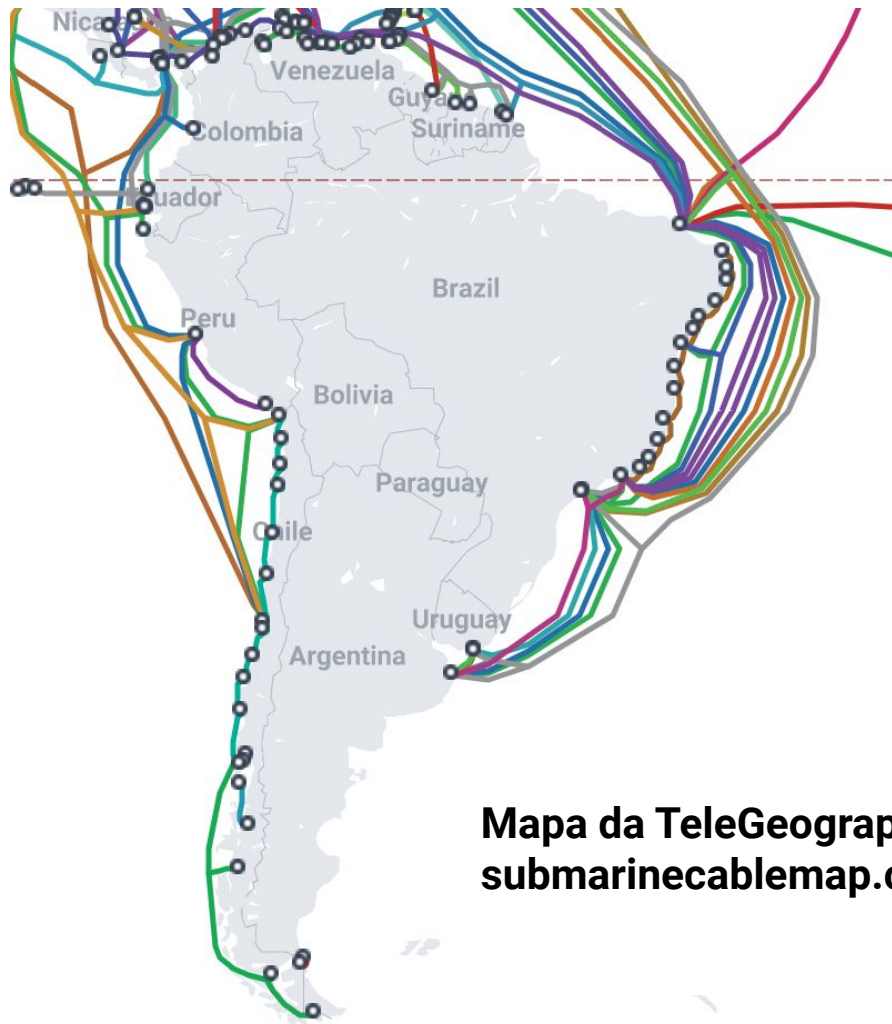
IX Fórum Fortaleza
12 abril 2023

Tópicos de interesse

- **Infraestrutura**
 - Cabos submarinos
 - Conectividade terrestre
 - Data center e serviços corporativos
- **Capacidade**
 - Transporte e trânsito
 - Apreçamento
- **Olhando para o futuro**
 - Transporte
 - Trânsito

Infraestrutura

Cabos submarinos



Mapa da TeleGeography
submarinecablemap.com



TeleGeography
Data Navigator

O que se conecta com o Brasil?

AMX-1 (RFS 2014)

- **Capacidade max: 60.000 Gbps**

Americas-II (2000)

- **6.100 Gbps**

Festoon (1996)

BRUSA (2018)

- **176.000 Gbps**

EllaLink (2021)

- **100.000 Gbps**

Firmina (2023)

- **240.000 Gbps**

GlobeNet (2000)

- **50.000 Gbps**

Junior (2018)

Malbec (2021)

- **108.000 Gbps**

Monet (2017)

- **64.000 Gbps**

Seabras-1 (2017)

- **84.000 Gbps**

SAm-1 (2001)

- **48.000 Gbps**

SAC (2000)

- **44.000 Gbps**

SACS (2018)

- **40.000 Gbps**

SAIL (2020)

- **32.000 Gbps**

Tannat (2018)

- **90.000 Gbps**

E Fortaleza?

Fortaleza, Brazil

[Copy link](#)

Submarine Cables

[America Movil Submarine Cable System-1](#)

[\(AMX-1\)](#)

[Americas-II](#)

[BRUSA](#)

[EllaLink](#)

[GlobeNet](#)

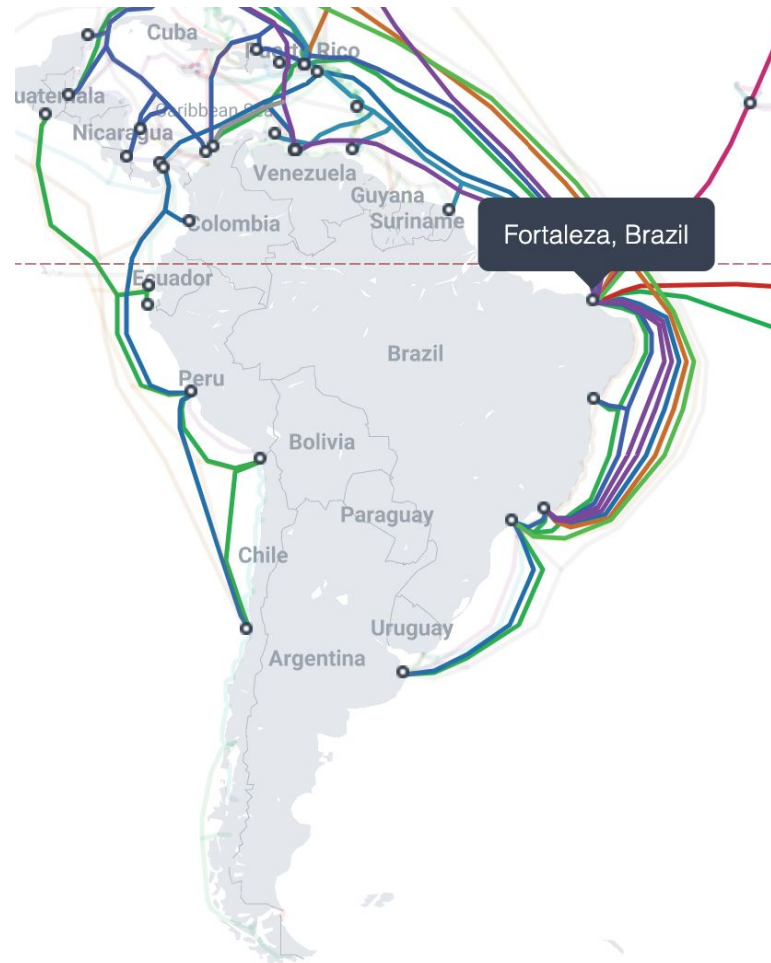
[Monet](#)

[South America-1 \(SAm-1\)](#)

[South American Crossing \(SAC\)](#)

[South Atlantic Cable System \(SACS\)](#)

[South Atlantic Inter Link \(SAIL\)](#)



Fortaleza

Fortaleza

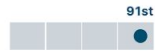
Brazil

Enterprise, Cloud, and Data Centers

Cloud & WAN Infrastructure

16

WAN Service Providers



Data Center Research Service

3

Data Centers



Pricing Suite - MPLS VPN

\$1,980

MPLS VPN Price

MPLS VPN weighted median price: FastE MRC



Pricing Suite - DIA

\$965

DIA Price

DIA weighted median price: FastE MRC

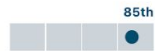


Transport

Global Bandwidth Research Service

27

Transport-Level Carriers



Global Bandwidth Research Service

11

Submarine Cables



Pricing Suite - Waves

\$11,250

Transport Price

Transport weighted median price: Fortaleza-Miami 400G MRC



Internet Backbones

Global Internet Geography

7,184.0

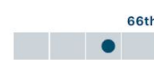
International Internet Capacity (Gbps)



Internet Exchange Map

2

Internet Exchanges



Pricing Suite - IP Transit

\$0.30

IP Transit Price per Mbps

IP Transit weighted median price: 100 GigE MRC



Salvador também está conectado

Salvador, Brazil

[Copy link](#)

Submarine Cables

America Movil Submarine Cable System-1 (AMX-1)

Brazilian Festoon

South America-1 (SAm-1)



Salvador

Salvador

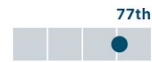
Brazil

Enterprise, Cloud, and Data Centers

Cloud & WAN Infrastructure

8

WAN Service Providers



Transport

Global Bandwidth Research Service

15

Transport-Level Carriers



Global Bandwidth Research Service

3

Submarine Cables



Pricing Suite - Waves

\$30,000

Transport Price

Transport weighted median price: Salvador-São Paulo
100G MRC



Internet Backbones

Internet Exchange Map

1

Internet Exchanges



Pricing Suite - IP Transit

\$0.30

IP Transit Price per Mbps

IP Transit weighted median price: 100 GigE MRC



Recife e o resto da região

Recife

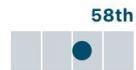
Brazil

Enterprise, Cloud, and Data Centers

Cloud & WAN Infrastructure

7

WAN Service Providers



Transport

Global Bandwidth Research Service

12

Transport-Level Carriers



Global Bandwidth Research Service

1

Submarine Cables



Internet Backbones

Internet Exchange Map

1

Internet Exchanges



Natal

Natal

Brazil

Enterprise, Cloud, and Data Centers

Cloud & WAN Infrastructure

4

WAN Service Providers

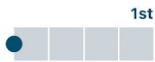


Transport

Global Bandwidth Research Service

10

Transport-Level Carriers



Global Bandwidth Research Service

1

Submarine Cables

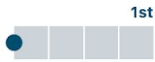


Internet Backbones

Internet Exchange Map

1

Internet Exchanges



João Pessoa

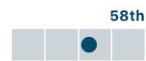
João Pessoa Brazil

Enterprise, Cloud, and Data Centers

Cloud & WAN Infrastructure

3

WAN Service Providers



Data Center Research Service

1

Data Centers



Transport

Global Bandwidth Research Service

10

Transport-Level Carriers



Global Bandwidth Research Service

1

Submarine Cables



Internet Backbones

Internet Exchange Map

1

Internet Exchanges



Aracajú

Aracajú

Brazil

Enterprise, Cloud, and Data Centers

Cloud & WAN Infrastructure

3

WAN Service Providers



Transport

Global Bandwidth Research Service

8

Transport-Level Carriers



Global Bandwidth Research Service

1

Submarine Cables



Internet Backbones

Internet Exchange Map

1

Internet Exchanges



São Luís

São Luis

Brazil

Enterprise, Cloud, and Data Centers

Cloud & WAN Infrastructure

2

WAN Service Providers



Transport

Global Bandwidth Research Service

8

Transport-Level Carriers



Internet Backbones

Internet Exchange Map

1

Internet Exchanges



Maceió

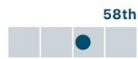
Maceió Brazil

Enterprise, Cloud, and Data Centers

Cloud & WAN Infrastructure

3

WAN Service Providers



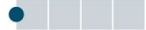
58th

Transport

Global Bandwidth Research Service

7

Transport-Level Carriers



1st

Global Bandwidth Research Service

1

Submarine Cables

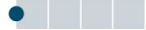


Internet Backbones

Internet Exchange Map

1

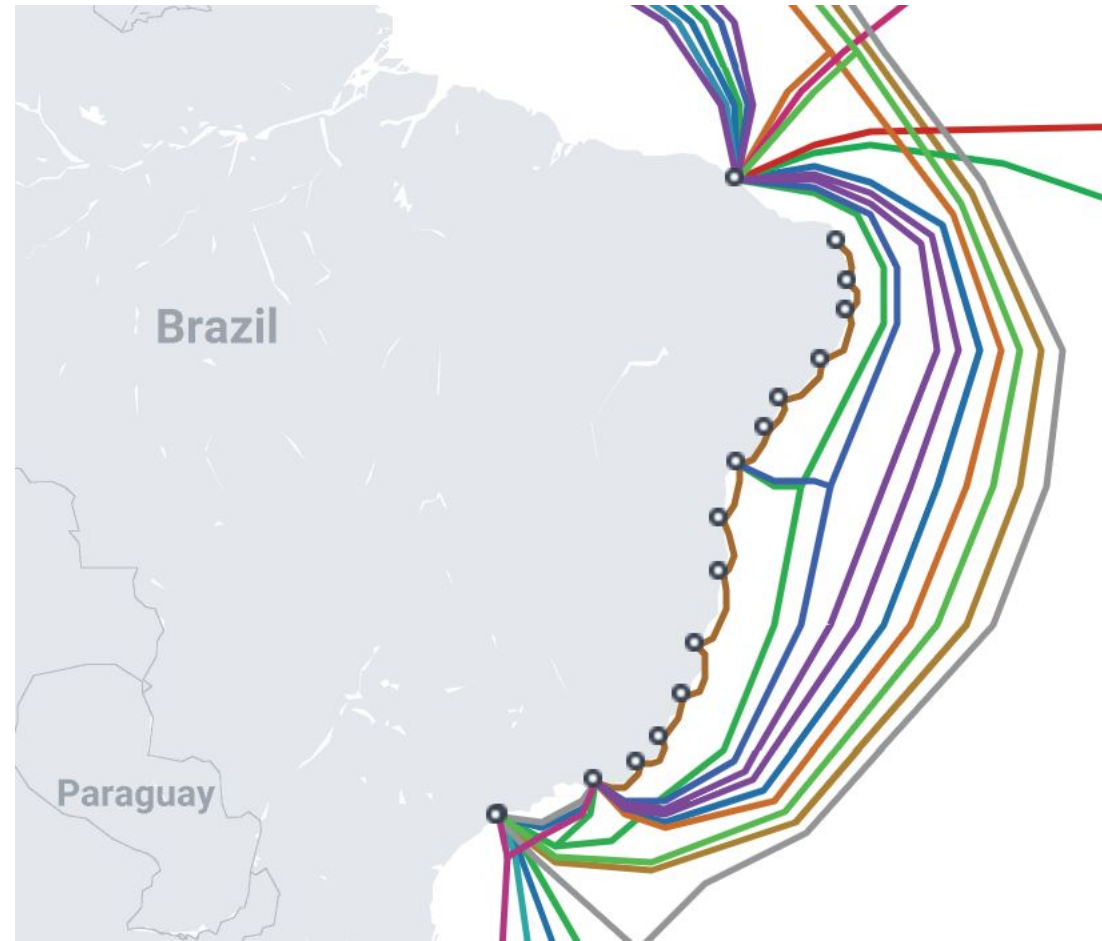
Internet Exchanges



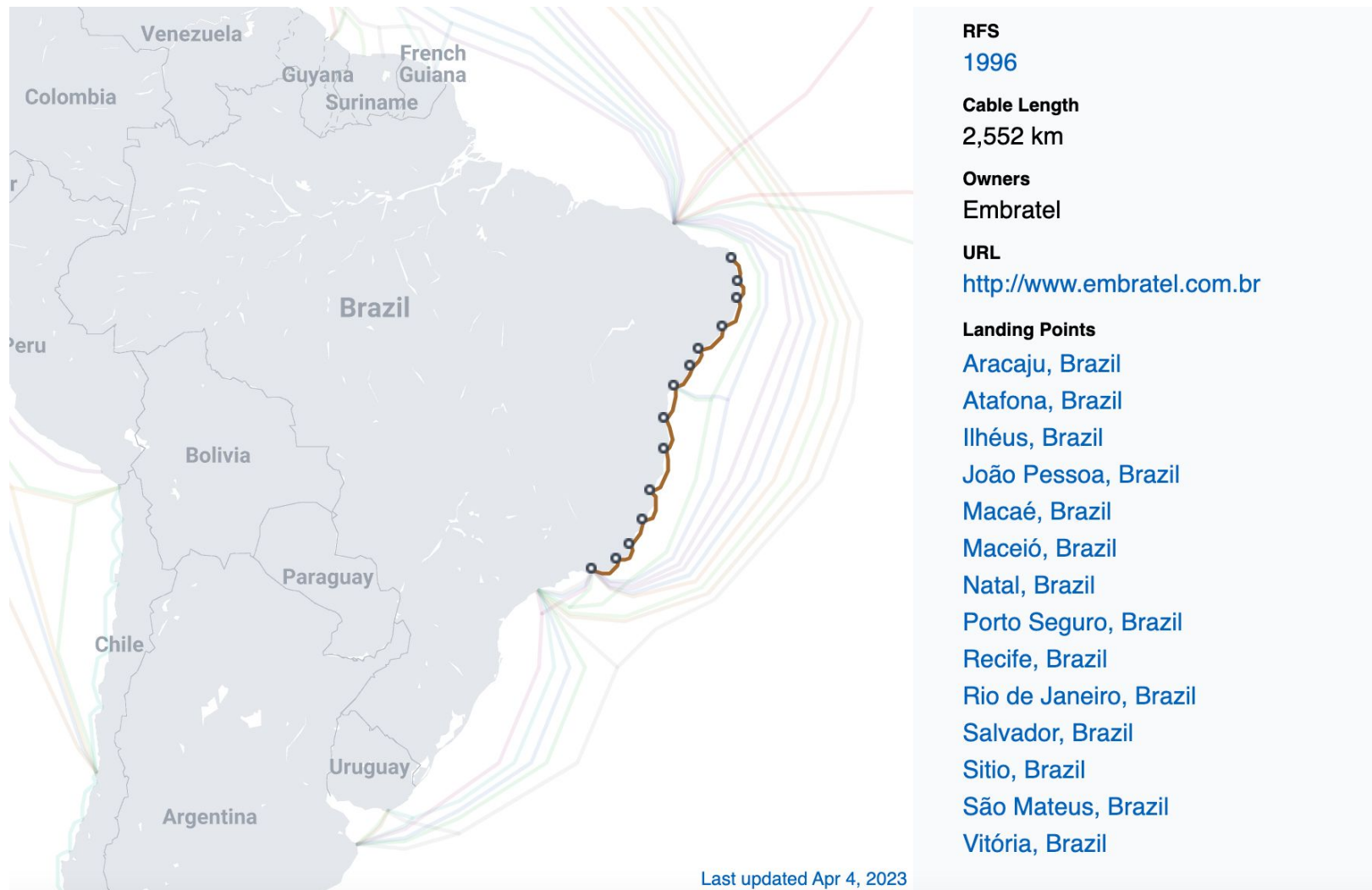
1st



Quais cabos chegam no nordeste?



Festoon



BRUSA



RFS

2018 August

Cable Length

11,000 km

Owners

Telxius

Suppliers

ASN

URL

<http://www.telxius.com>

Landing Points

Fortaleza, Brazil

Rio de Janeiro, Brazil

San Juan, PR, United States

Virginia Beach, VA, United States

Monet



RFS

2017 December

Cable Length

10,556 km

Owners

Algar Telecom, Angola Cables, Antel Uruguay, Google

Suppliers

SubCom

Landing Points

Fortaleza, Brazil

Santos, Brazil

Boca Raton, FL, United States

AMX-1



Last updated Apr 4, 2023

RFS

2014

Cable Length

17,800 km

Owners

América Móvil (Claro)

Suppliers

ASN

URL

<http://www.americamovil.com>

Landing Points

Fortaleza, Brazil

Rio de Janeiro, Brazil

Salvador, Brazil

Barranquilla, Colombia

Cartagena, Colombia

Schooner Bight, Colombia

Puerto Limón, Costa Rica

Puerto Plata, Dominican Republic

Puerto Barrios, Guatemala

Cancún, Mexico

Hollywood, FL, United States

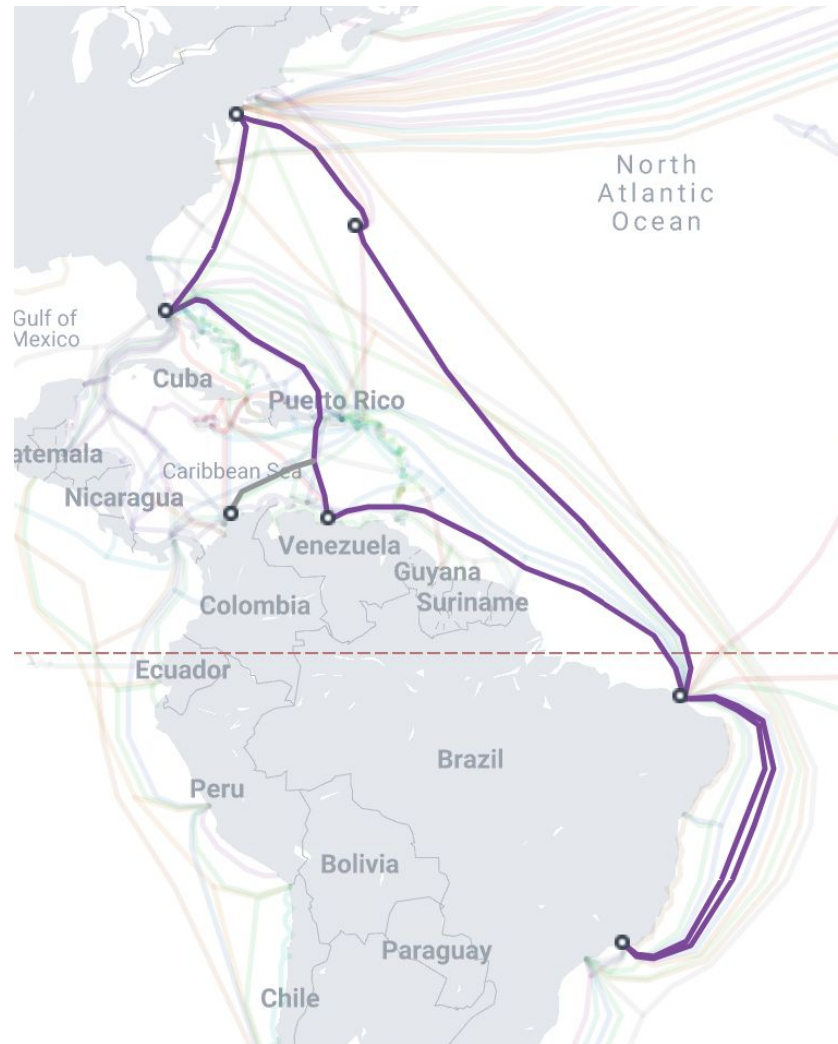
Jacksonville, FL, United States

San Juan, PR, United States

SAm-1



GlobeNet



RFS

2000 October

Cable Length

23,500 km

Owners

GlobeNet

Suppliers

ASN

URL

<http://www.globenet.net>

Landing Points

St. David's, Bermuda

Fortaleza, Brazil

Rio de Janeiro, Brazil

Barranquilla, Colombia

Boca Raton, FL, United States

Tuckerton, NJ, United States

Maiquetia, Venezuela

South American Crossing



RFS

2000 September

Cable Length

20,000 km

Owners

Cirion Technologies, Telecom Italia Sparkle

Suppliers

ASN

URL

<https://www.ciriontechnologies.com>

Notes

Cirion owns three fiber pairs on the systems, while Telecom Italia Sparkle owns one fiber. Only Cirion has capacity on the branch to Colombia.

Landing Points

Las Toninas, Argentina

Fortaleza, Brazil

Rio de Janeiro, Brazil

Santos, Brazil

Valparaíso, Chile

Buenaventura, Colombia

Colon, Panama

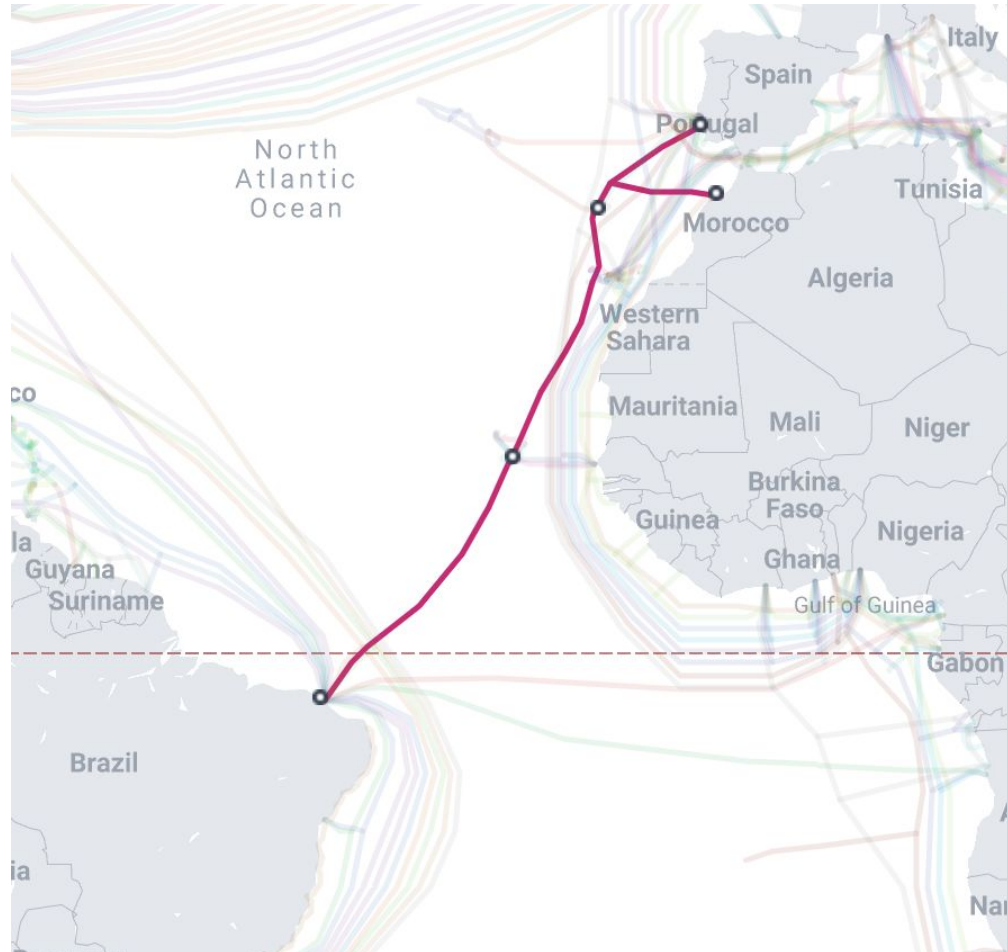
Fort Amador, Panama

Lurin, Peru

Puerto Viejo, Venezuela

St. Croix, Virgin Islands (U.S.)

EllaLink



RFS

2021 June

Cable Length

6,200 km

Owners

EllaLink

Suppliers

ASN

URL

<http://www.ella.link/>

Landing Points

Fortaleza, Brazil

Praia, Cape Verde

Casablanca, Morocco

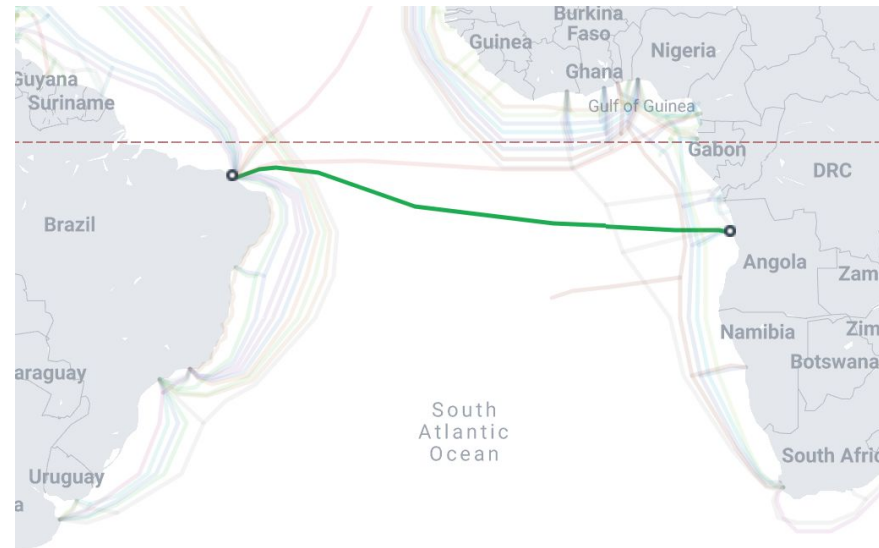
Funchal, Portugal

Sines, Portugal

SACS e SAIL

South Atlantic Cable System

- Fortaleza-Luanda, Angola



RFS

2018 September

Cable Length

6,165 km

Owners

Angola Cables

Suppliers

NEC

URL

<http://www.angolacables.co.ao>

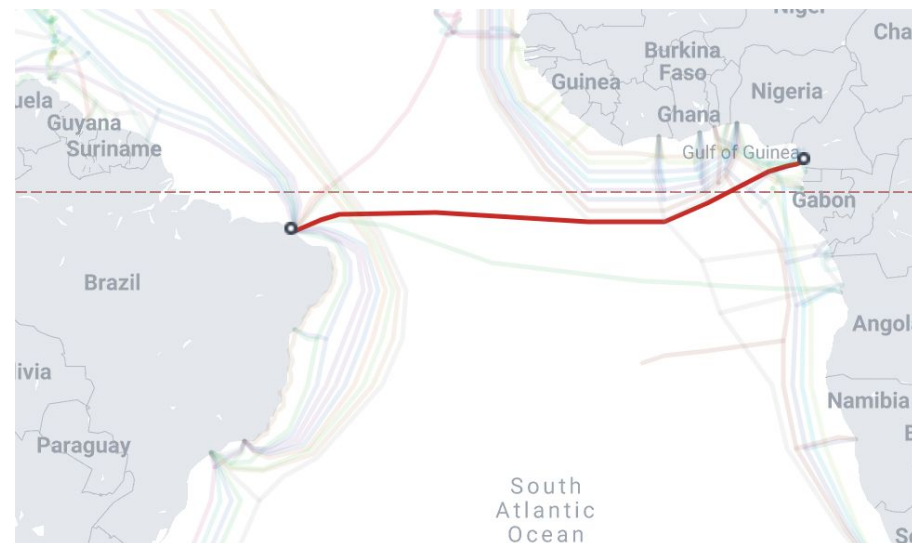
Landing Points

Sangano, Angola

Fortaleza, Brazil

South Atlantic Inter Link

- Fortaleza-Kribi, Camarões



RFS

2020

Cable Length

5,800 km

Owners

Camtel, China Unicom

Suppliers

HMN Tech

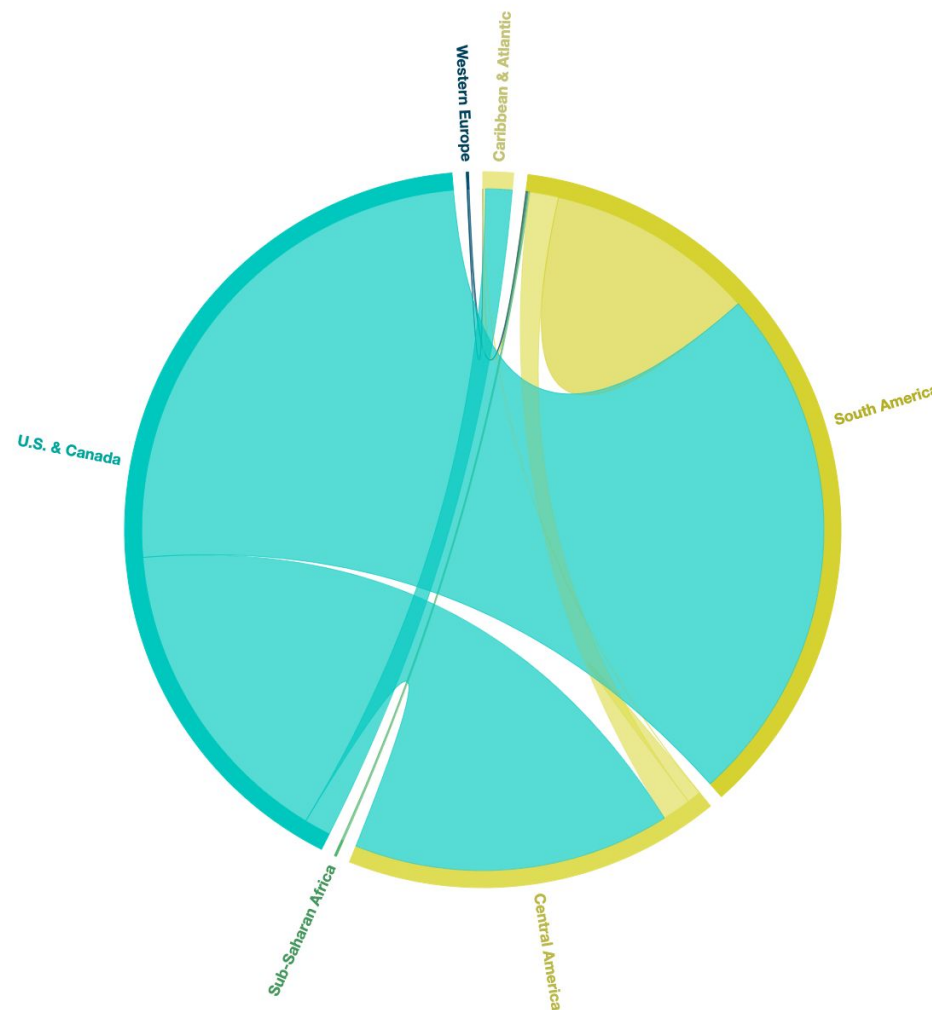
Landing Points

Fortaleza, Brazil

Kribi, Cameroon

Largura de banda à África

- América Latina–EUA: 77,1% do total
- América Latina–América Latina: 22,5%
- América Latina–África: 0,2%
- América Latina–Europa: 0,2%



Terrestre importa: Telxius

Propriedade direta

- ALPAL-2
- AMX-3/Tikal
- BRUSA
- Estepona-Tetouan
- MAREA
- Pacific Caribbean Cable System (PCCS)
- SAT-3/WASC
- South America-1 (SAM-1)
- South Pacific Cable System (SPSC)/Mistral
- Unisur

IRU e/ou capacidade alugada

- Dunant
- Junior
- Tannat



Eletronet

IRU e/ou capacidade alugada

- GlobeNet
- Monet
- Seabras-1



Source: *Global Bandwidth Research Service*

Algar Telecom

Propriedade direta

- Monet



Source: *Global Bandwidth Research Service*

Wirelink



Wirelink



Internet Exchange no Brasil

Mapa da TeleGeography
internetexchangemap.com



TeleGeography Internet Exchange Map

The Internet Exchange Map is a free resource from TeleGeography. Data contained in this map was compiled by TeleGeography and is updated on a regular basis.

To learn more about TeleGeography or this map, please visit www.telegeography.com.

Visit the IXPDB for more detailed IX information.

IXPDB

Feedback [t](#) [f](#) [github](#)

Search

Internet Exchange List

Brazil

Email link

- 103 Norte Rua NO-05
Lote 02
Palmas, Brazil
- A. Roberto Pinto Sobrinho, 350
Building 1 - 4
Jd. Santa Rita de Cassia
Osasco, Brazil

Data center

Mapa da TeleGeography Data Center Research Service



TeleGeography Data Center Research Map

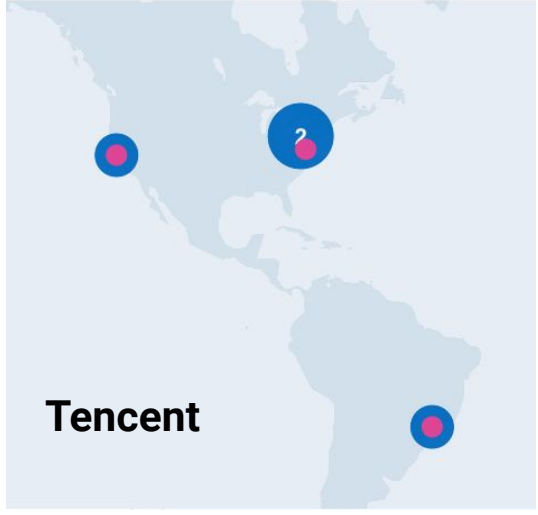
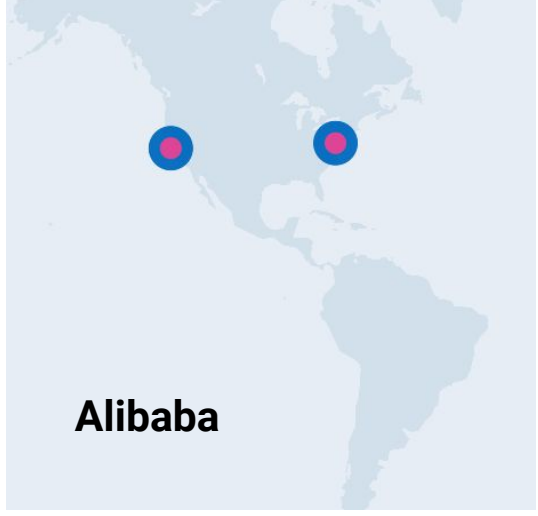
[Feedback](#)

[Reset Search](#)

Country Brazil

- Alameda Araguacema 187
Tamboré
Barueri, Brazil
ODATA SP03
- Alameda Araguaia 3641 - Alphaville
Tambore
Barueri, Brazil
Equinix SP2
- Av. Aruanã, 452
Barueri, Brazil
Omid Solutions BU01 (Barueri)
- Avenida Ceci 1600
Barueri, Brazil, 06460
Scala SP5
- Avenida Ceci 1850
Barueri, Brazil, 06460
Scala SP1

E a nuvem?



Qual o papel do nordeste?

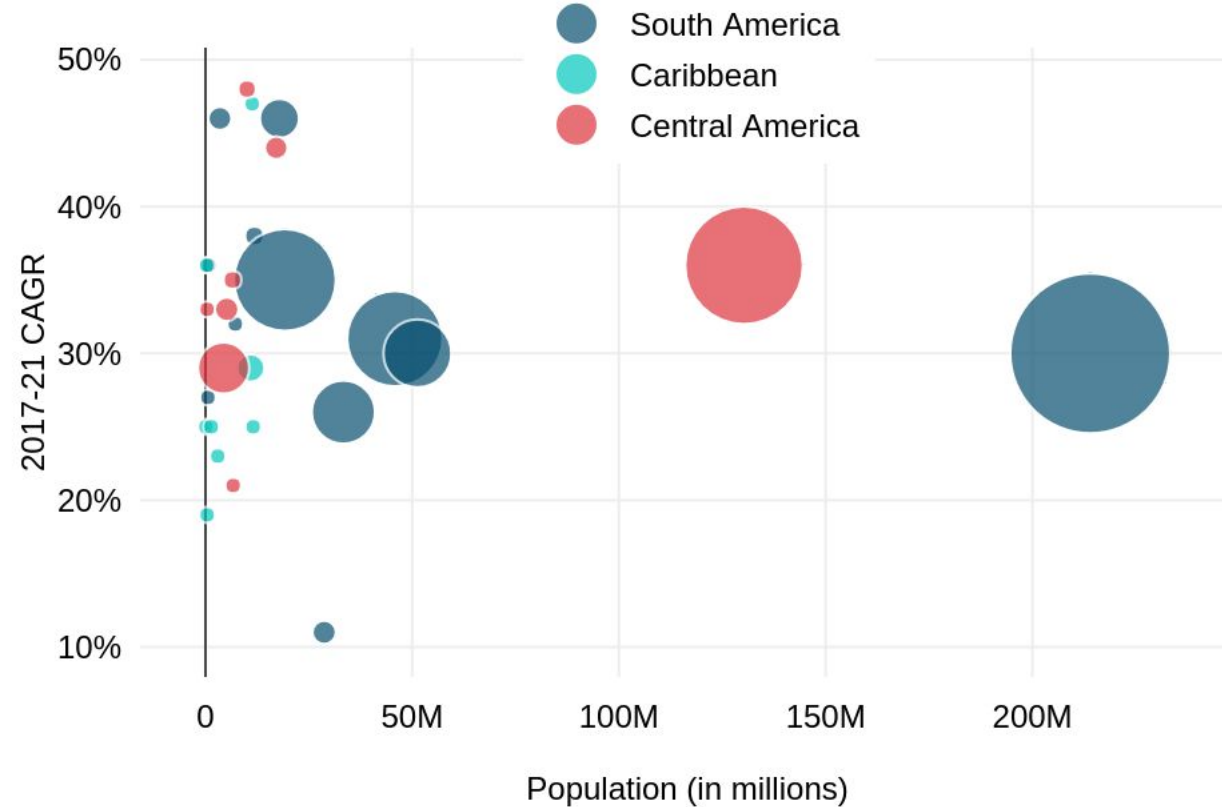
- **População + demanda**
 - Existe potencial para crescer mais
- **Geograficamente estratégico**
 - Fortaleza está perto dos EUA
- **Desenvolvimento regional**
 - Aumento de conectividade
 - Investimento geral

Capacidade

Demanda

Brasil

- Capacidade 2021: 54,982 Gbps
- População: 213m
- CAGR 2017-21: 30%



Transporte ao Brasil

- Capacidade internacional usada em 2022: 74.142 Gbps
- O preço de transporte fica mais barato
 - 100 Gbps no Miami—São Paulo: \$12.000+

Transport

Global Bandwidth Forecast Service

54,997

Forecast International Capacity Used (Gbps)

Chart shows historical data + forecasts for next 7 years. Value shows most recent year.



Global Bandwidth Research Service

50

Transport-Level Carriers



Global Bandwidth Research Service

17

Submarine Cables



Pricing Suite - Waves

\$5,250

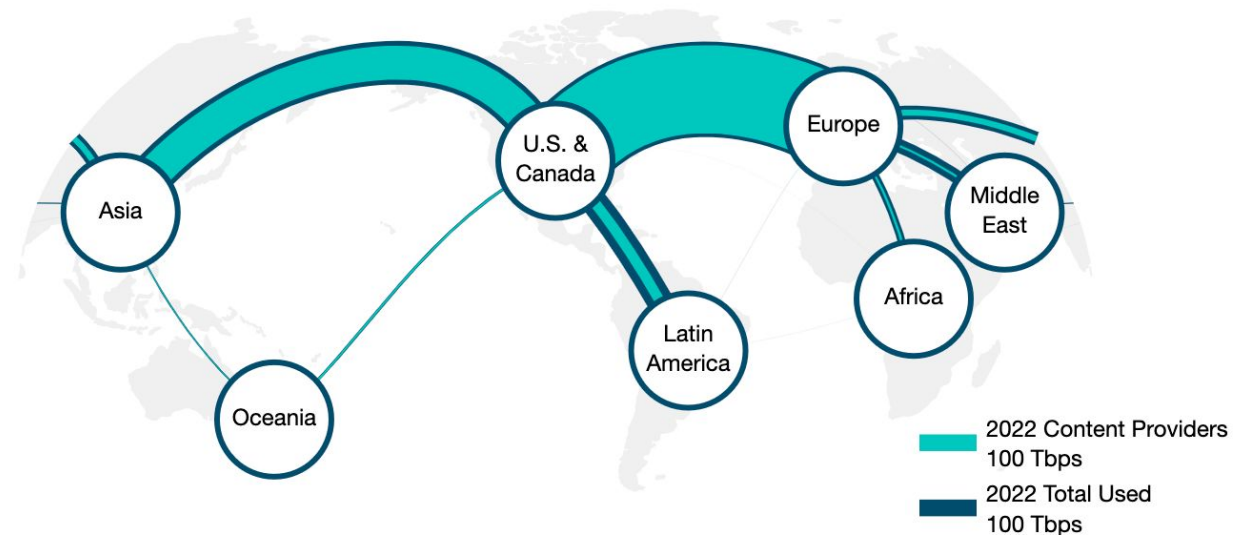
Transport Price

Transport weighted median price: Porto Alegre-São Paulo 10G MRC



Largura de banda internacional usada por rota

- **Brasil–EUA: 81,5%**
- **Argentina–Brasil: 11,9%**
- **Brasil–Peru: 2,3%**
- **Brasil–Chile: 1,3%**



Empresas ativas

- AFRIX Telecom
- Algar Telecom
- Aloo Telecom
- Angola Cables
- AT&T
- Avelacom
- BICS
- Blackburn Networks
- BR.Digital Telecom
- BSO
- BT
- China Mobile
- China Telecom Group
- China Unicom
- Chunghwa Telecom
- Cirion Technologies
- Eletronet
- EllaLink
- Embratel
- Flō Networks
- Forte Telecom
- GlobeNet
- Gold Data
- GoldConnect
- Gtd
- GTT
- Internexa
- IPTP Networks
- Mob Telecom
- Neterra
- Nova Soluções
- NTT Communications
- Orange
- Paratus
- PCCW Global
- Seaborn Networks
- Silica Networks
- SoftBank Corp
- T-Mobile
- Tata Communications
- Telebras
- Telecom Italia Sparkle
- Telefonica
- Telstra
- Telxius
- TIM Brasil
- Ufinet
- V.tal
- Verizon
- Vodafone
- Wirelink
- Zayo

Trânsito IP no Brasil

- Capacidade de largura de banda da internet internacional em 2022: 38.622 Gbps
- O preço de trânsito fica mais competitivo
 - Porto de 10 GigE no Rio, São Paulo, Fortaleza: R\$1+

Internet Backbones

Global Internet Geography

38,622

International Internet Capacity (Gbps)

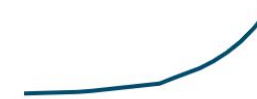


IP Transit Forecast Service

44,462

Forecast IP Transit Volumes (Gbps)

Chart shows historical data + forecasts for next 7 years. Value shows most recent year.



Global Internet Geography

9,343

Registered ASNs



Internet Exchange Map

41

Internet Exchanges



Pricing Suite - IP Transit

\$0.30

IP Transit Price per Mbps

IP Transit weighted median price: 100 GigE MRC



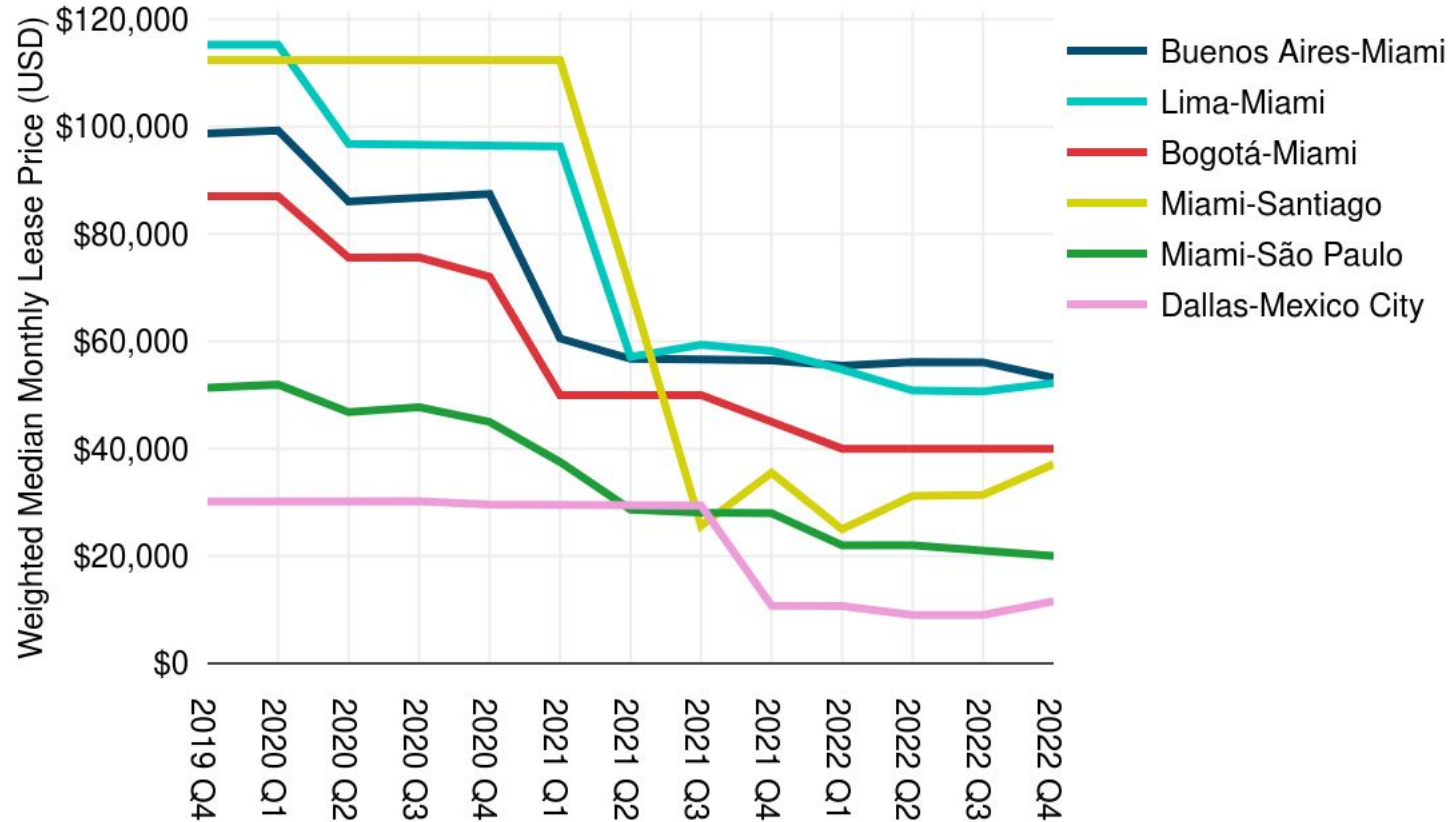
Tráfego por região metropolitana

- Fortaleza é #7 na América Latina
 - Tráfego da internet internacional
- 7.184 Gbps em 2022
 - Cresceu 35% entre 2018-22
- #1 São Paulo
- #2 Buenos Aires
- #3 Cidade do México

Tráfego entre regiões metropolitanas

- Fortaleza–Miami é #4 na América Latina
 - Tráfego da internet internacional por rota
- 4.330 Gbps em 2022
 - Cresceu 26% entre 2018-22
- #1 Miami–São Paulo
- #2 Miami–Rio de Janeiro
- #3 Dallas–Monterrey

Apreçamento 100 Gbps



- **Fortaleza-Miami:**
\$15.000+

Olhando pro futuro

Previsão de largura de banda usada: 2023

- O Brasil está atualmente #18 no mundo
 - ~101.000 Gbps estimado
- #1 EUA
- #2 Alemanha
- #17 Índia

Previsão de largura de banda usada: 2029

- O Brasil está estável
 - #19 com ~516.000 Gbps
- #1 ainda EUA
- #2 Alemanha
- #17 Índia
- #18 Taiwan

Qual o papel do nordeste?

- Mercado local
 - Região do Brasil com espaço para aumentar demanda
- Presença internacional
 - Existem os recursos para se tornar um *hub*
- Potencial para diversificar o mercado brasileiro
 - Mais do que São Paulo e o Rio?

Muito obrigado

Peter Wood

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pwood@telegeography.com