TeleGeography

African Network Geography Update

Patrick Christian

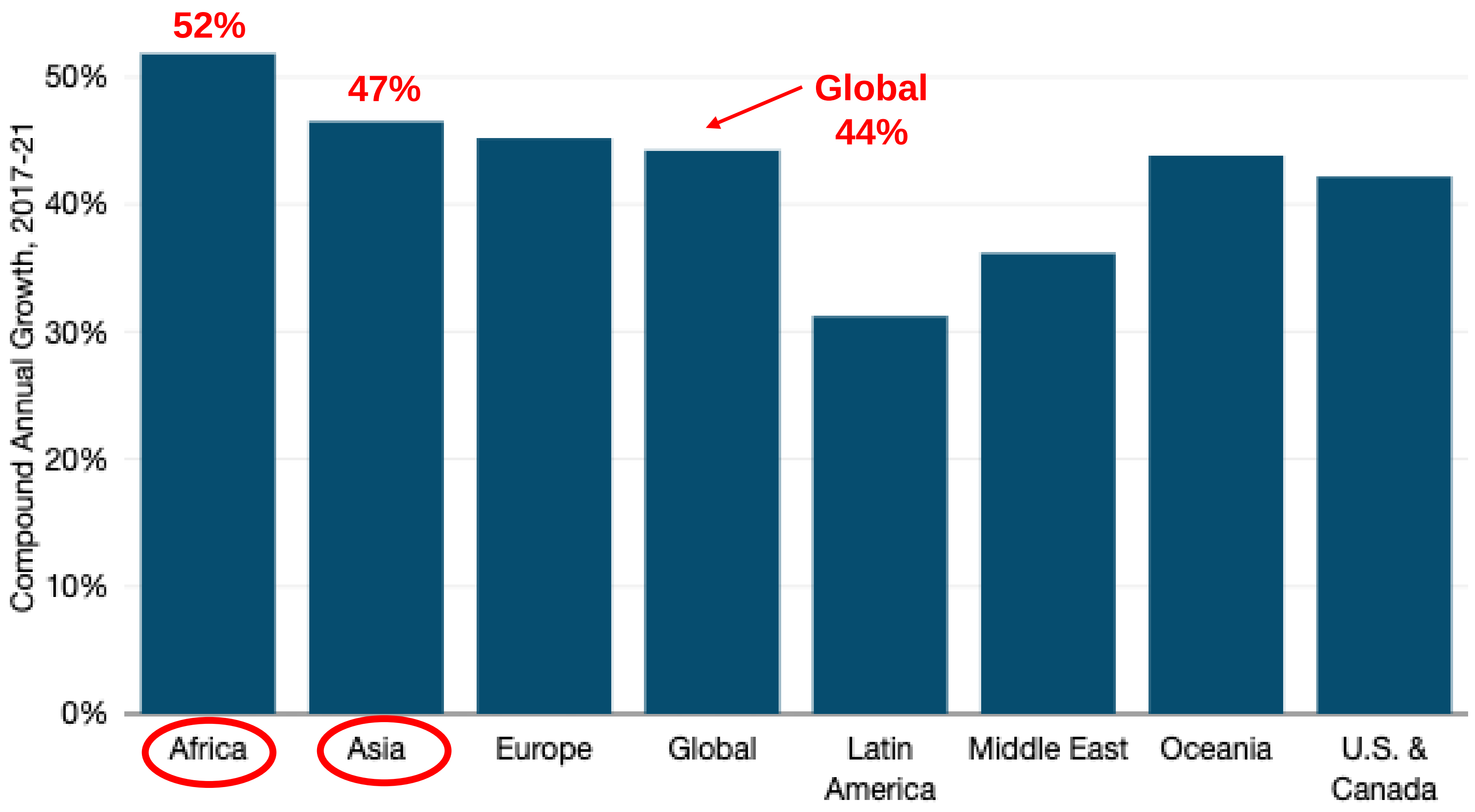
AfPIF 2022 Kigali
August 23, 2022

What we'll cover

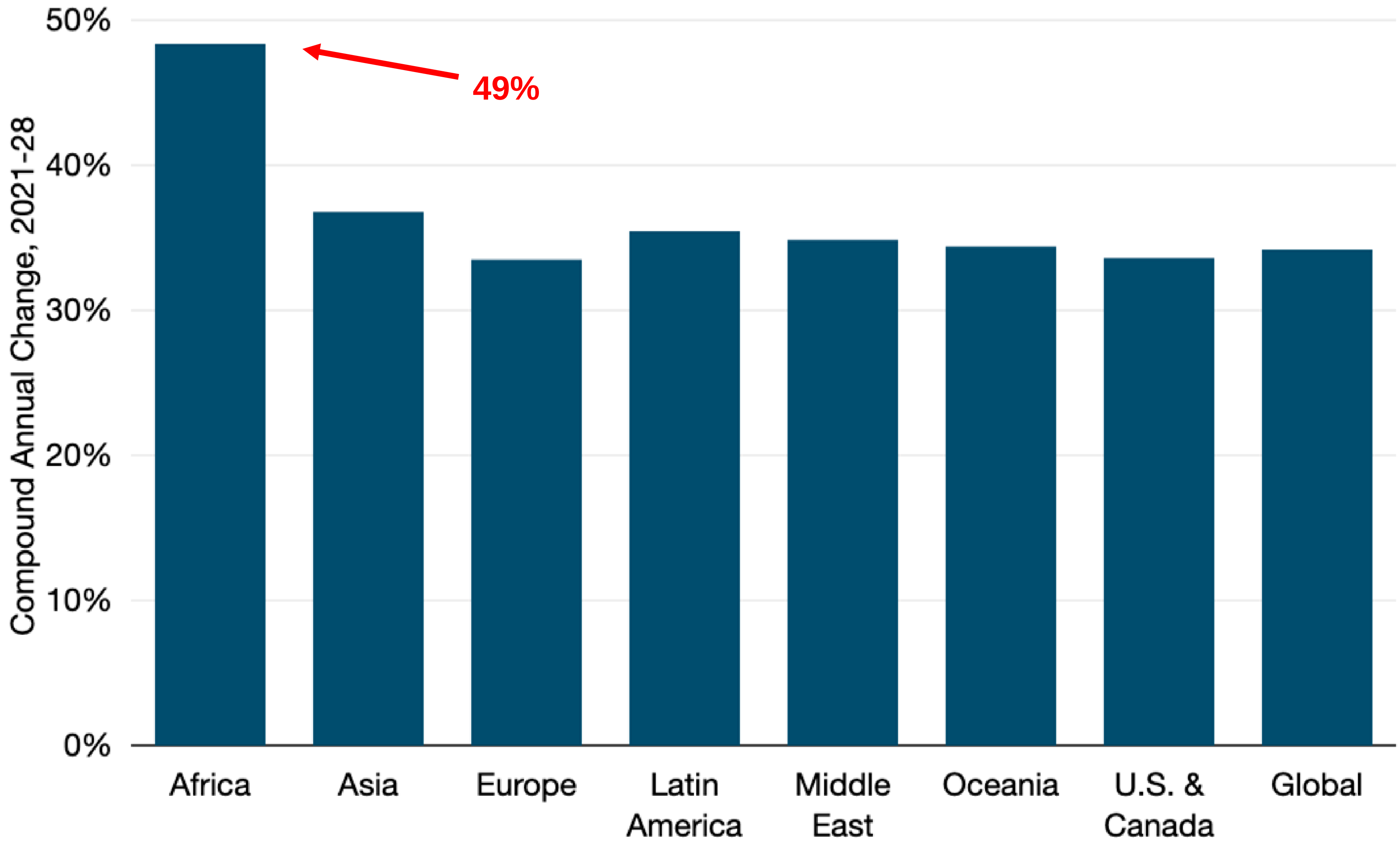
- Global Bandwidth trends
  - How is int'l bandwidth growing? What is driving demand?
  - Where are sub cables landing?
  - How fast are global prices falling
- Africa trends
  - Inter-regional & intra-African route growth
  - New (content) sub cables are coming
  - Price erosion on key African routes, IPT vs pipe and port
- End-user demand growth in Africa
  - Where we are seeing growth in end-user demand
  - Looking ahead for future growth in mobile and fixed broadband

Global Network Trends

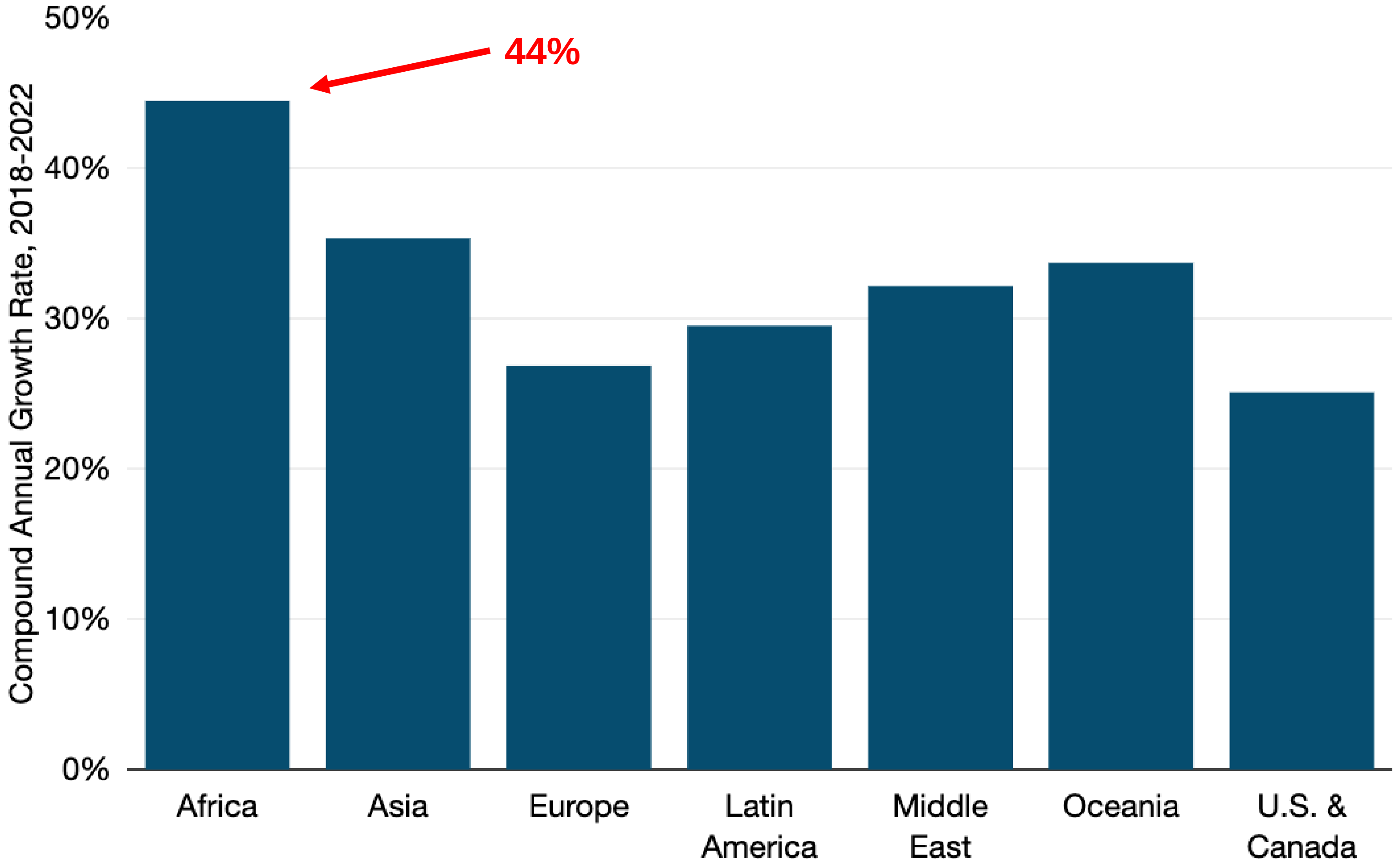
International bandwidth growth by region



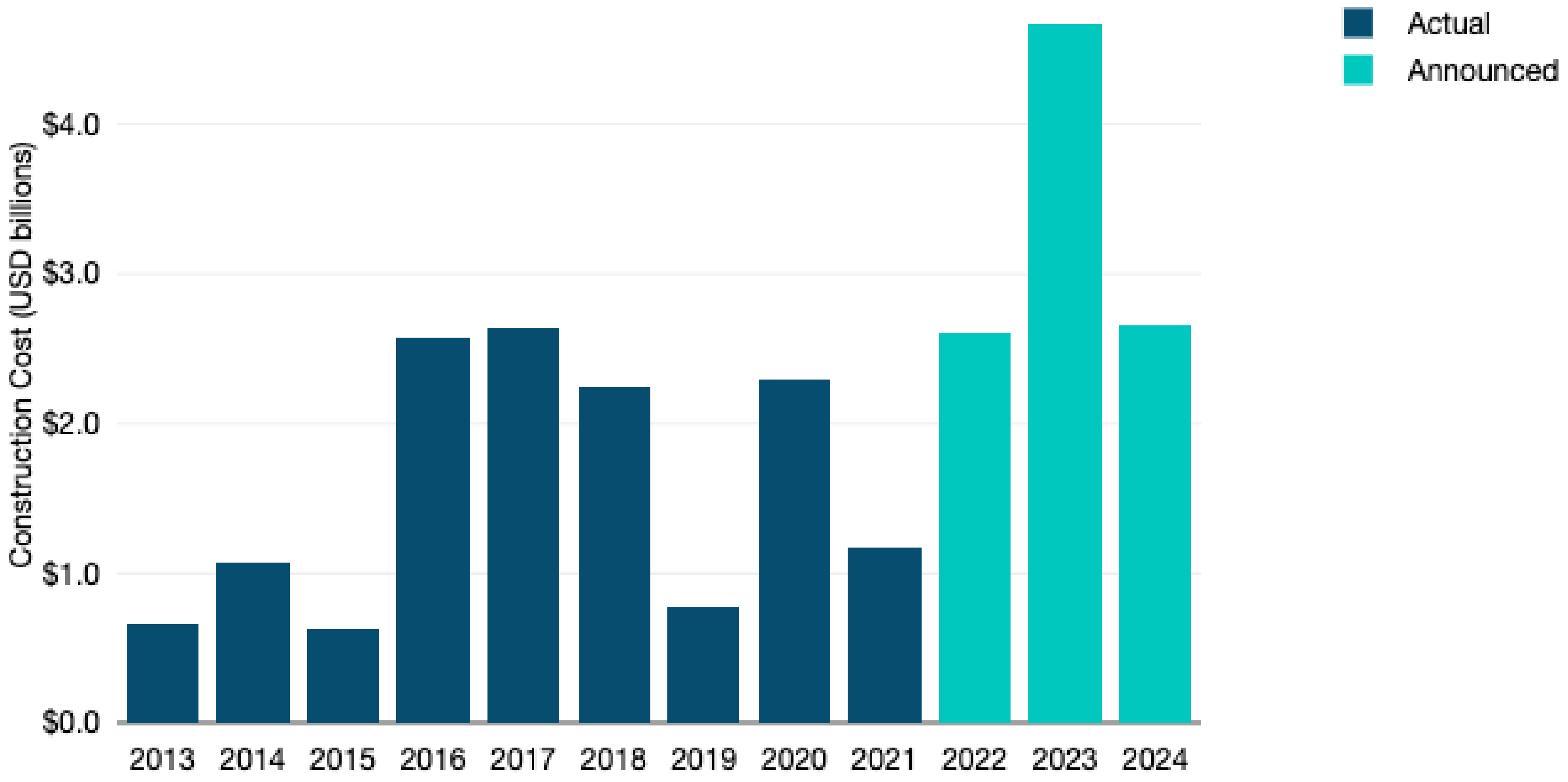
Forecasted bandwidth growth by region



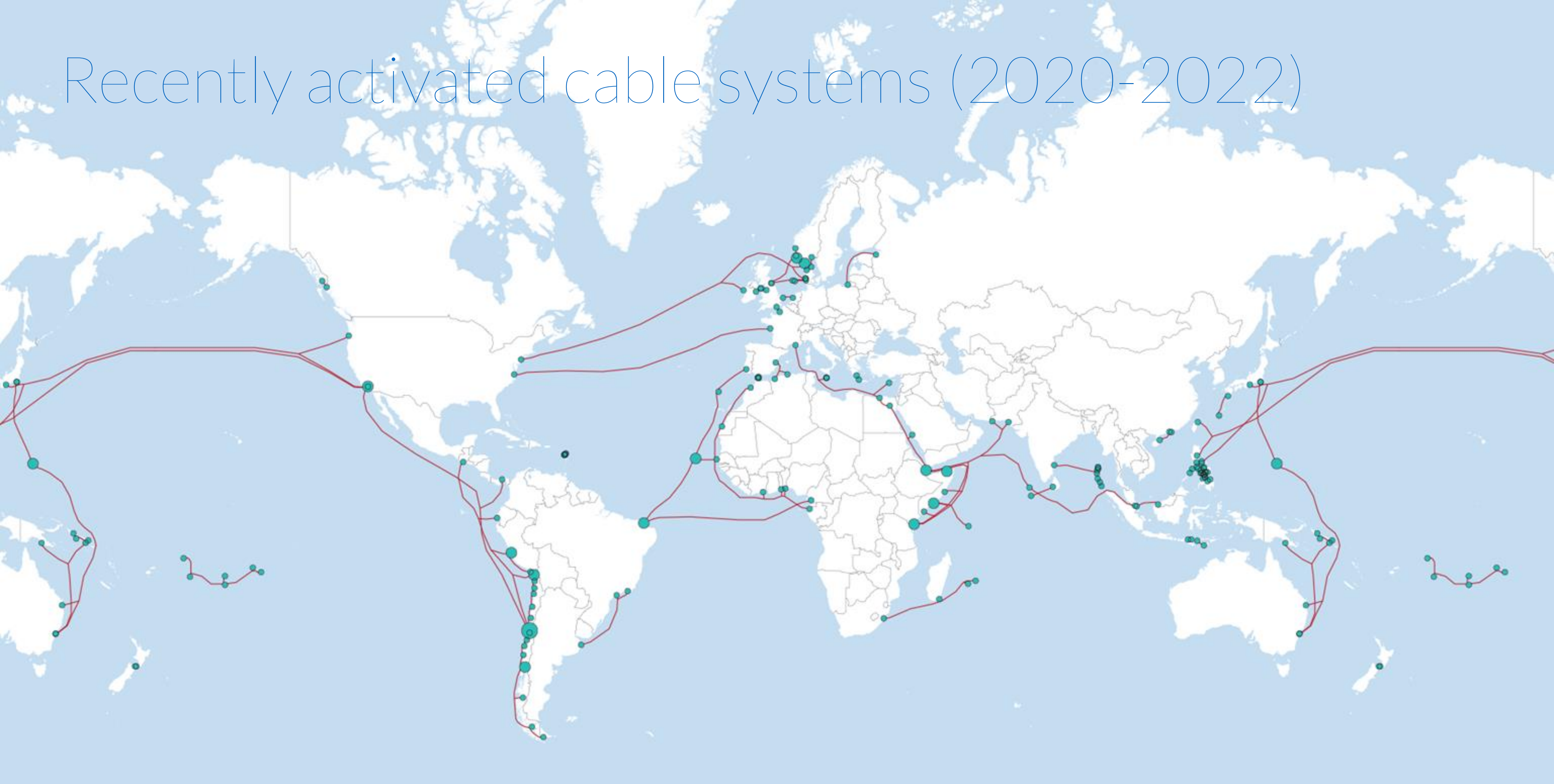
International Internet Bandwidth Growth by Region



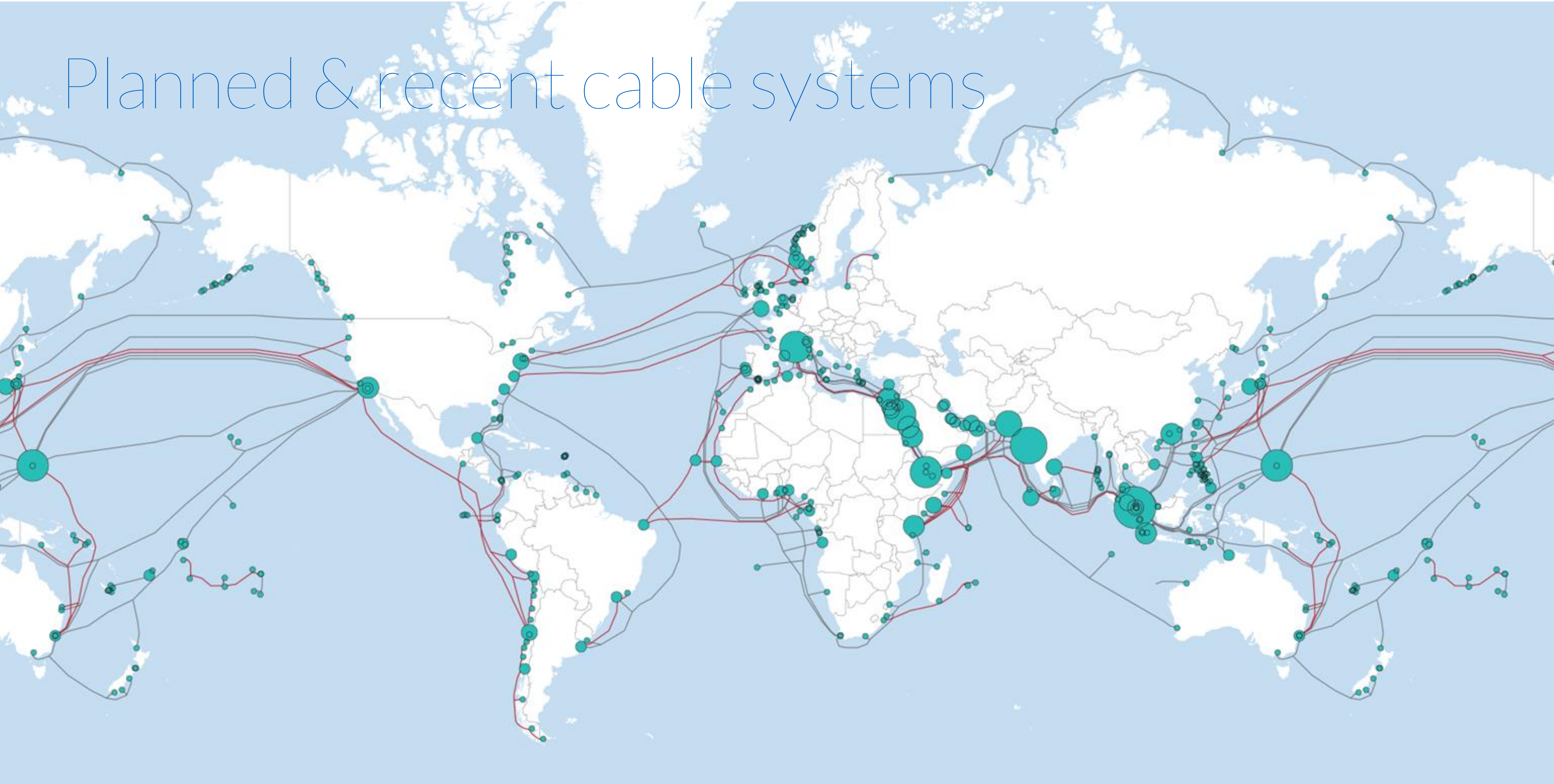
Submarine cable investment



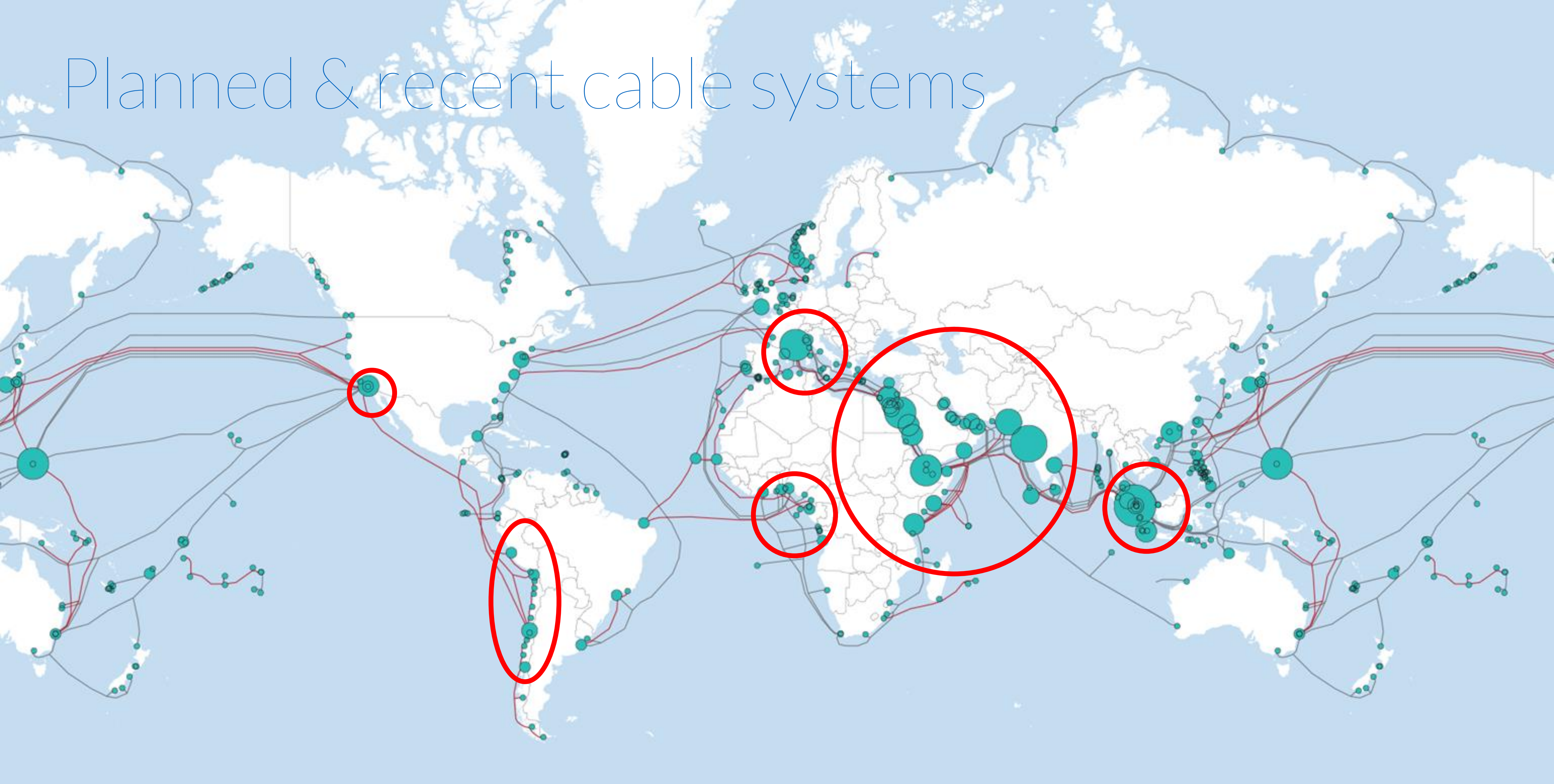
Recently activated cable systems (2020-2022)



Planned & recent cable systems



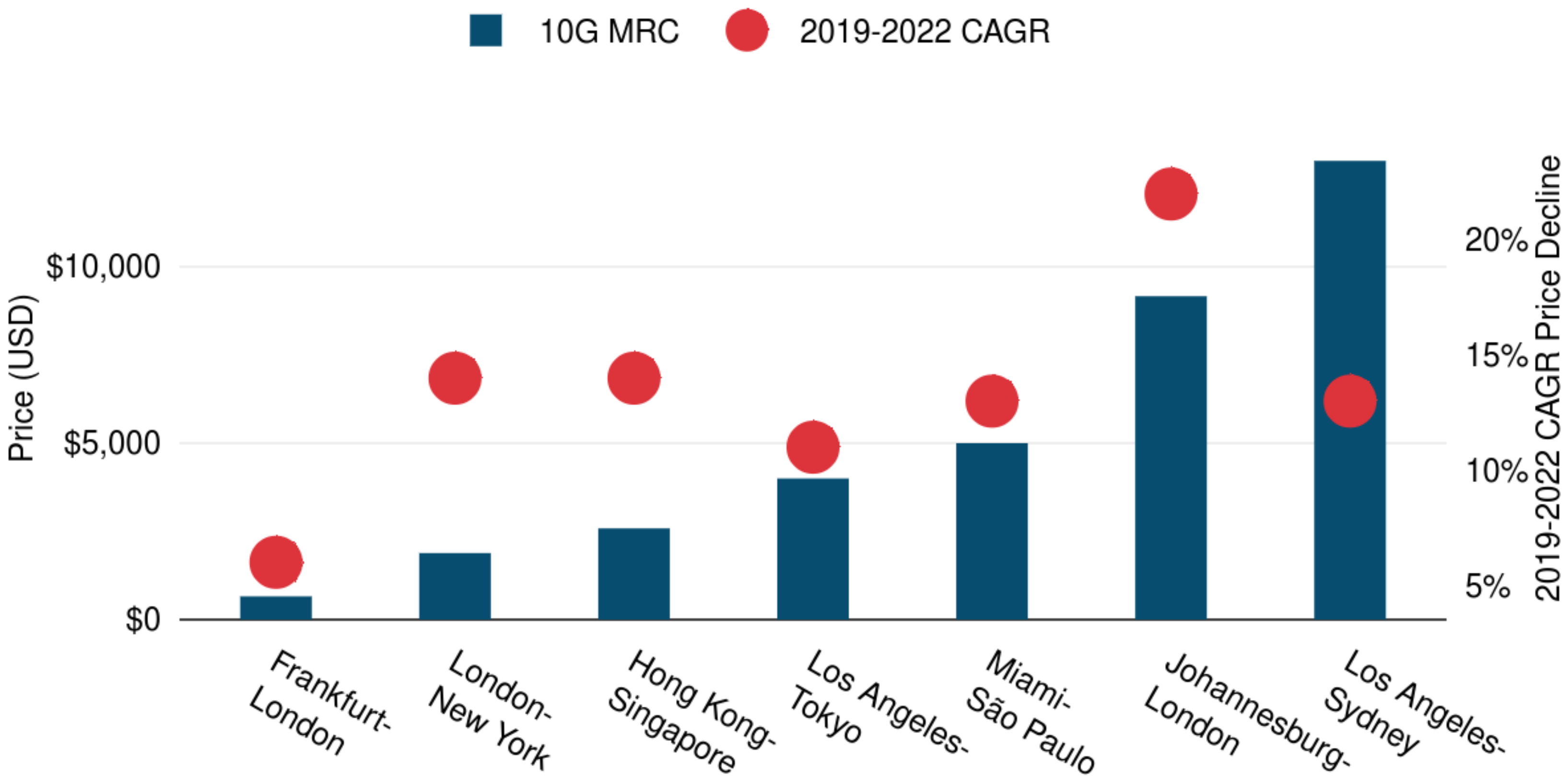
Planned & recent cable systems



Planned cloud data centers

10 Gbps median prices and erosion rates varies by route

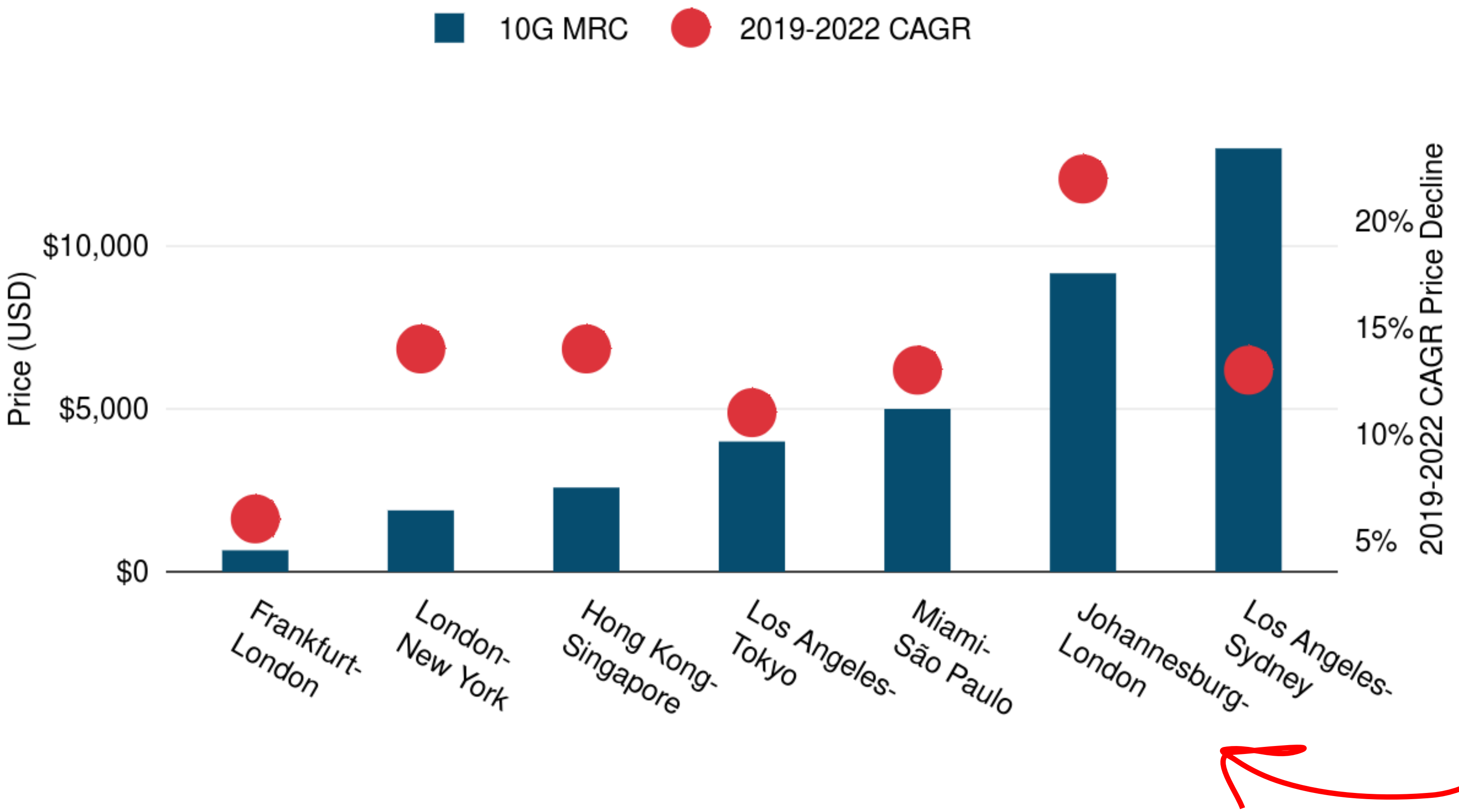
Weighted Median 10 Gbps Wave Prices & CAGR Price Decline on Select Int'l Routes



- Jo'burg has one of highest erosion rates
- Jo'burg only lower than outliers LA-Sydney
- Following lead of Miami-Sao Paolo

10 Gbps median prices and erosion rates varies by route

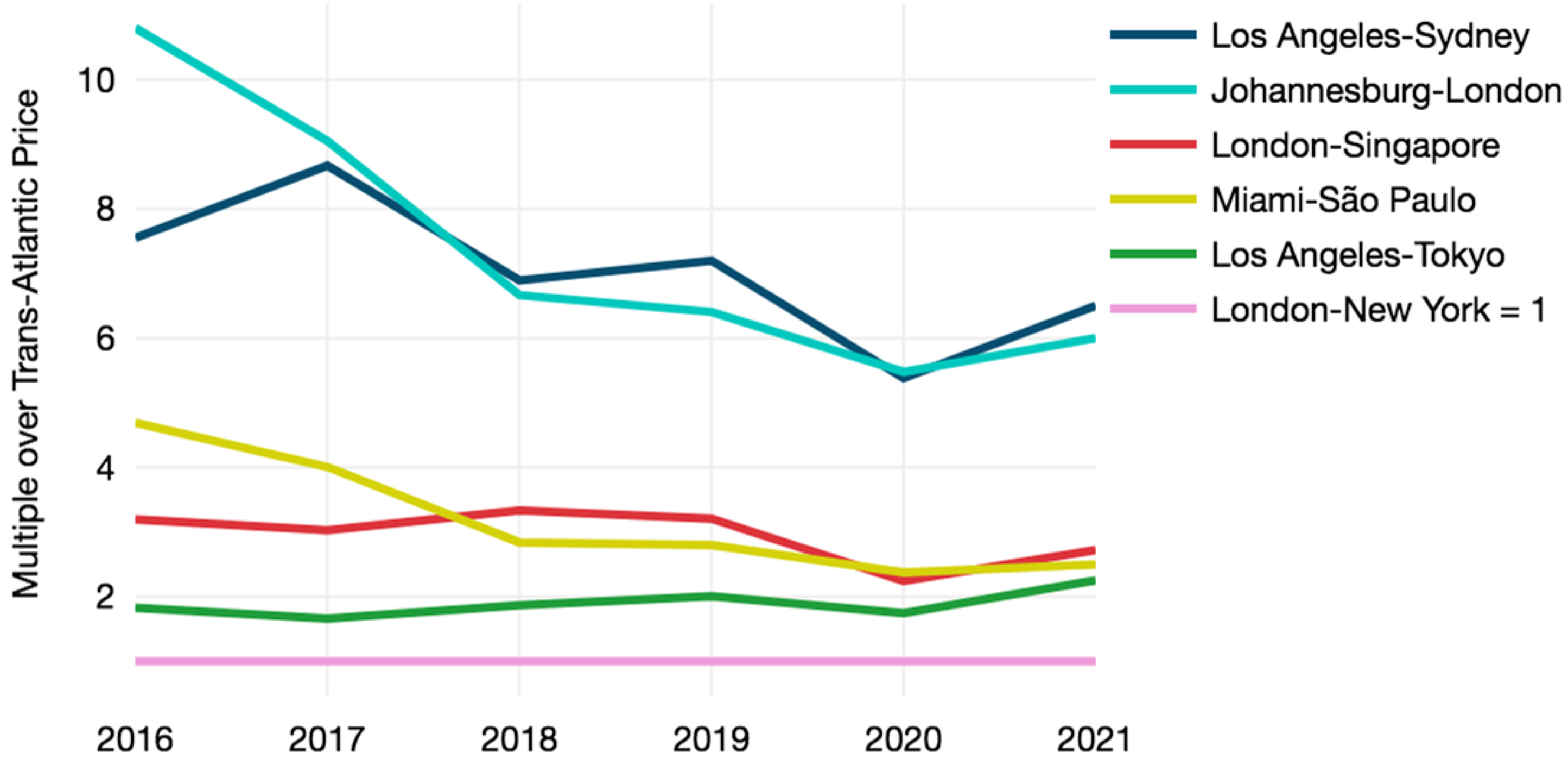
Weighted Median 10 Gbps Wave Prices & CAGR Price Decline on Select Int’l Routes



- Jo’burg has one of highest erosion rates
- Jo’burg only lower than outliers LA-Sydney
- Following lead of Miami-Sao Paolo

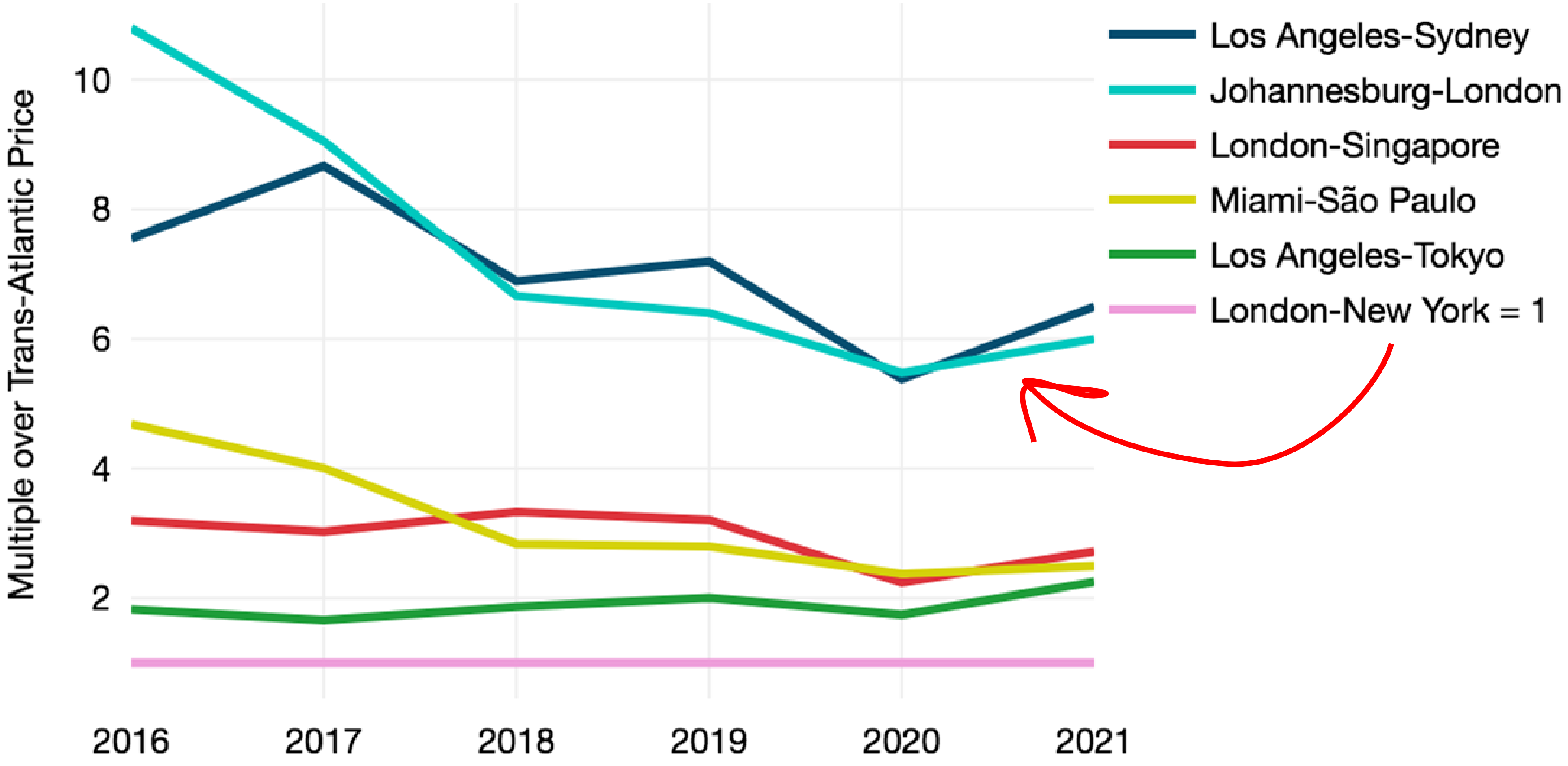
10 Gbps prices starting to converge

Weighted Median 10 Gbps Monthly Lease Prices on Key Int'l Routes Relative to London-New York



10 Gbps prices starting to converge

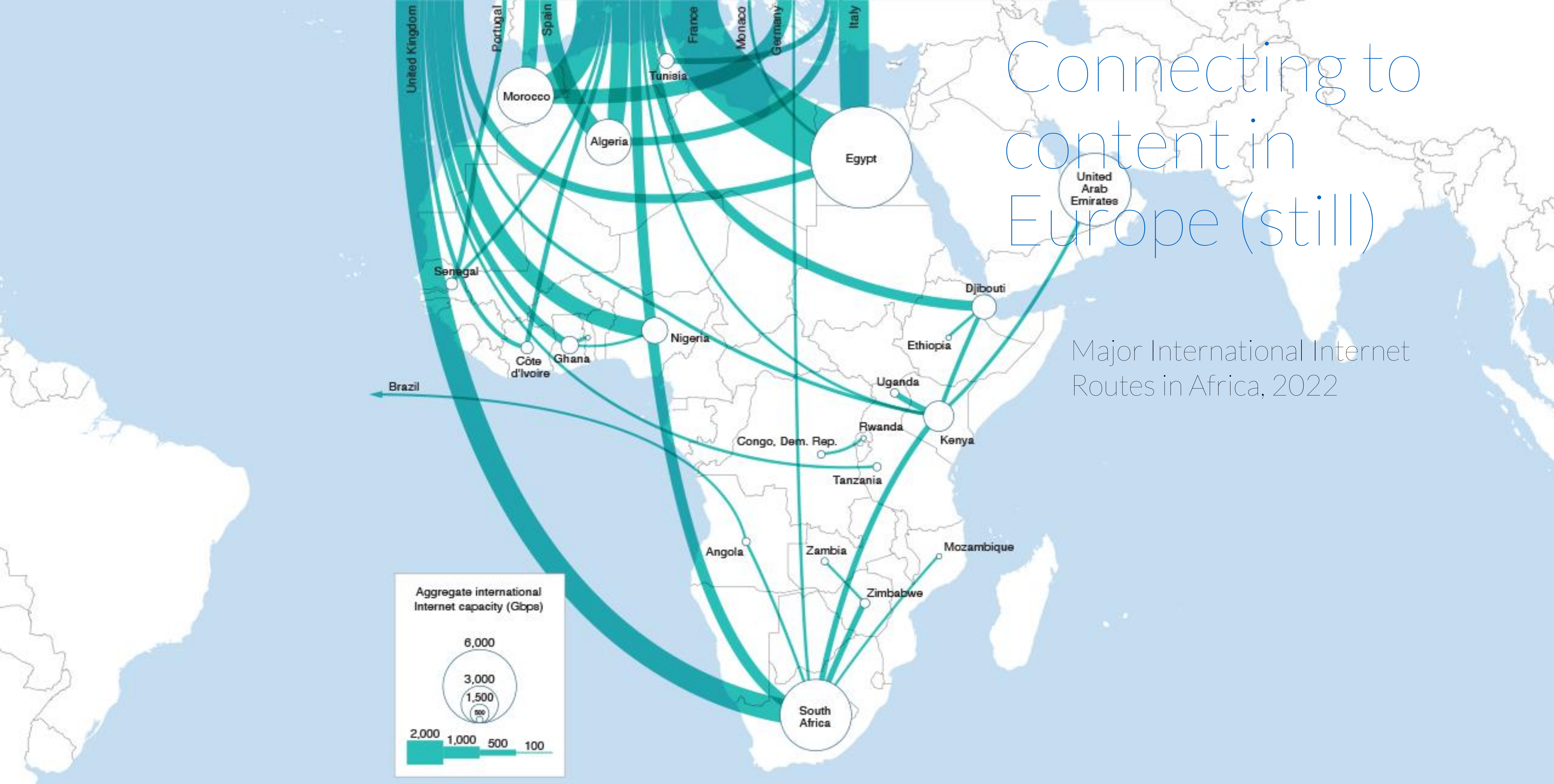
Weighted Median 10 Gbps Monthly Lease Prices on Key Int'l Routes Relative to London-New York



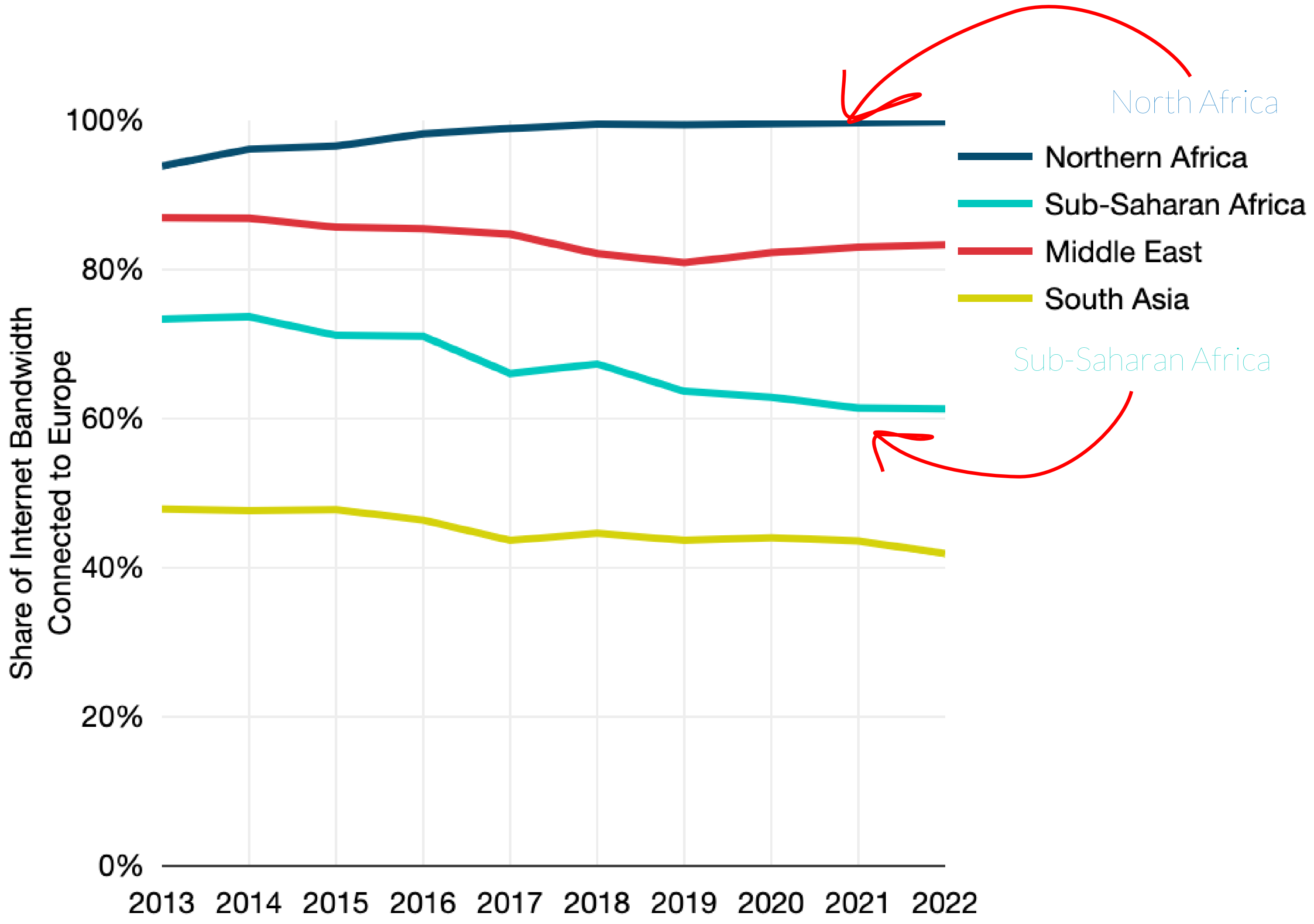
Africa Bandwidth Trends

Connecting to content in Europe (still)

Major International Internet Routes in Africa, 2022

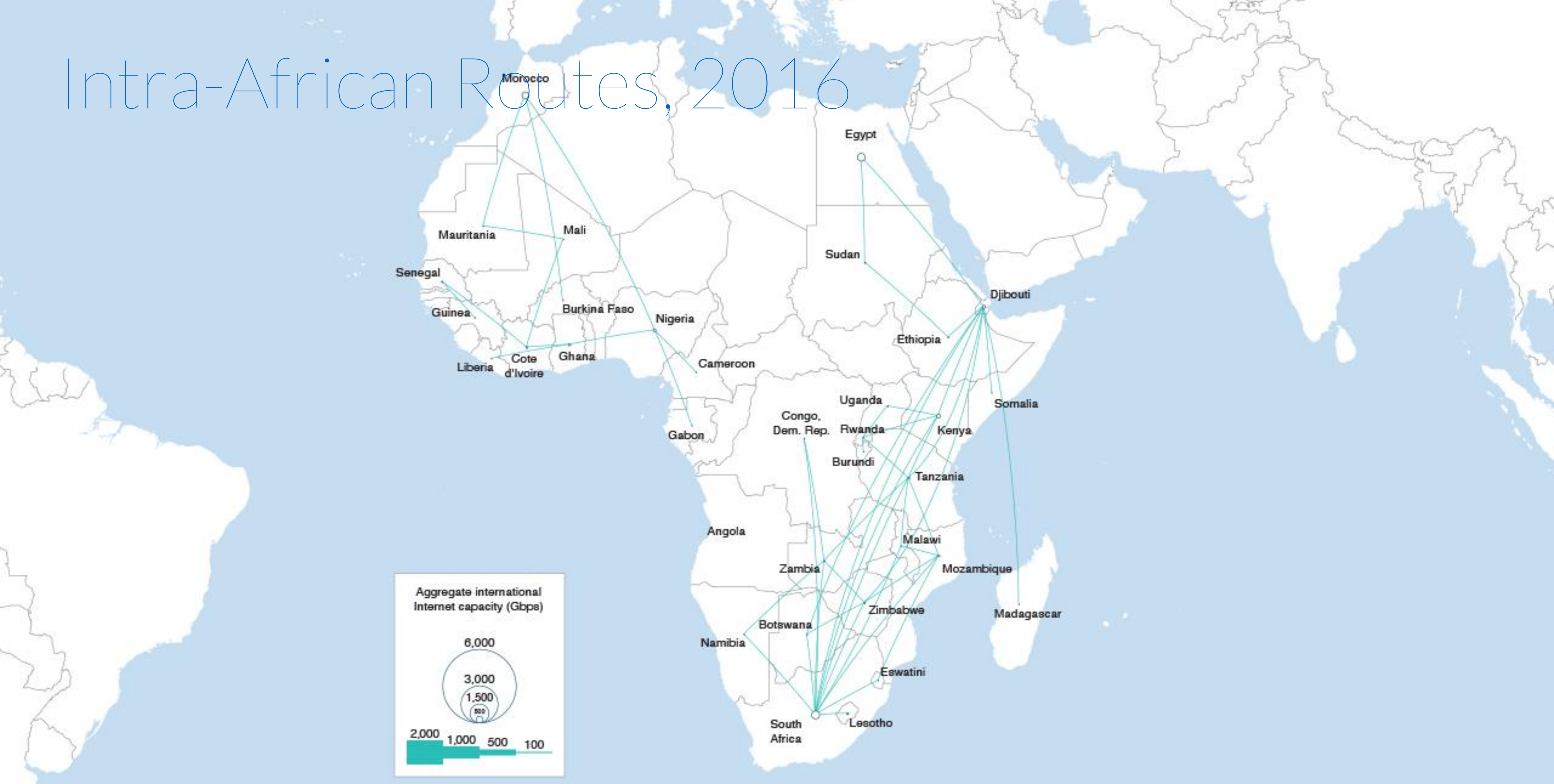


Changes in Subregional Capacity Connected to Europe

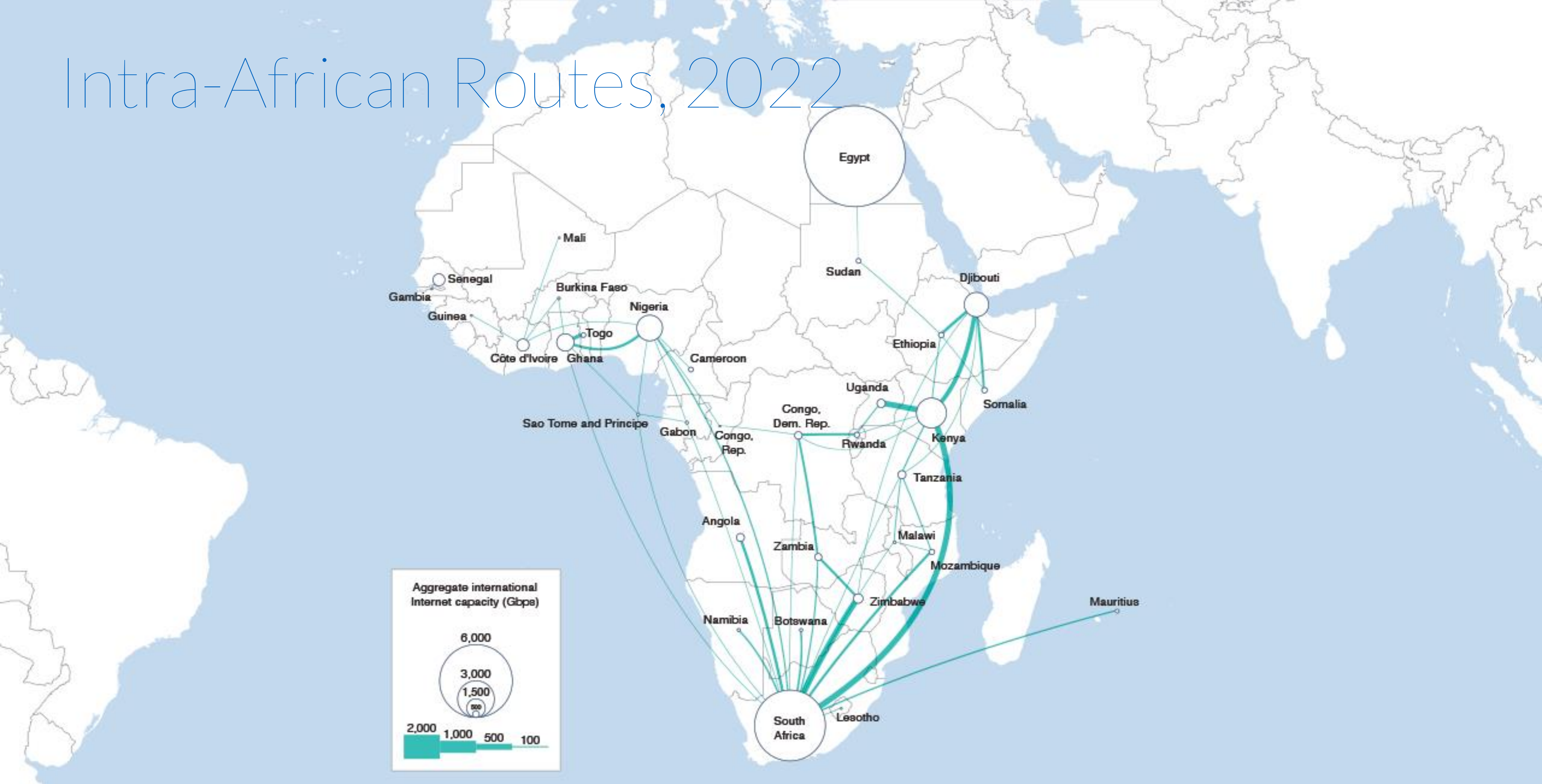


- Total Africa-Europe connectivity has hovered around 80% for the past 5 years
- North Africa's international connectivity is almost 100% to Europe
- While Sub-Saharan Africa's share of connectivity to Europe has dropped to about 60%

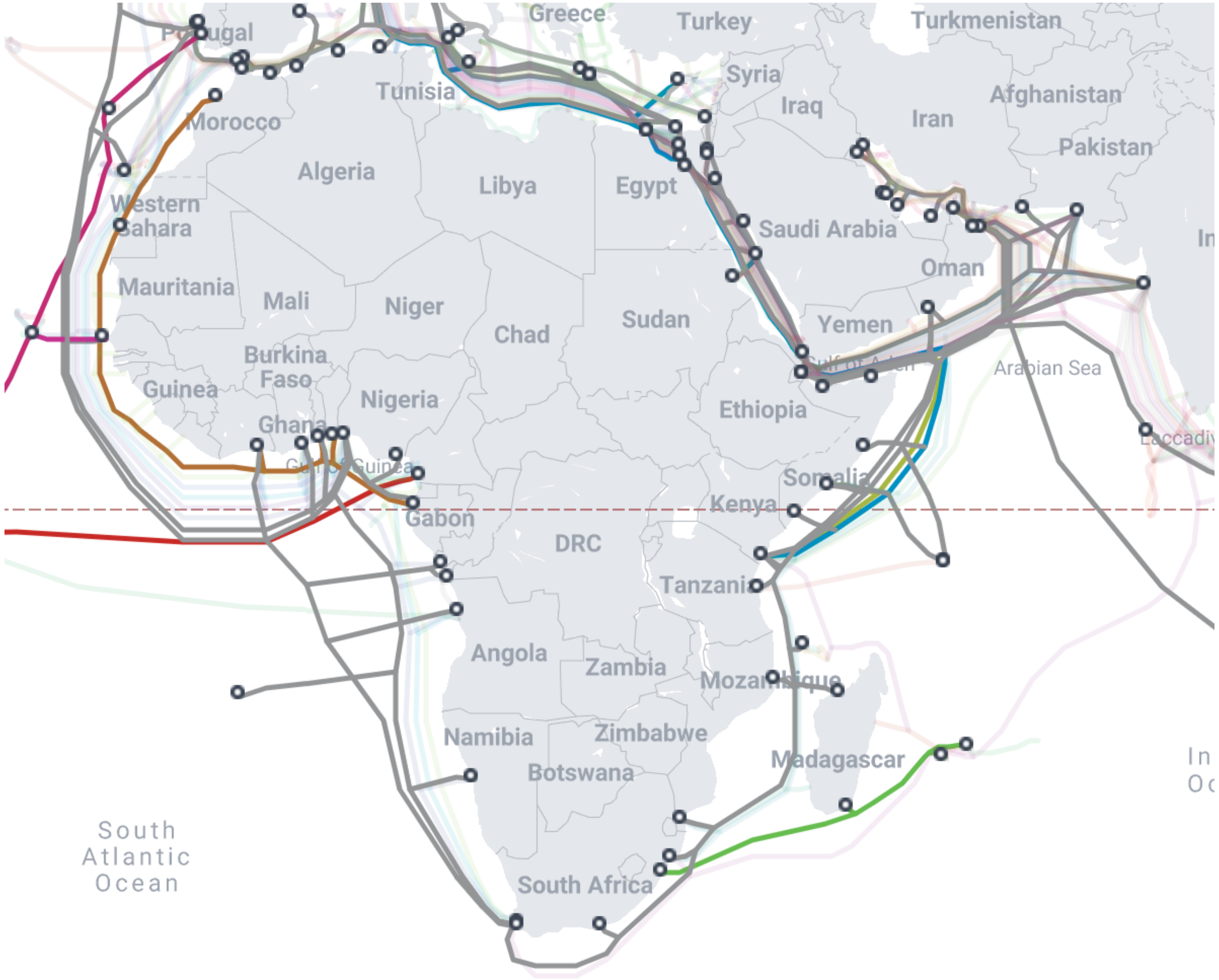
Intra-African Routes, 2016



Intra-African Routes, 2022

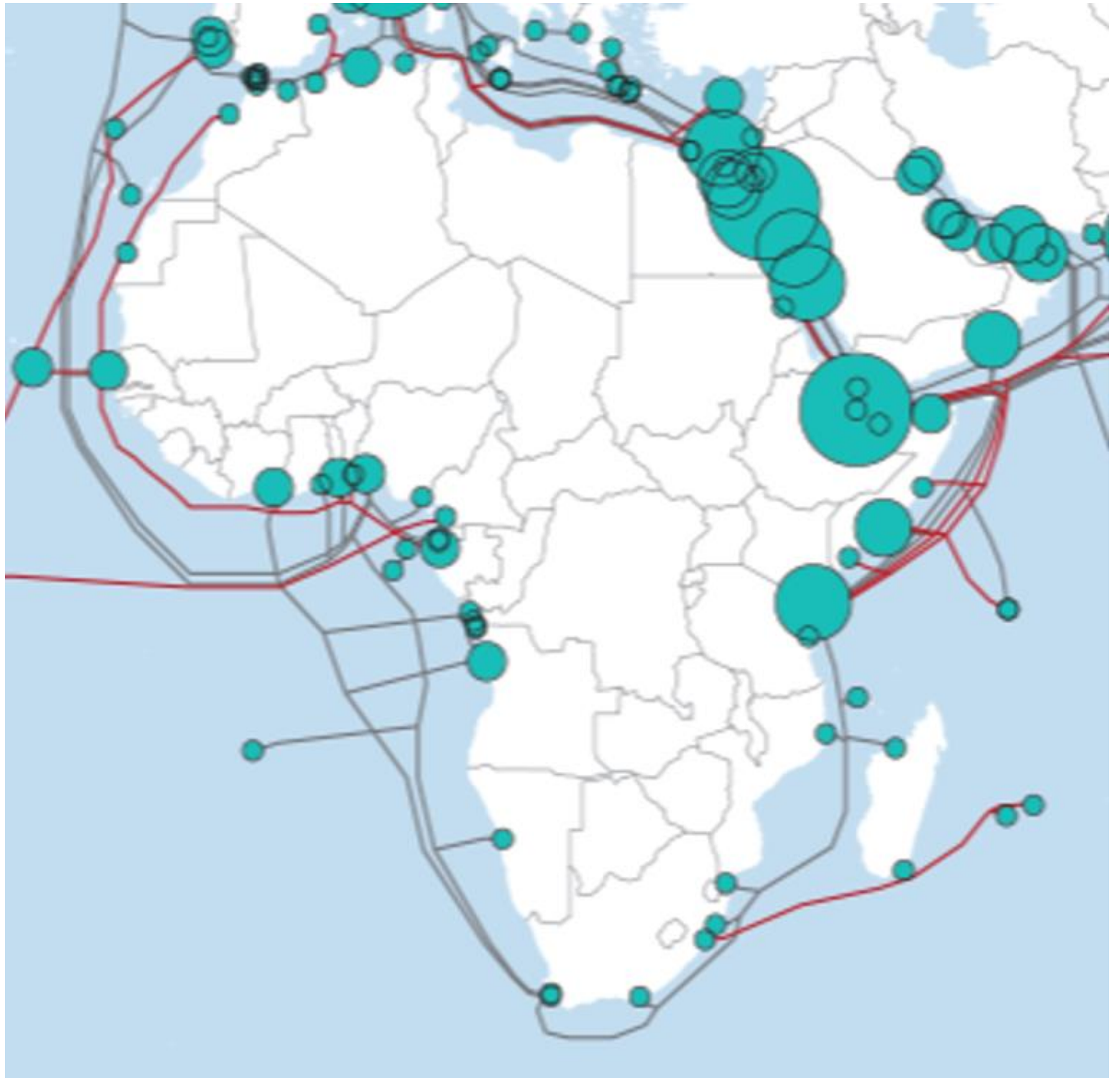


Changes in Subregional Capacity Connected to Europe



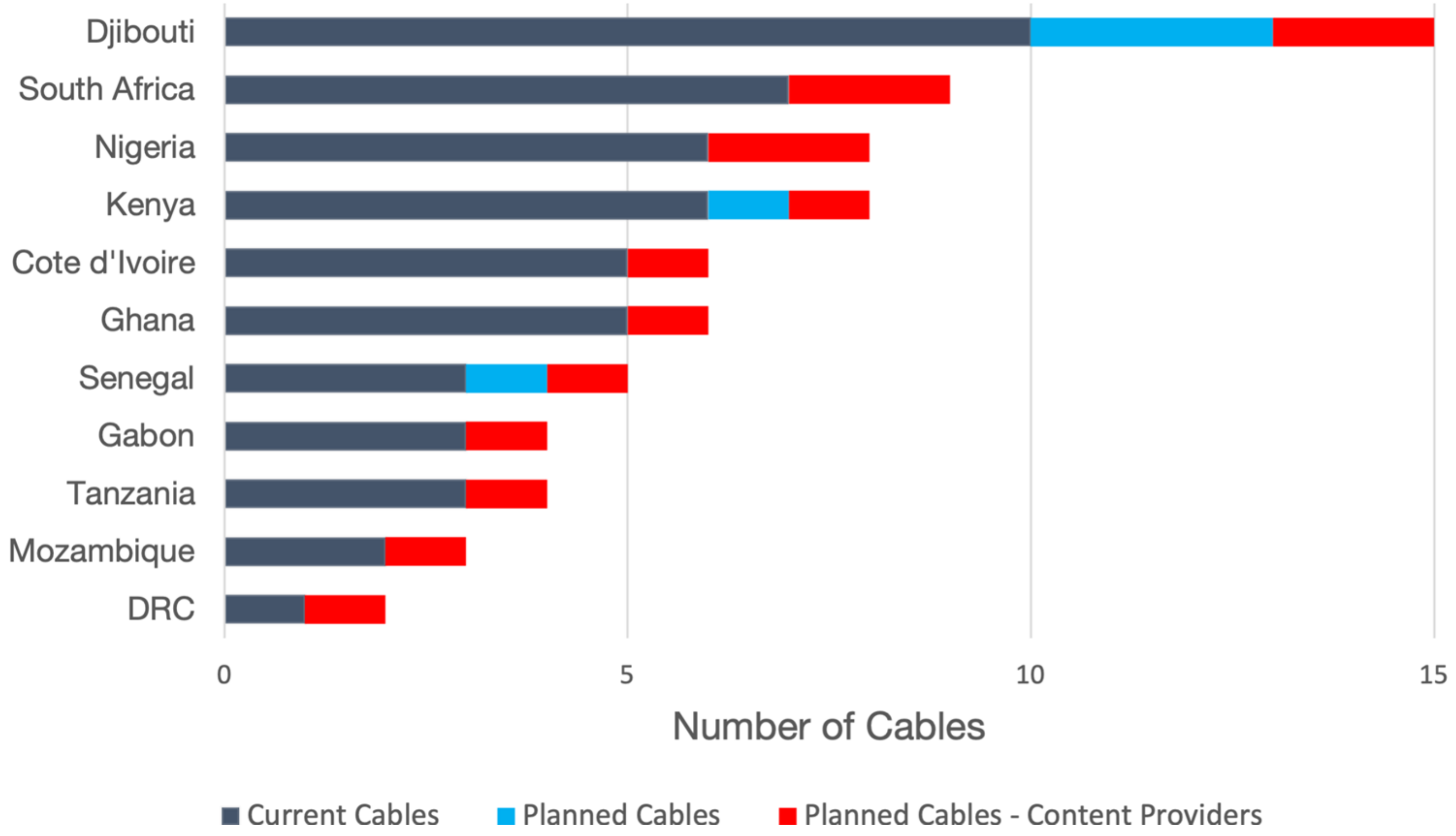
- Equiano – NG, NA, TG, ZA, PT, SH
- 2Africa – 35 African, ME, Europe & South Asia countries
- Africa-1 – Egypt, Saudi Arabia, UAE, Djibouti, Kenya, PK
- Raman – Saudi Arabia, Jordan, Oman, Djibouti, India
- IEX – Saudi Arabia, Djibouti, Egypt, Oman, India, Italy
- Medusa – N Africa + S Europe
- SeaMeWe-6 – EG, DJ, SA, PK, LK, IN, BD, MY, SG, FR

Planned sub cable landings



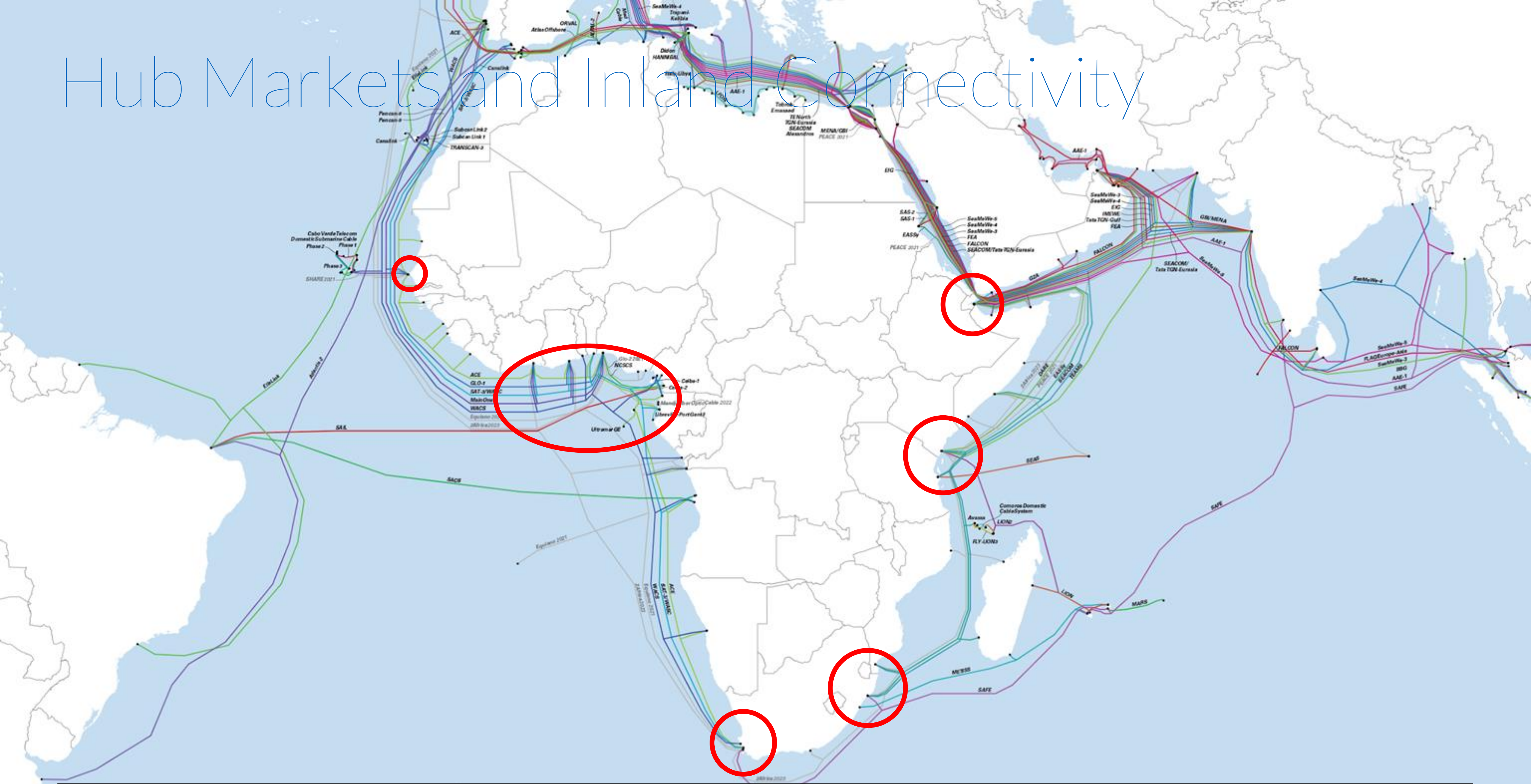
- Highest number of planned landings in East/NE
  - More concentrated—in just 3 locations
- West has similar number of landings but spread out among more than 12 countries
- South Africa has 5 different locations

Changes in Subregional Capacity Connected to Europe

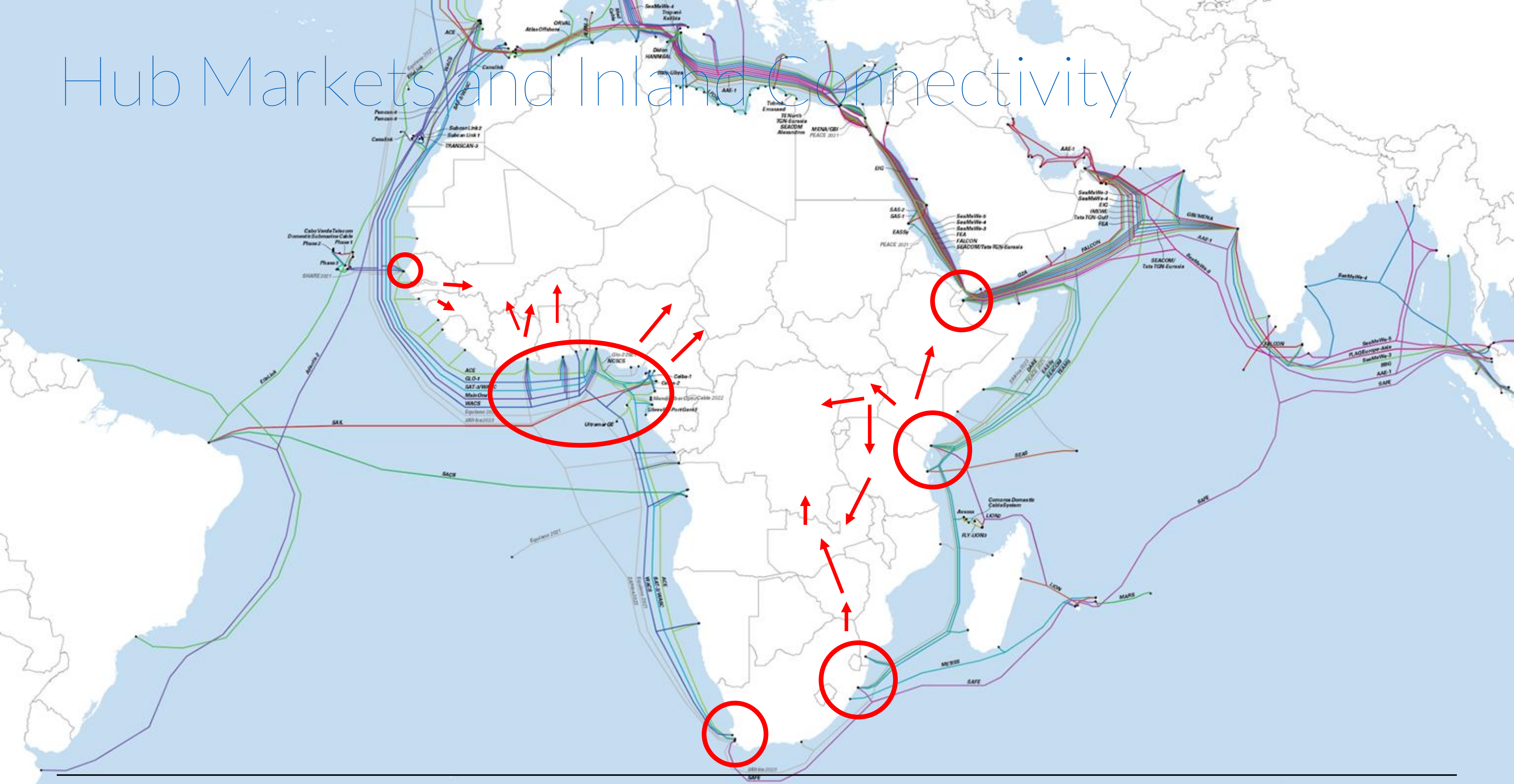


- Djibouti has the most cables but primarily serves as a transit hub
- Main hubs ZA, Nigeria and Kenya have 8 or more cables
- Growing hubs Côte d'Ivoire, Ghana and Senegal with 5 or more

Hub Markets and Inland Connectivity

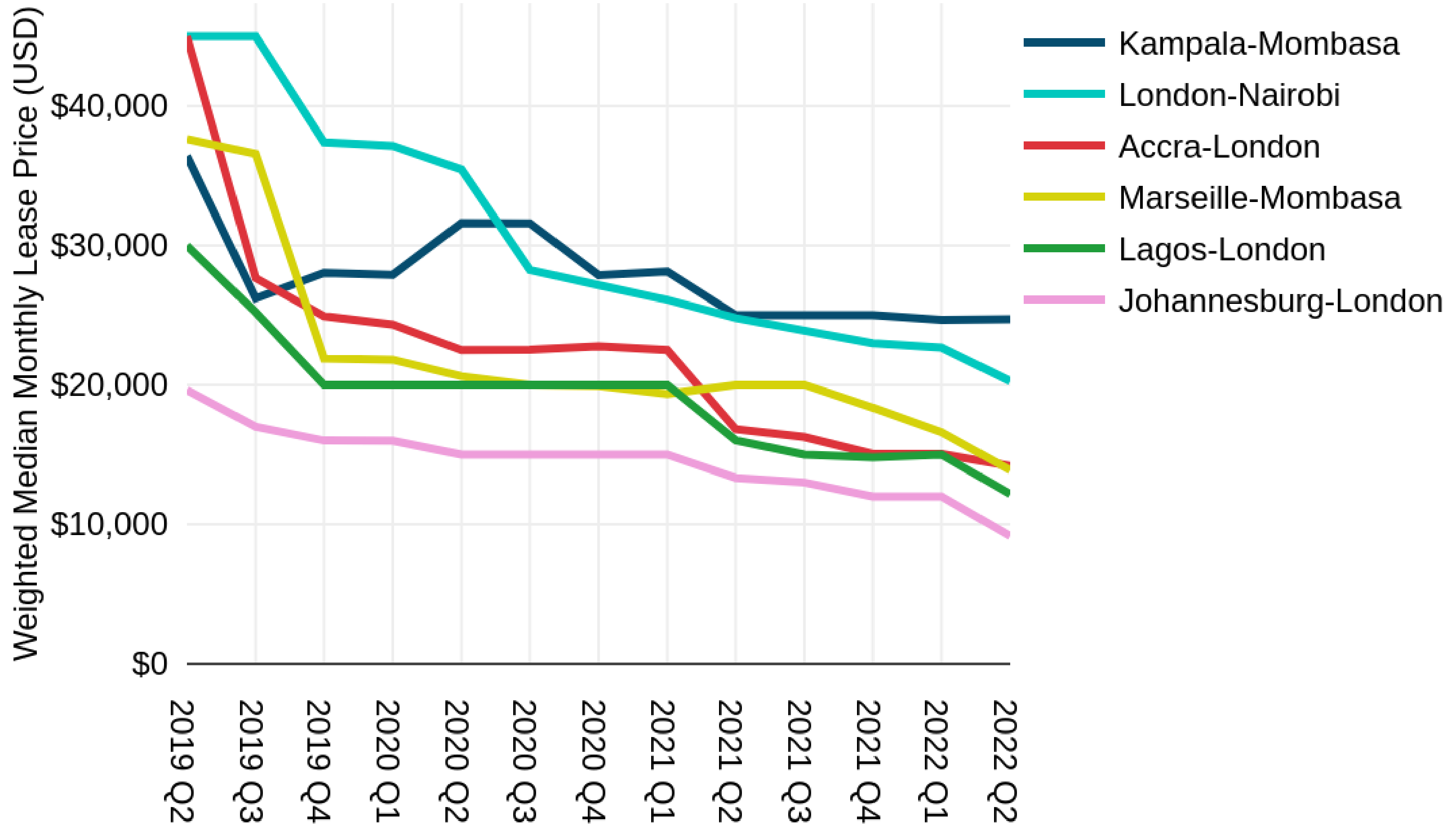


Hub Markets and Inland Connectivity



Widespread Price Erosion on Africa-Europe 10 Gbps Waves

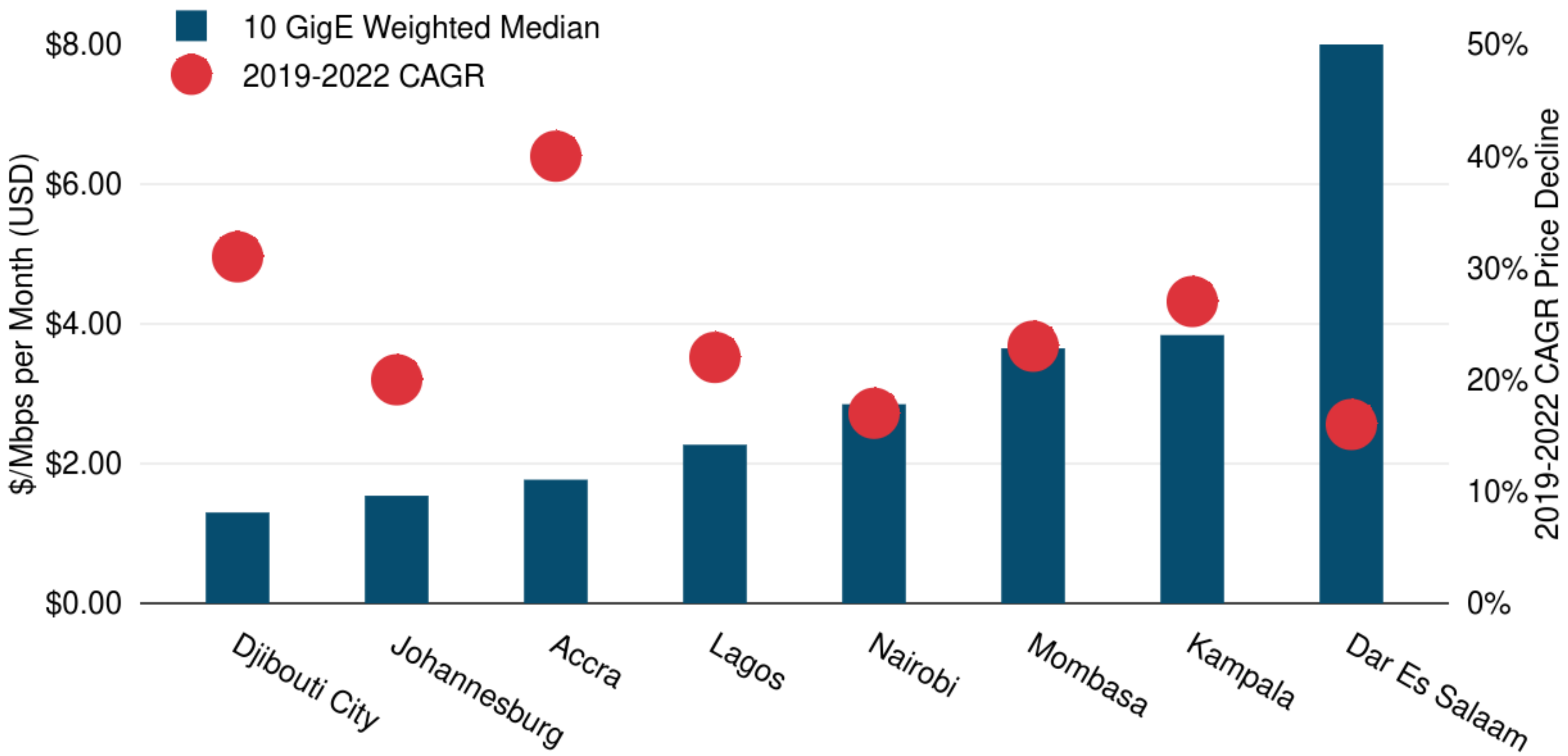
Weighted Median Prices for 10 Gbps Wavelengths on Key Africa-Europe Routes



- South Africa has the lowest prices
- West Africa slightly lower prices than East
- Terrestrial and backhauled destinations the highest prices

Transit prices follow transport pricing trends

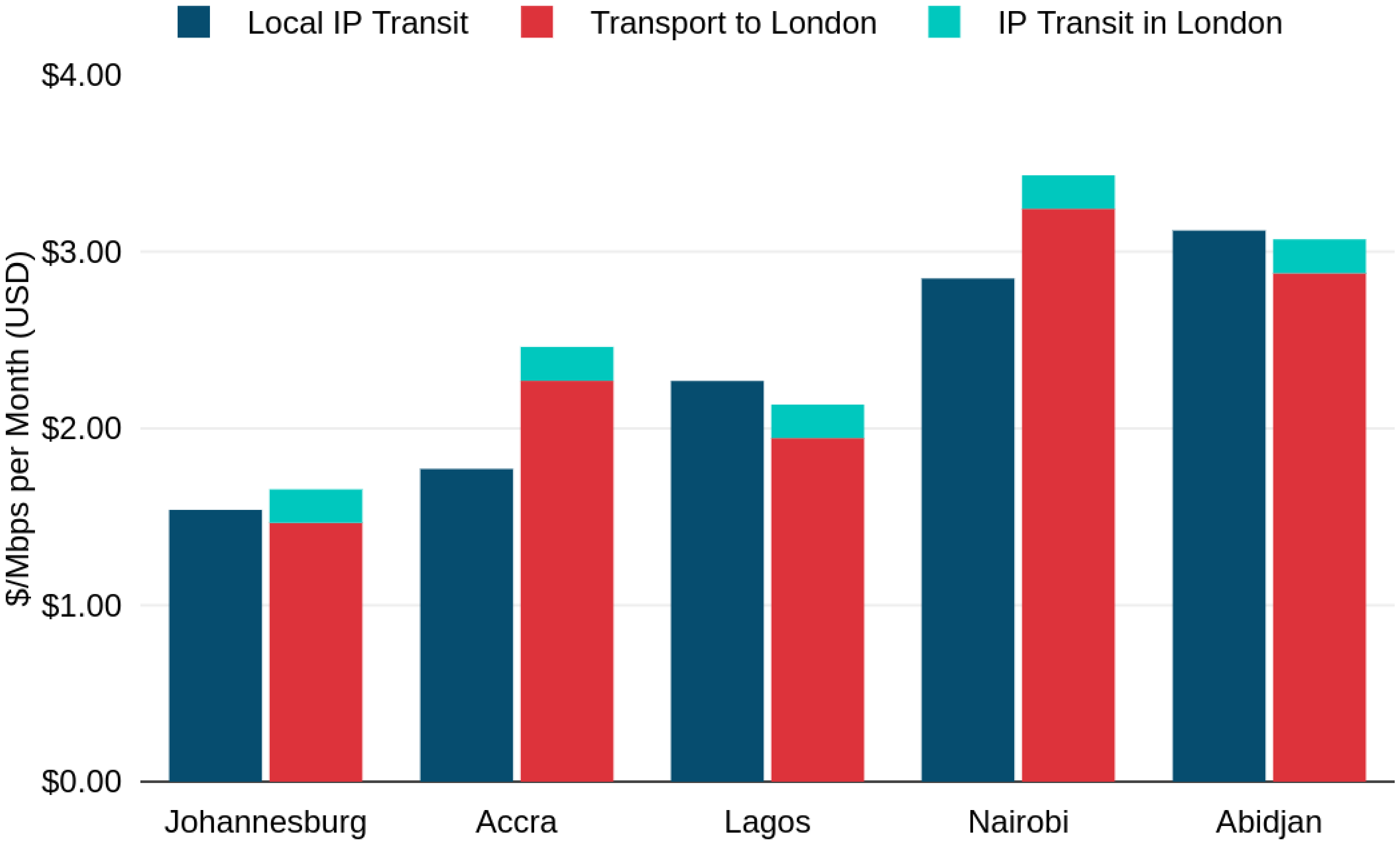
Weighted Median Prices for 10 GigE IP Transit Ports & CAGR Price Decline Key Global Cities



- Price decline is 'slowing' in Nairobi, Jo'burg, Lagos
- Lower than most developing markets but still higher than most mature markets

Comparing Pipe & Port vs. Local Transit (10 Gbps)

Pipe & Port vs. Local Transit in Key Africa Cities

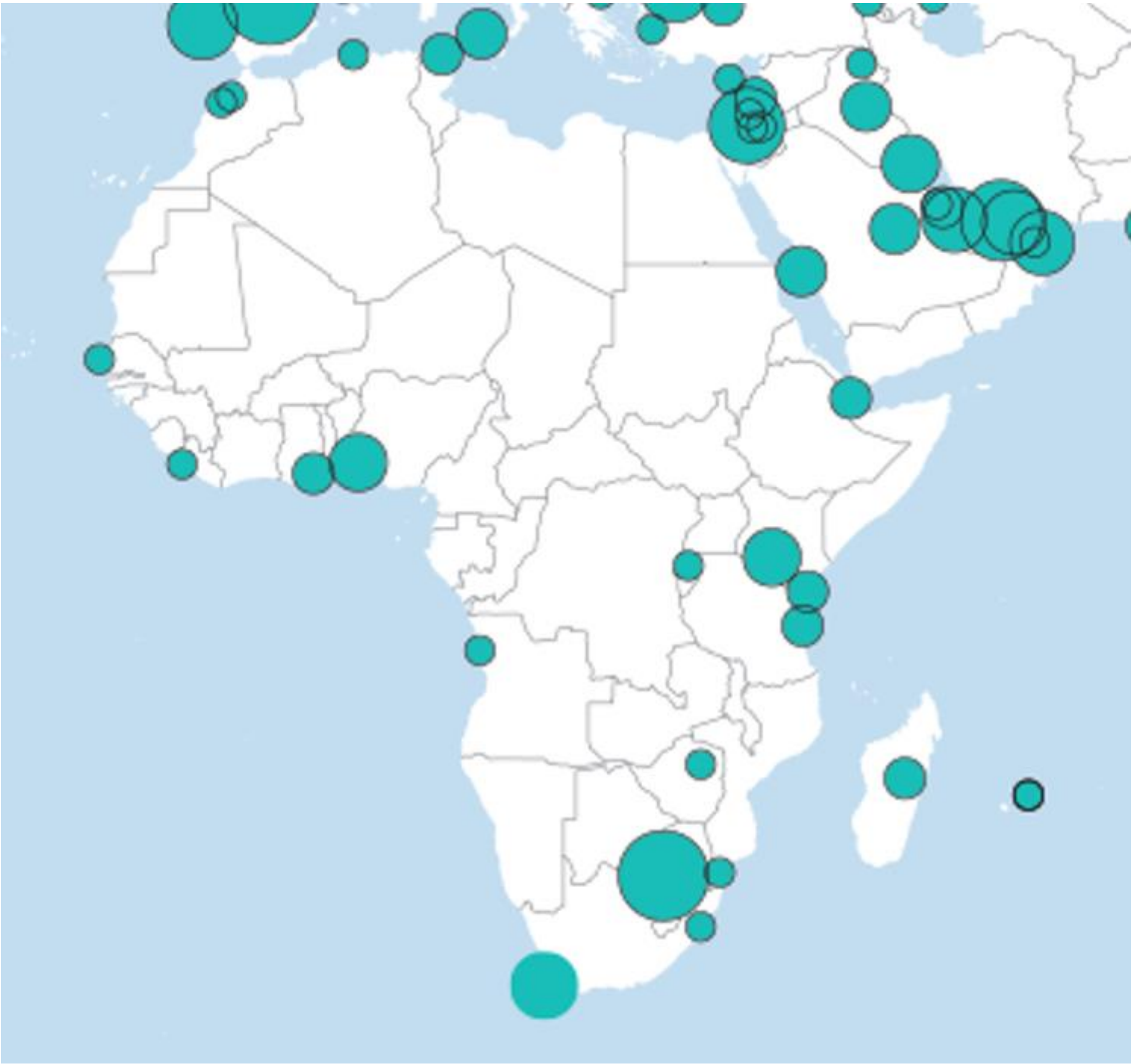


- Increased localization of capacity, local IPT cost drops below pipe and port
- Africa is following same pattern as we see in Latam where most major markets see local IPT cheaper than pipe and port

IXP Geography

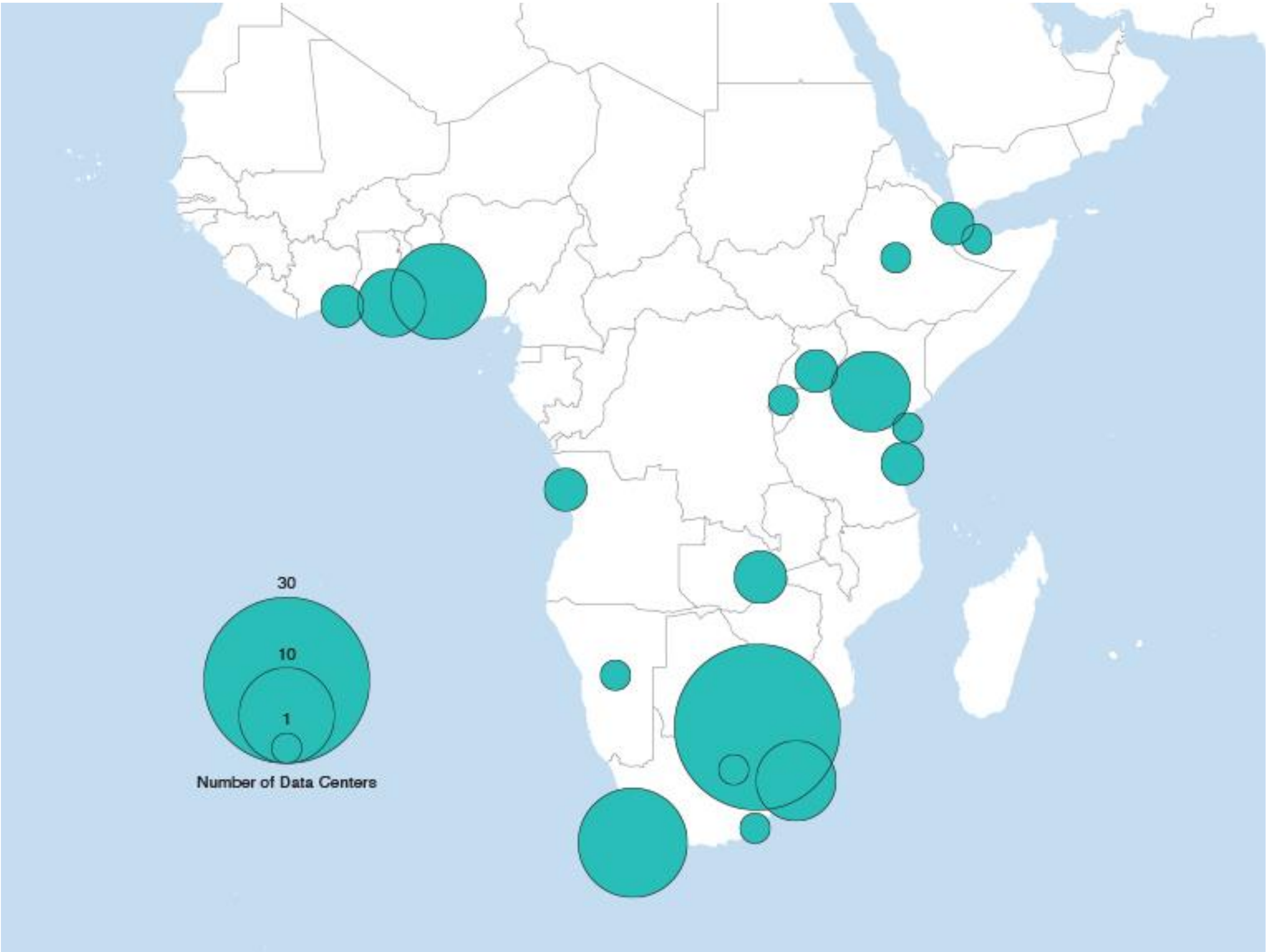
- IXPs help localize traffic and content connecting networks and content providers
- Lowering costs (less IPT) and enhances performance (lower latencies)
- Essential element of creating hubs and their ecosystems
- Sourced from IXPDB

CDN Geography



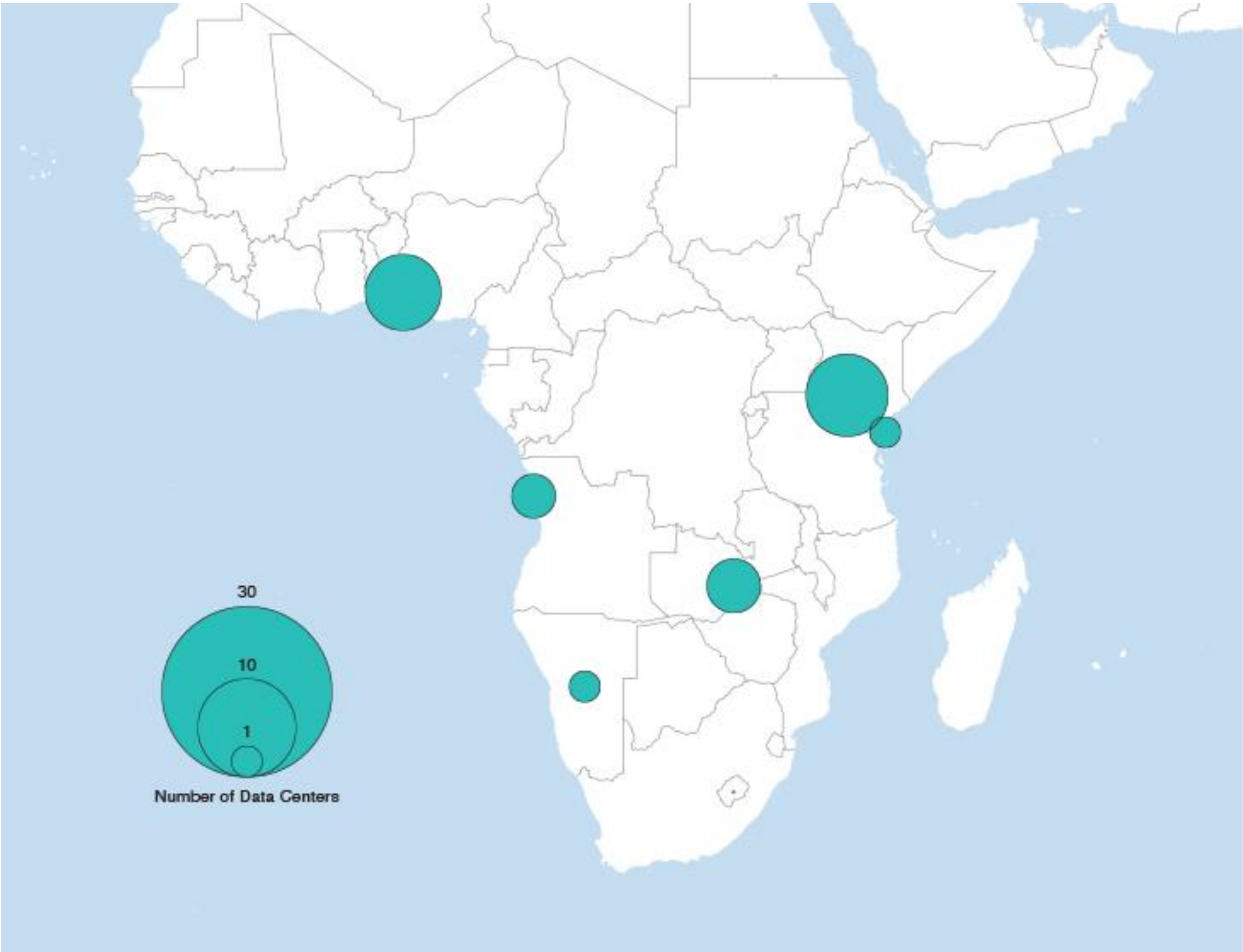
- 45 CDN nodes in Sub-Saharan Africa from 13 providers
- Track with the IXs – no surprise
- Primarily in the primarily and secondary hubs

Data Center Landscape



- More than 90 current and planned data centers in Sub-Saharan Africa
- Primarily in the 3 major hub markets in Africa

Data Centers 2021-2022 + Planned



- Data center investment goldrush... 20 planned or recently launched since 2021
- Primarily in Nigeria and Kenya

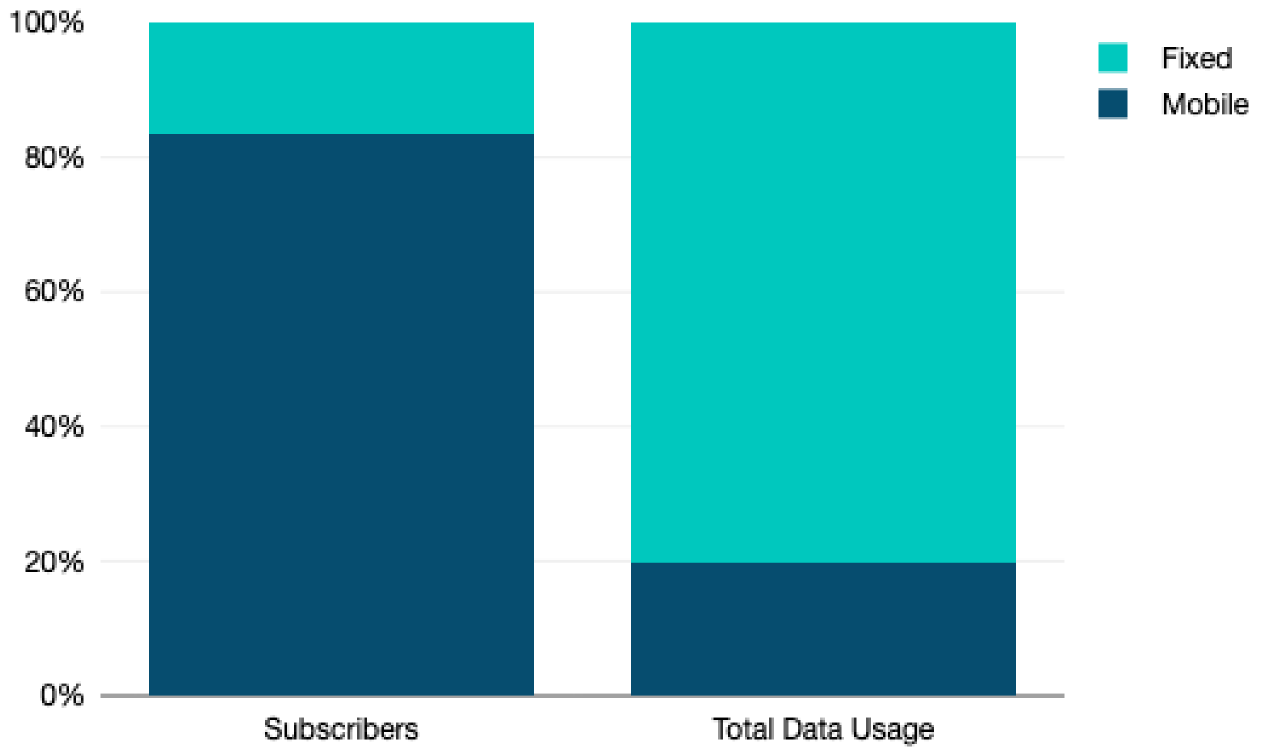
Potential end-user driven growth in Africa

Potentional surges in end-user demand

- Transition by mobile generation - 3G to 4G & 4G to 5G
  - 3G to 4G → x5 throughput
  - When internet works better, demand increases

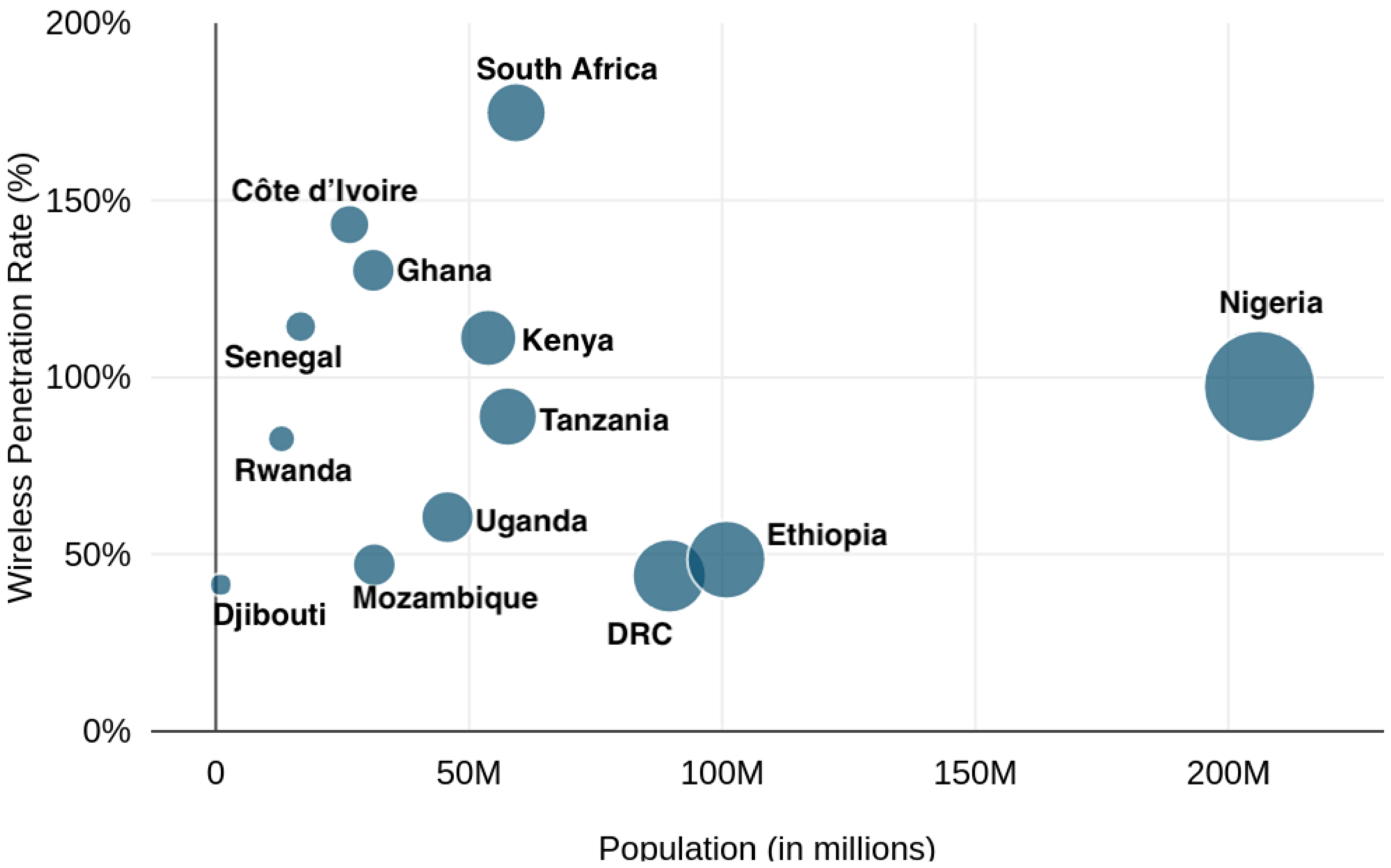
- Fixed broadband subscriber use much more data than mobile subscribers
  - 'Slow growth' of 10% greater effect than mobile at similar or higher growth rates

Global Share of Subscribers and Data Usage for Fixed and Mobile Users

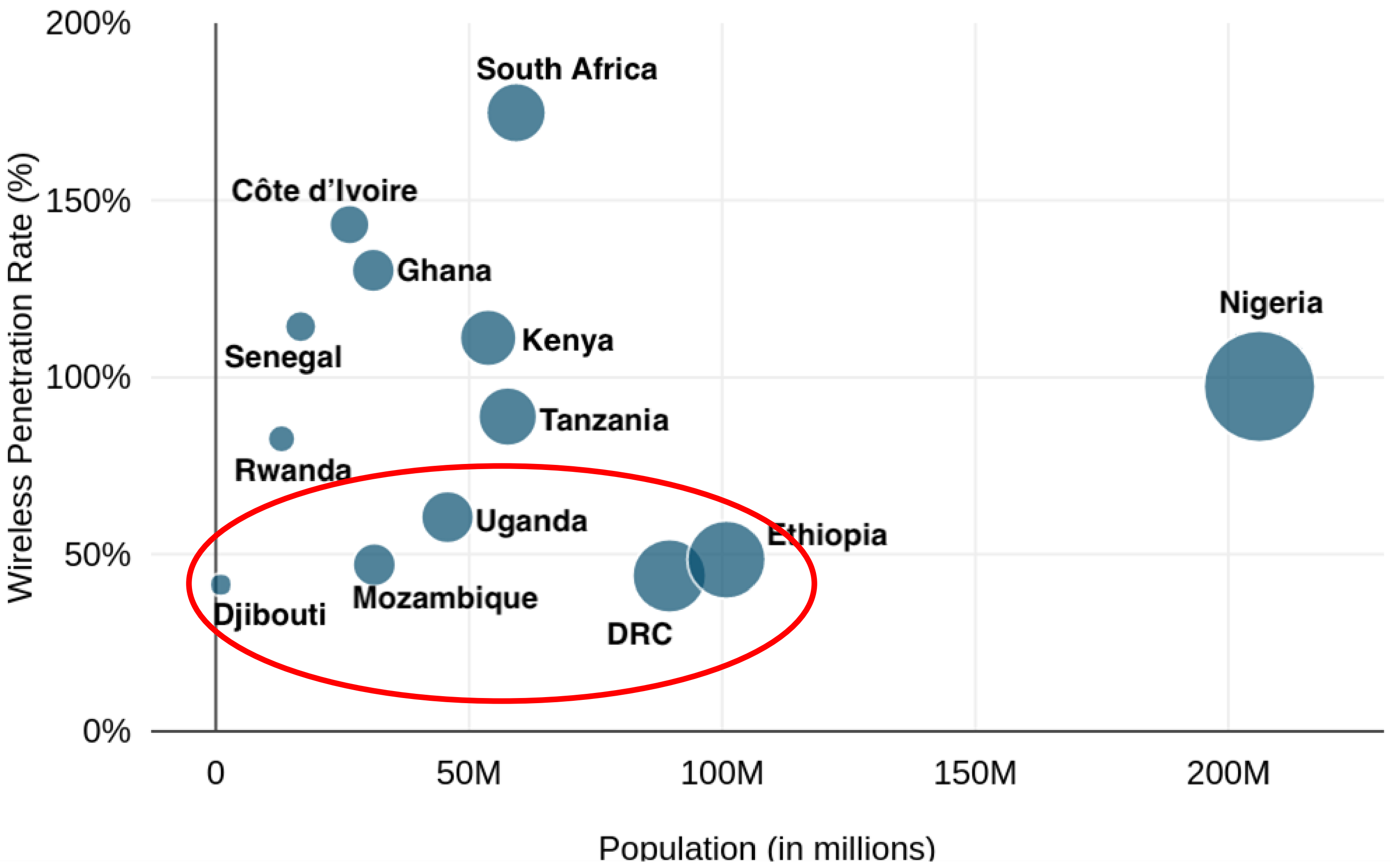


- Mobile users make up 84% of global subscribers
- Fixed broadband subscribers only make up 16% of total subs but generate 80% of data usage

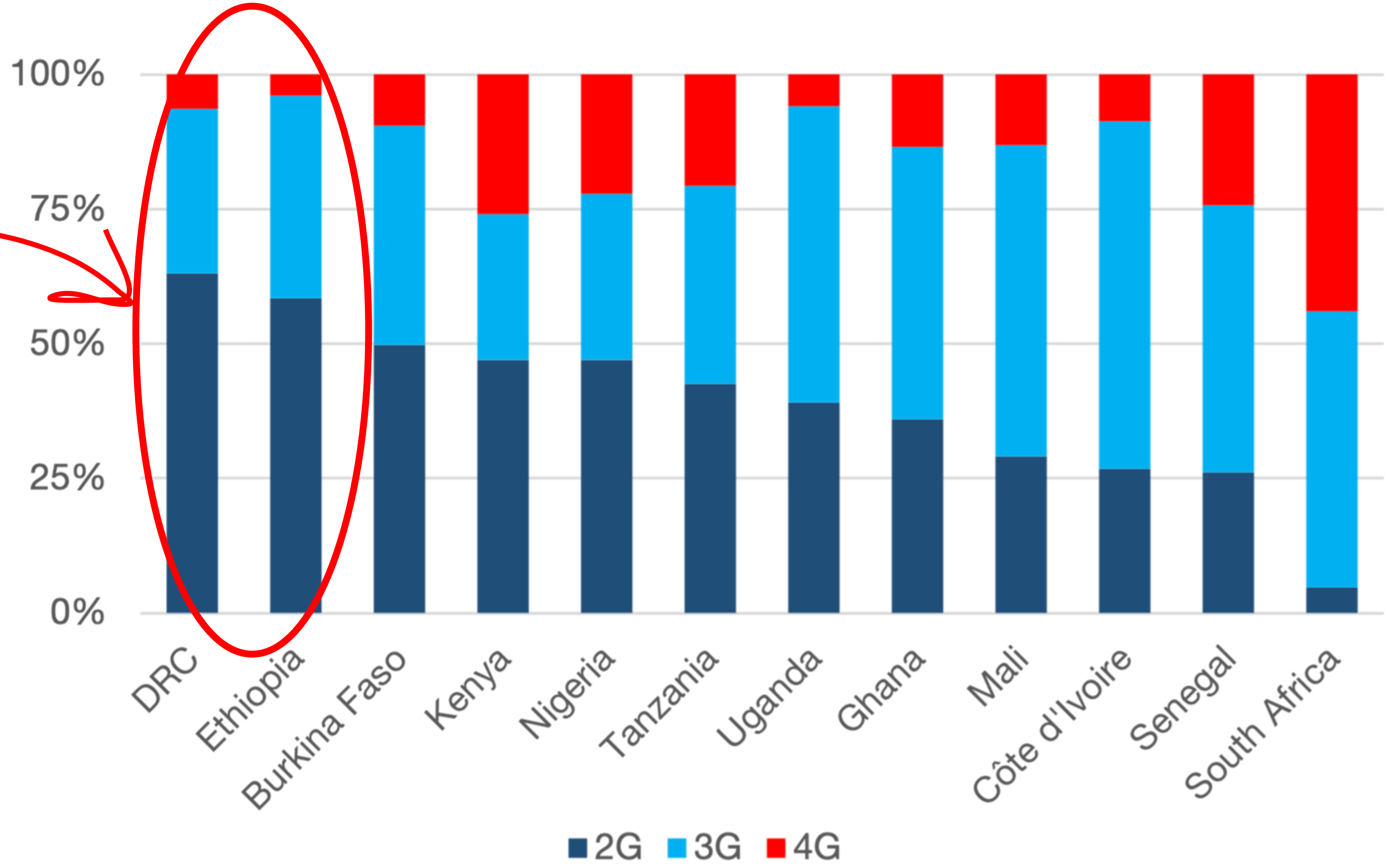
Population and Mobile Penetration Rate By Country



Population and Mobile Penetration Rate By Country

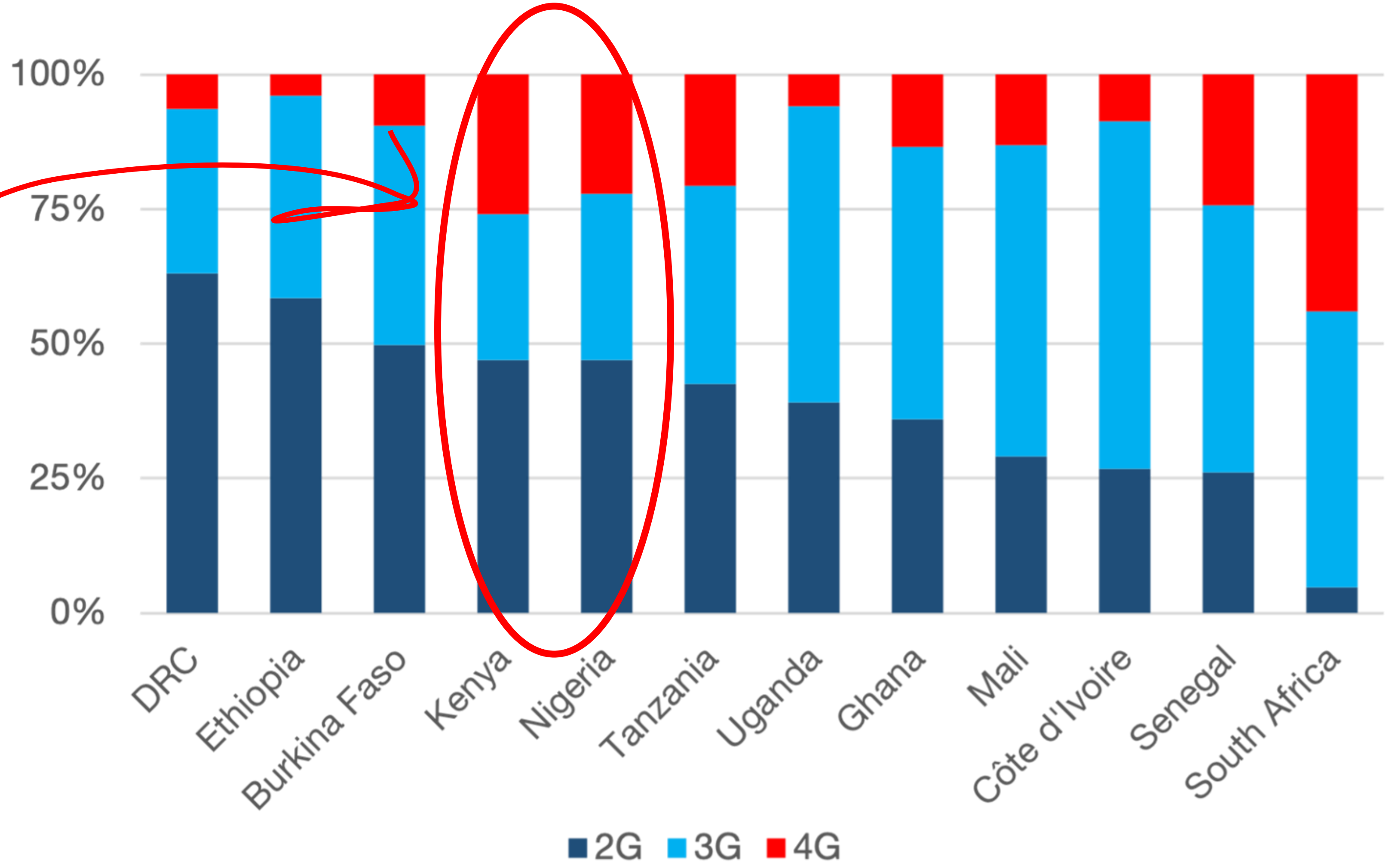


Percentage of Wireless Subscribers by Network Generation



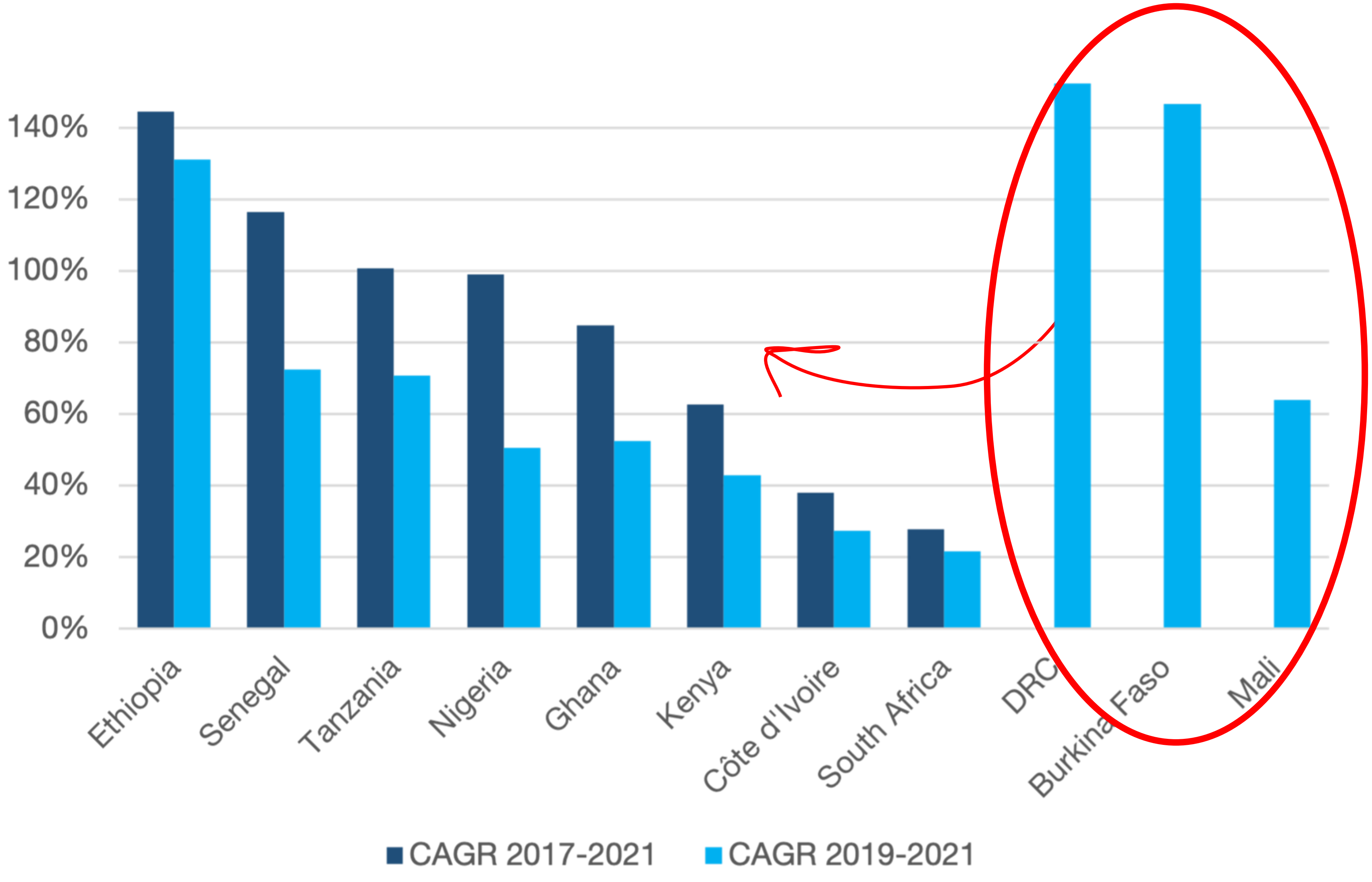
>50% 2G
<10% 4G

Percentage of Wireless Subscribers by Network Generation



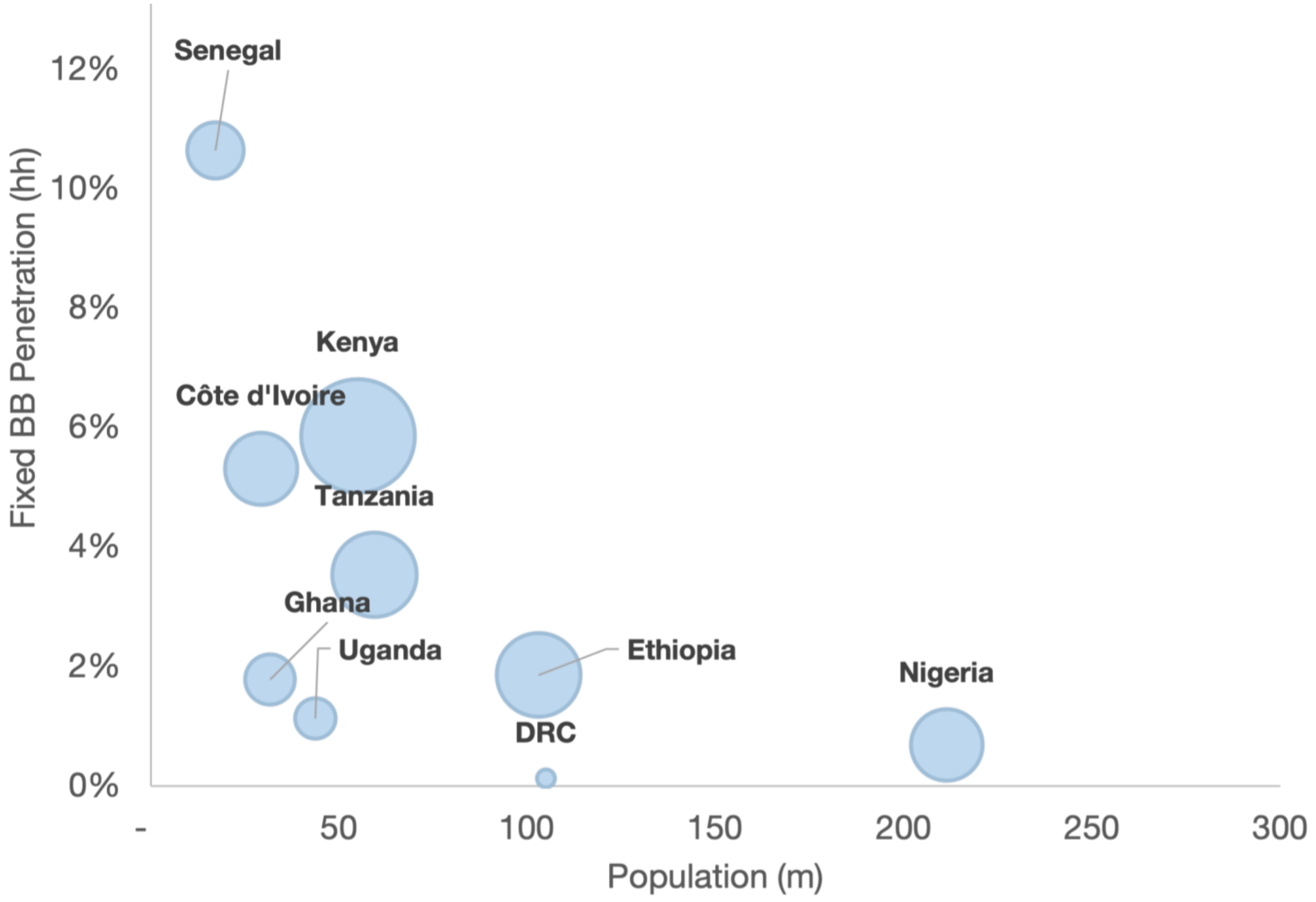
Even split
3G & 4G

4G Rollout CAGRs

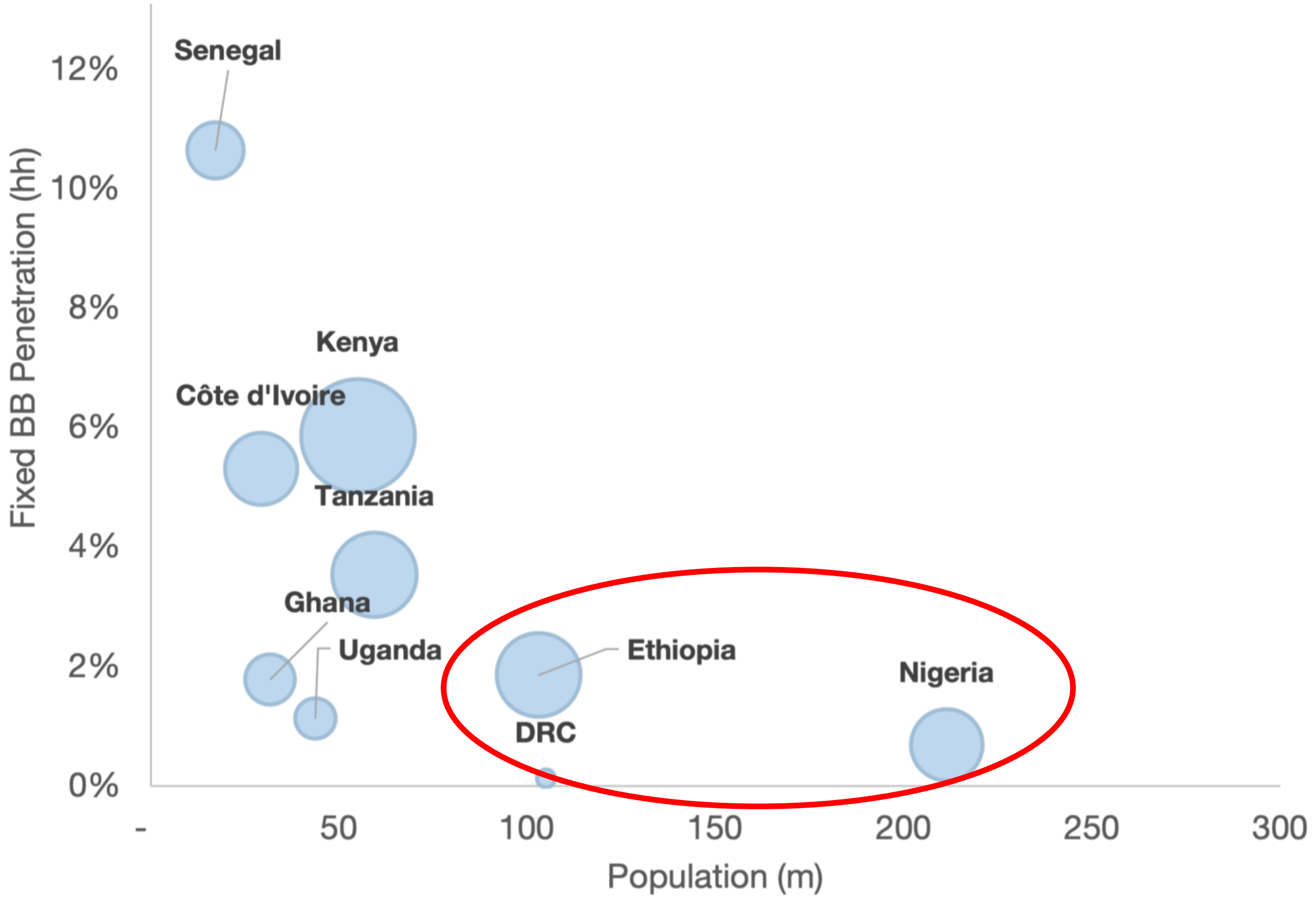


Rolled out 4G 2-3 yrs ago

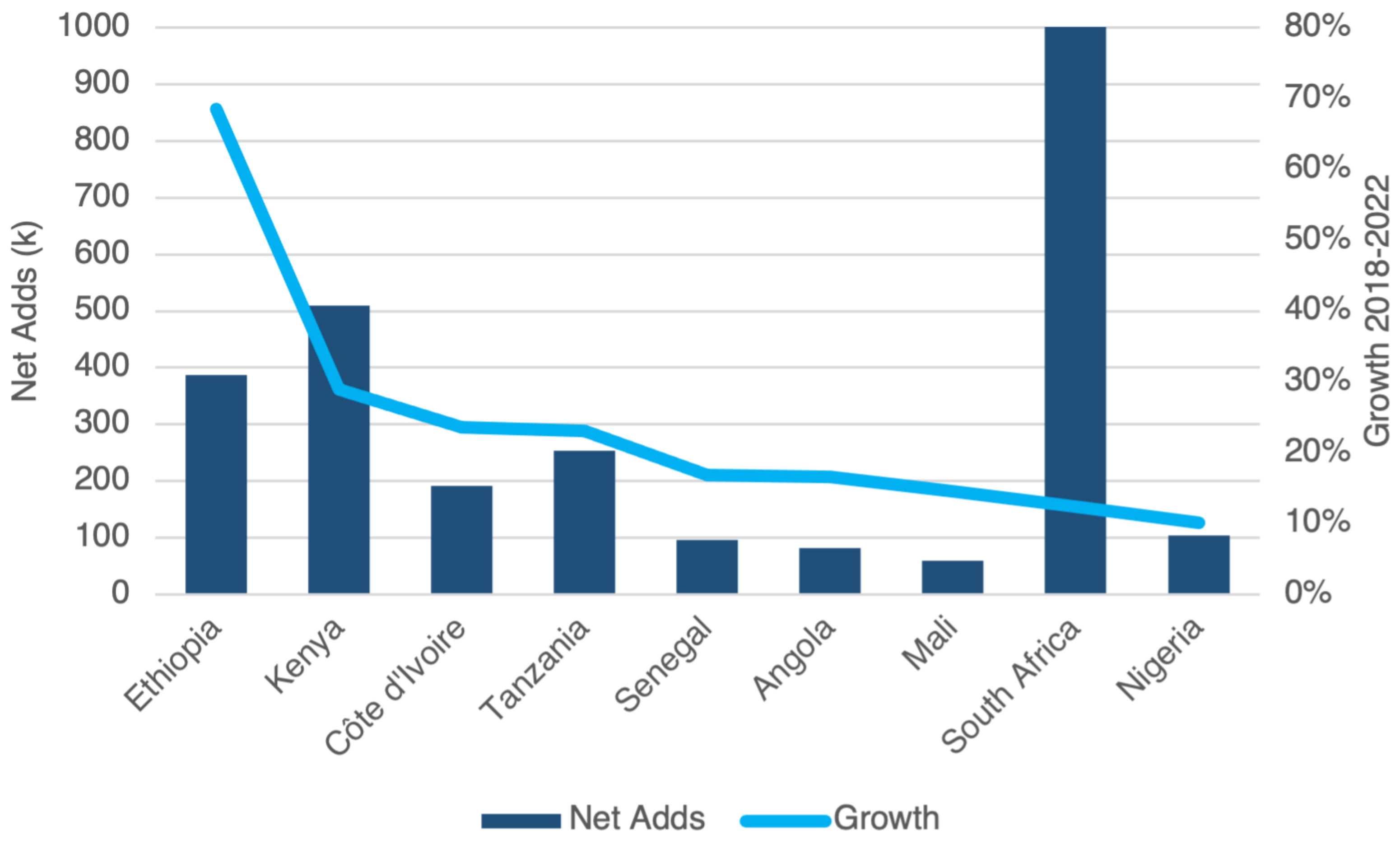
Population and Fixed Broadband Penetration Rate By Country



Population and Fixed Broadband Penetration Rate By Country



Fixed Broadband Growth 2018-2022



End-user growth markets

- Senegal & Côte d'Ivoire
  - Senegal rolling out 4G & fixed faster than CdI
  - CdI slower growth but larger population
- Kenya & Nigeria
  - Kenya rolling out fixed bb and 4G faster
  - Nigeria is growing faster than Kenya now
- DRC & Ethiopia
  - Just starting to roll out 4G, fixed BB lots of potential
- Mali & Burkina Faso
  - Just starting to roll out 4G, not much growth in fixed bb yet

What to Expect with New Sub Cable Systems

- Boost in Int'l Capacity
  - Both coastal and landlocked countries
  - Increase both number and size in intra-African routes
- Decline in Prices
  - Price erosion on key African routes, first coast then inland
  - Small at first then may accelerate, depends on product/capacity
- Localized Content Growth
  - First CDN caches then PoPs and finally DC builds
  - Content providers become the anchor tenants but spark growth of new ecosystems
- The edge is moving closer to African end-users
  - Away from Europe to major hubs within Africa

Thank You

Patrick Christian
Analyst
pchristian@telegeography.com