

# Global Open Exchange Points and Research Networking Futures

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# Global NREN CEO Forum

- Ad-hoc group of CEOs from various National Research and Education Network that meet several times a year to discuss global issues and to identify challenges
- A key issue that they have identified is global coordination of connections between NRENs
  - Formed a task force called the **Global Network Architecture Working Group**



# Global Network Architecture WG

- The charge is to draft a blueprint for the intercontinental R&E Network interconnects.
- This blueprint will enable participating R&E Networks to align their spending for intercontinental bandwidth.
- The blueprint is all-inclusive, and has the potential to take along all regions of the world if and when they are ready to embark.



# Global Network Architecture

- The discussions inside the GNA group have led to a global network model
  - Global Open Exchange Points (“GXPs”),
  - High-bandwidth transmission pipes (running between GXPs).
- The GXPs have two major functions:
  - Attachment points for the high-bandwidth international circuits
  - Connection points for the Regional and National R&E Networks that are part of and make use of the GNA infrastructure.

# Global Open Exchange Points

- The GNA group envisions at least two GXPs per continent or region that are placed in consultation with the region's R&E Network organizations, taking the intercontinental fiber paths into account
- Is the African R&E community ready to develop some GXPs on the continent?



# Traditional Exchanges in Africa

- There are a number of traditional exchange points in many countries (see next slide)
  - However, these are mostly local (in-country only) exchanges due to cost of international circuits
- There are not any large International peering points
  - Does the community want to define a GXP ?





# Why Peer?

- Reduce cost
- Reduce latency
- Increase reliability
- Other tertiary reasons
  - Relationships
  - Build prestige





# However, Not all as it Seems

- Primary motivation is to reduce cost, however....
  - It does cost money to peer
  - Not all peering partners pay the same
  - Sometimes peering is more expensive than buying Internet transit
- Africa is at a disadvantage
  - Lack of International peering points
  - Expense to get to peering points in Europe



# Peering is Not Free

- Let's say we have an Internet Exchange point with the following costs:
  - \$1000/month for a circuit to the exchange
  - \$500/month for some rack space at the exchange
  - \$200/month for maintenance on our router
  - \$300/month for a port on the peering fabric
- Total cost is \$2000/month
  - If we can drain an average of 10Mbs, then that traffic costs us \$200/Mbs
  - if we can drain 100Mbs, the cost is \$20/Mbs)



# Peering in Europe is Expensive

- If we have to get to Europe to an Exchange
  - \$30,000/month for a STM1 to an exchange
  - \$500/month for some rack space at the exchange
  - \$200/month for maintenance on our router
  - \$300/month for port charge
- Total is \$31,000/month
  - 10Mbs costs \$3100/Mbs per month
  - 100Mbs costs \$310/Mbs per month
  - 155Mbs costs \$200/Mbs per month

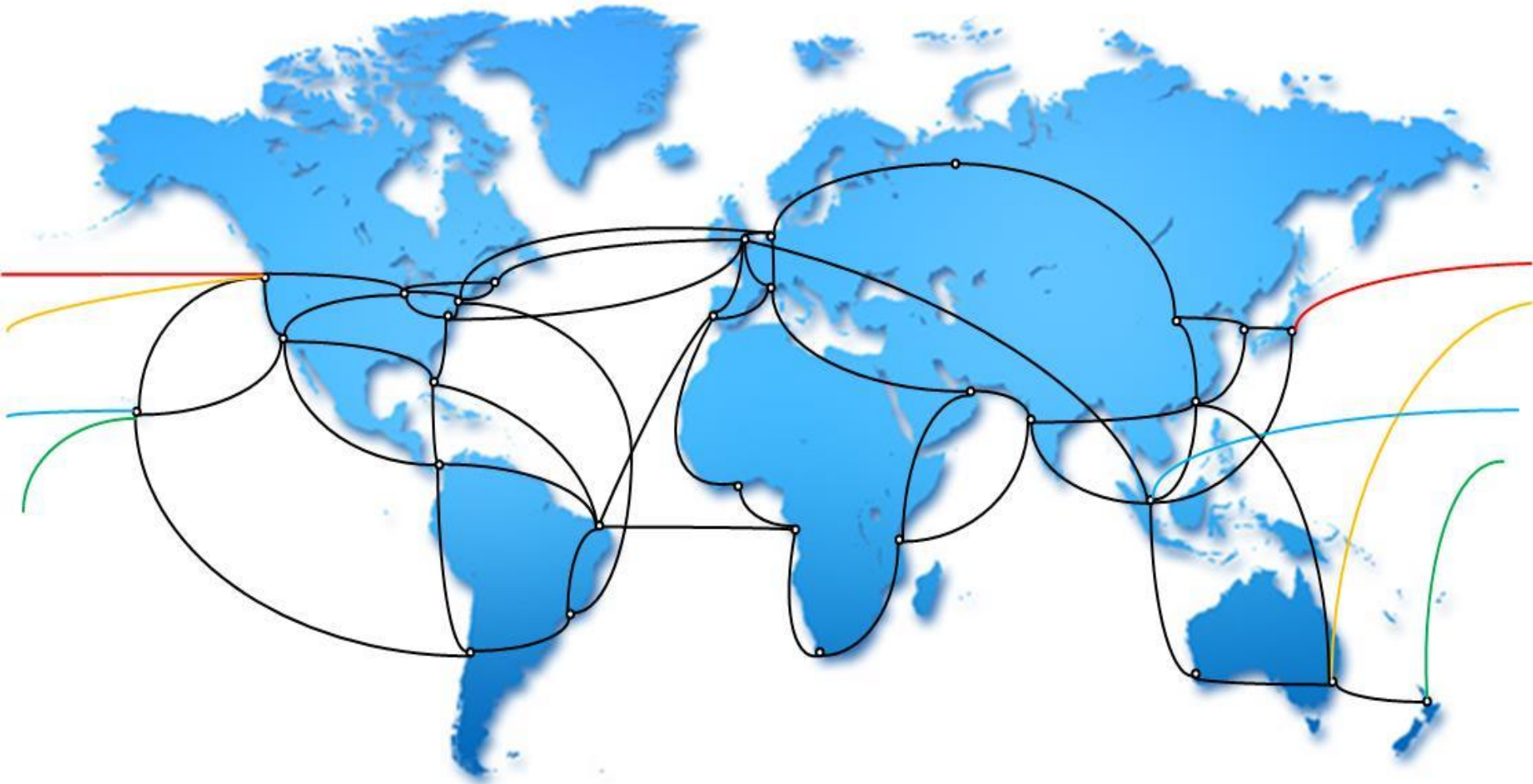


# Global Open Exchanges

- Wouldn't it be nice to be able to peer in Africa with other R&E networks (Internet2, etc) instead of in Europe?
- GXPs may give the African R&E community an opportunity to define some "targets" on the continent that others might pay to get circuits to.

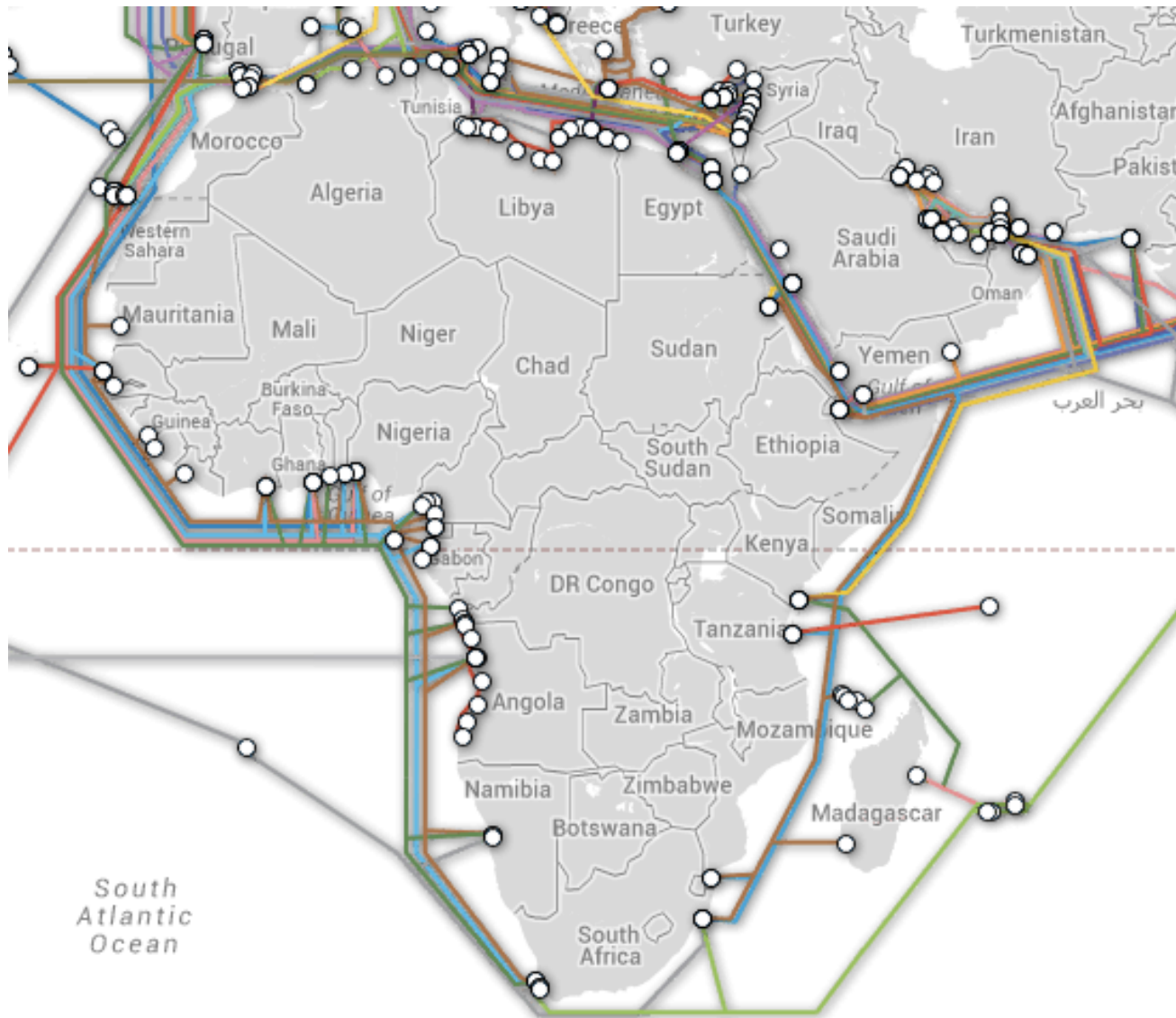


## GNA – artist's impression

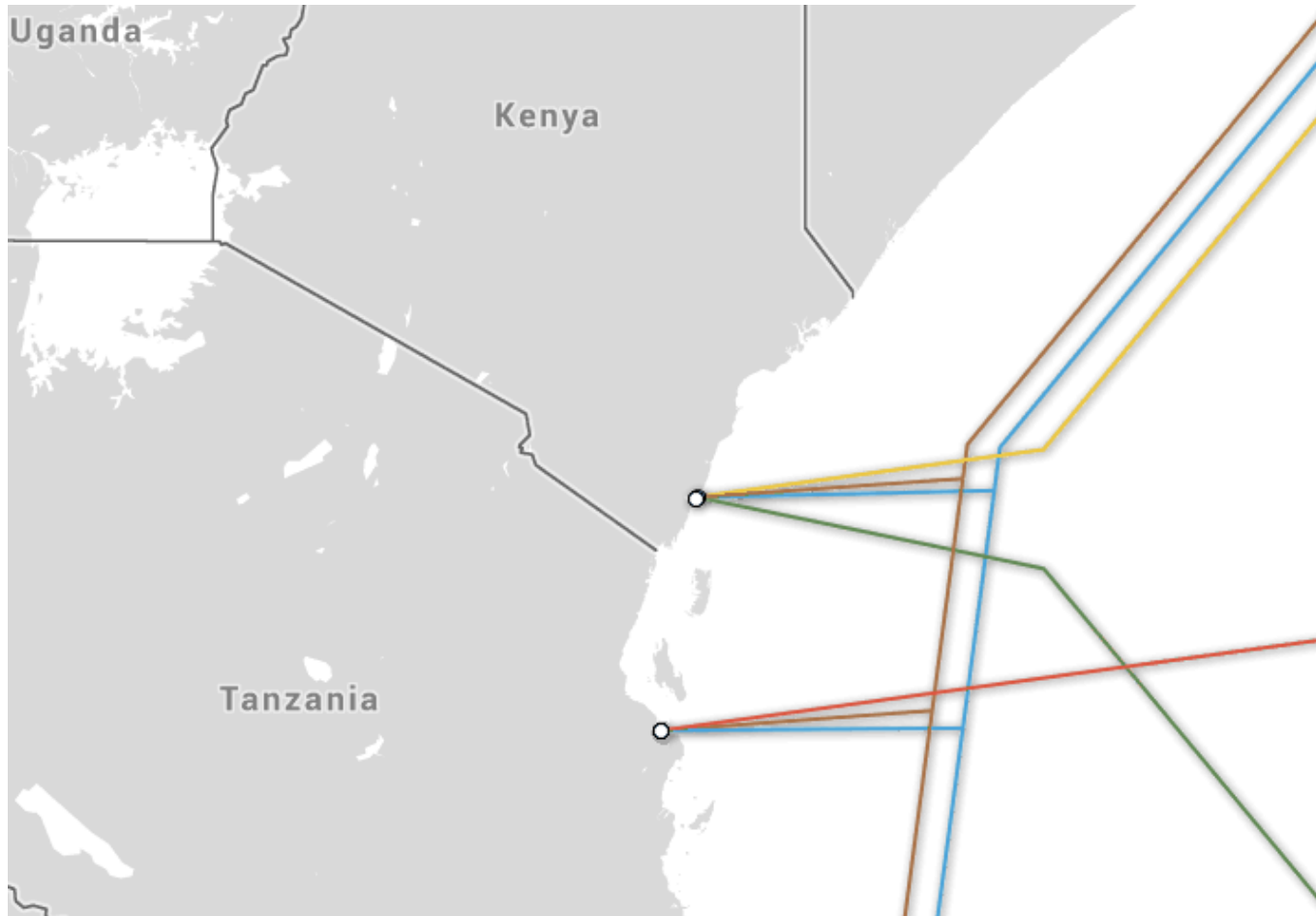


# Africa Undersea Cables

Compliments of Telegeography Submarine Cable Map <http://www.submarinecablemap.com/>



# Kenya & Tanzania



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# South Africa

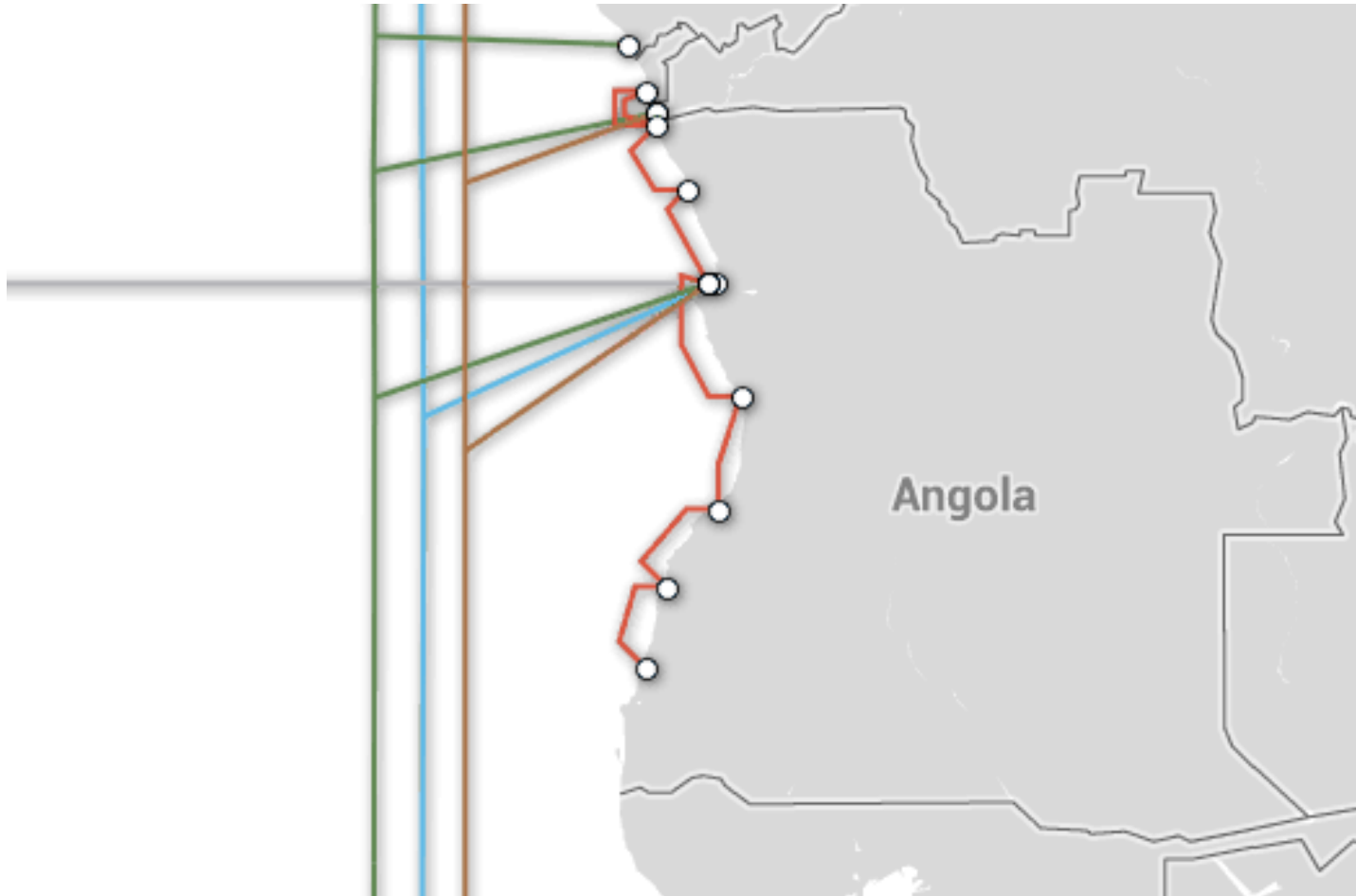


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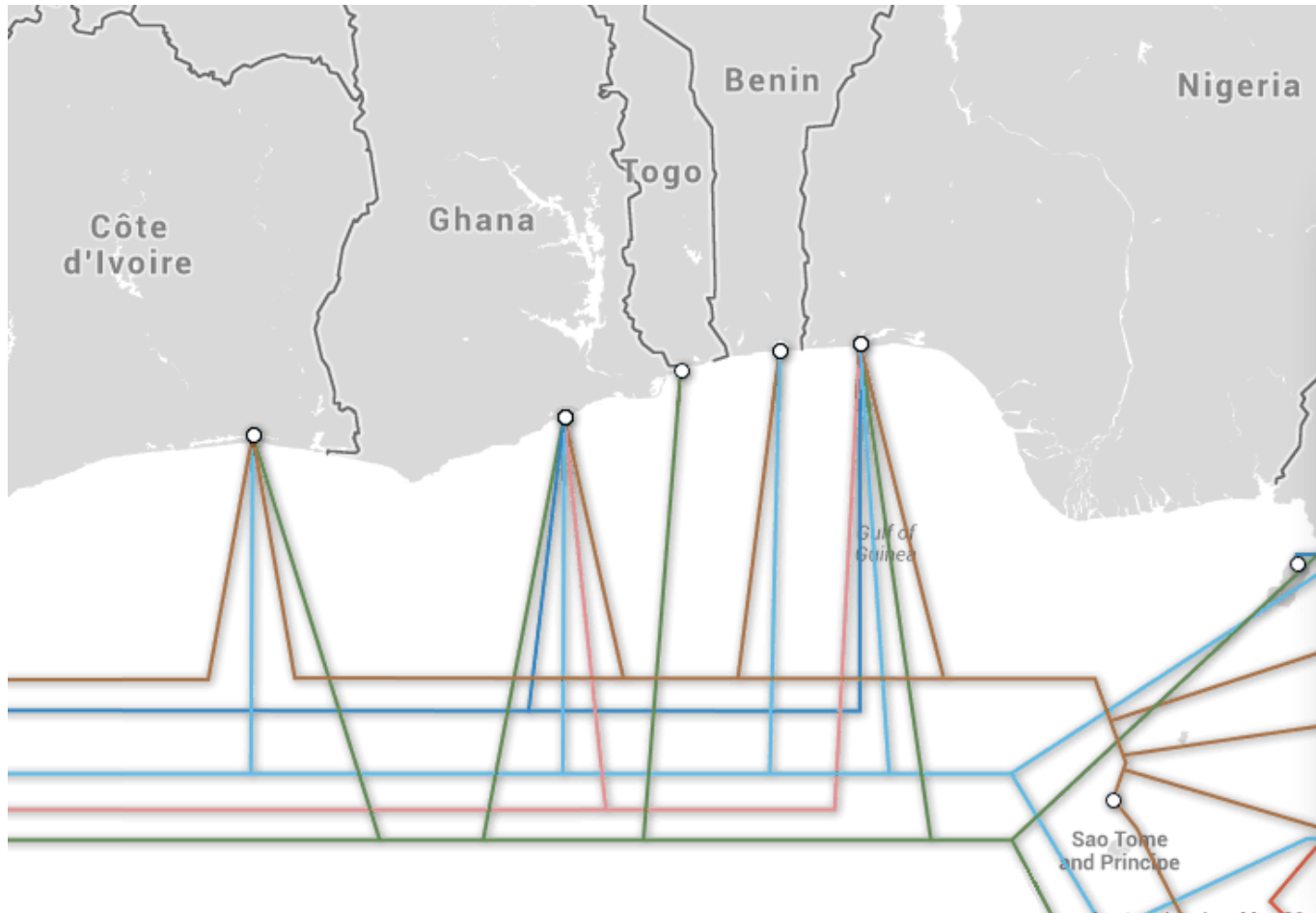
# Angola



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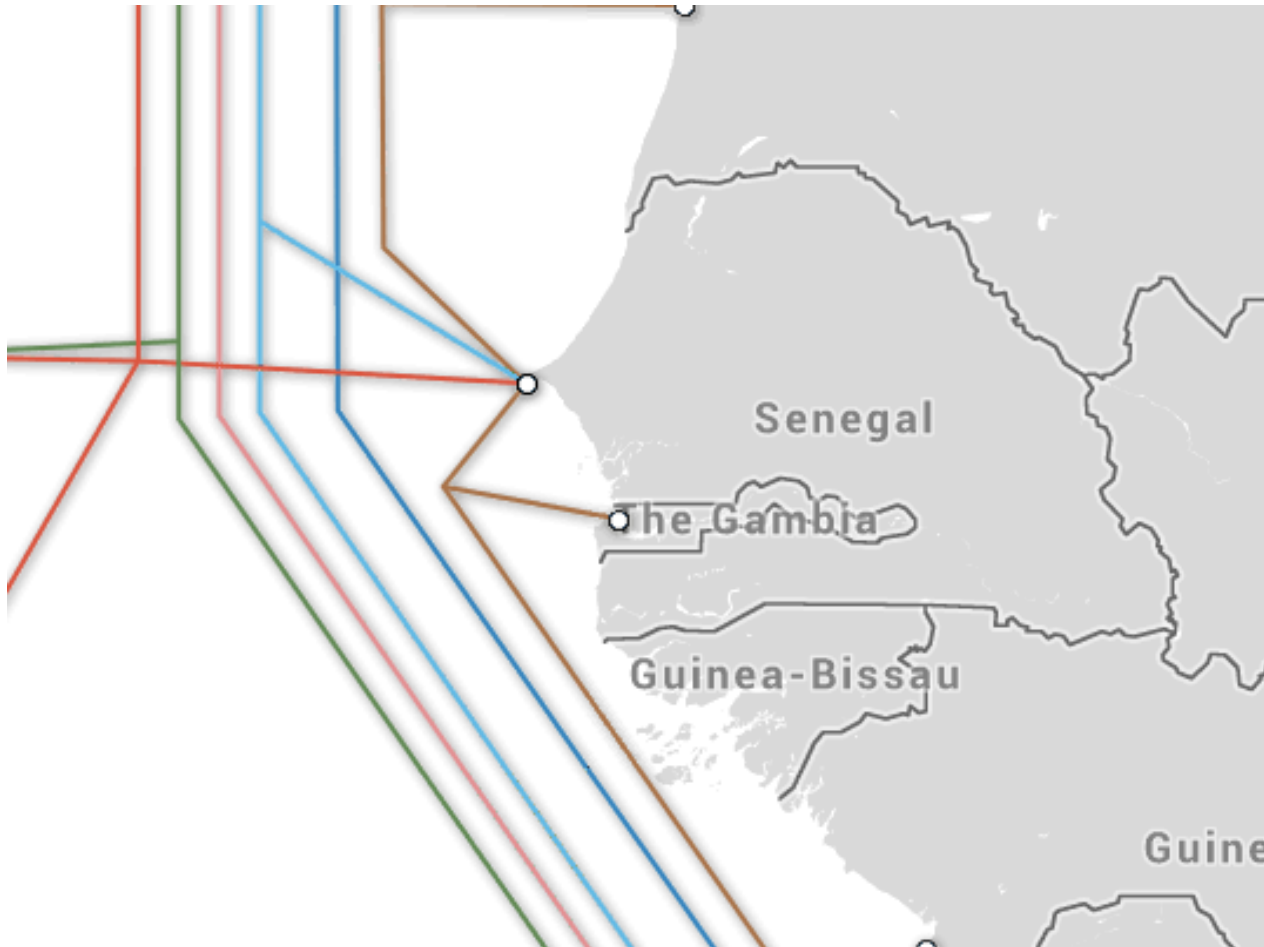
# West Africa



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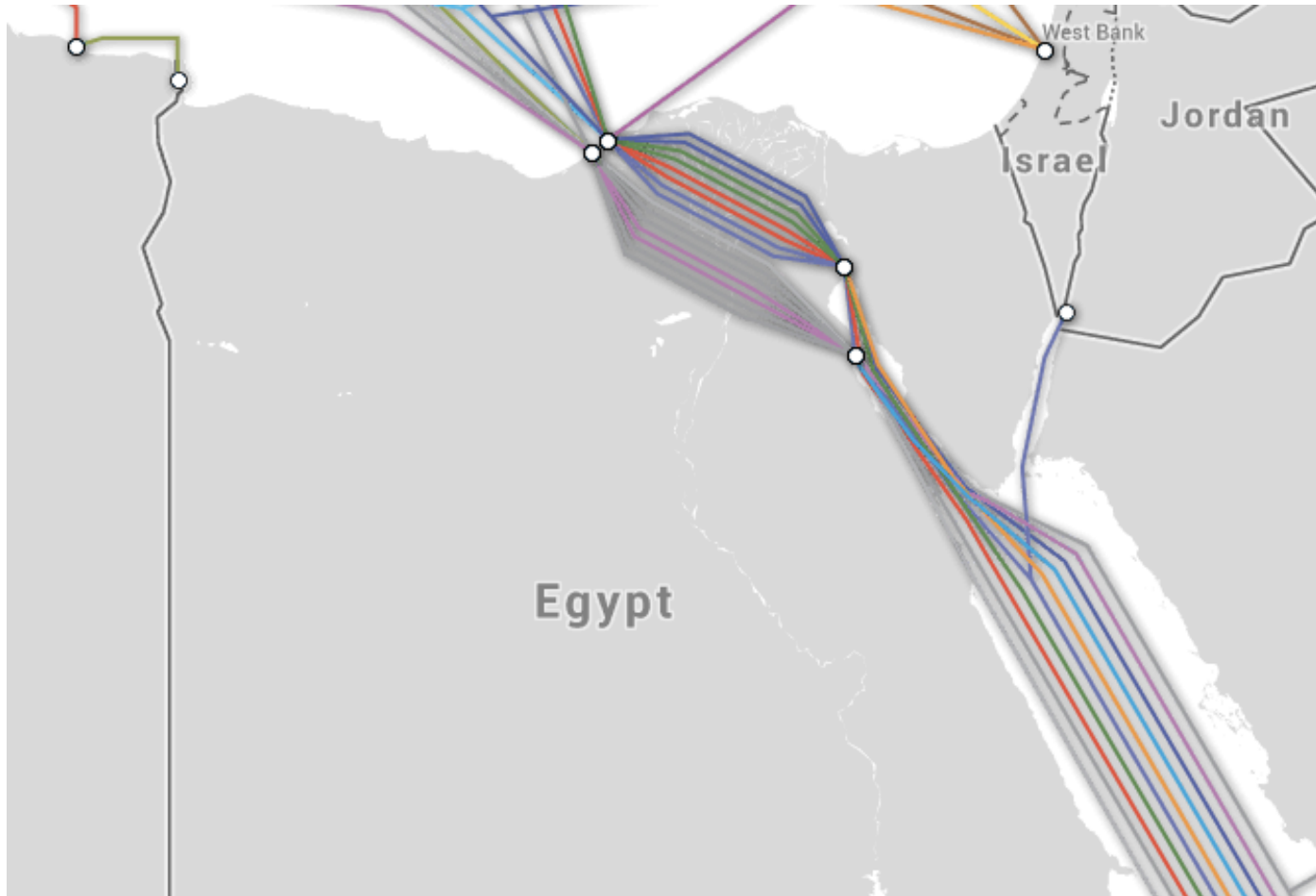
# Senegal



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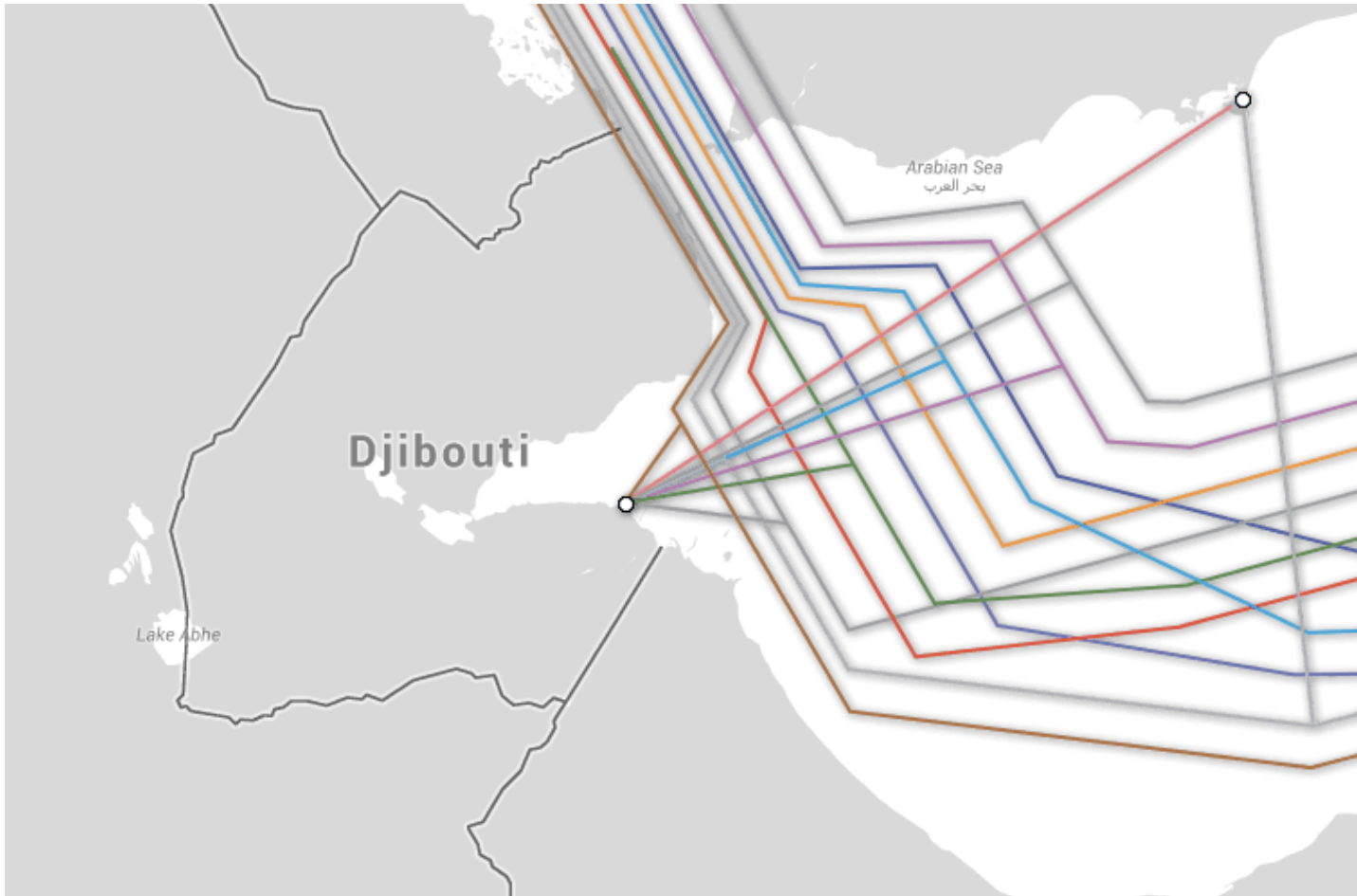
# Egypt



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# Djibouti



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# Parting Thoughts

- Global Open Exchanges are a key architectural element to the new proposed Global Network Architecture
- Will there be any GXPs in Africa?
  - Not unless people in this room take action
  - Where will these exchanges be?
  - Who will be the champions to make them happen?
- NSRC can help if you are interested



# Questions?

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