



the Internet is for
everyone



The Next Billion Internet Users Interconnecting Africa

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The Future of the Internet

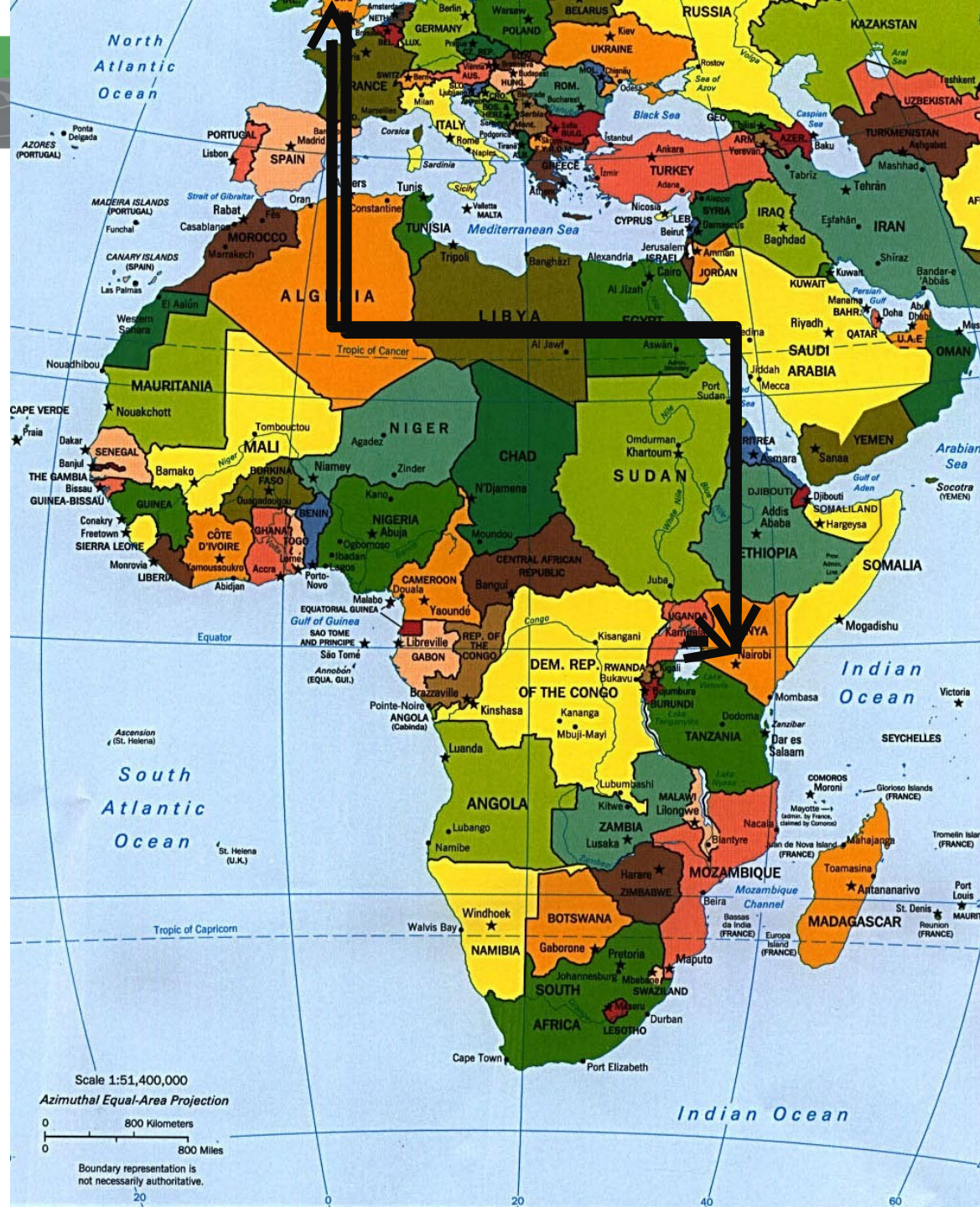
- Today, there are more than 1.8 Billion people accessing the Internet
- Access in developed countries is near 80%
- The next frontier for Internet growth lies substantially in emerging markets
- The Internet is a "network of networks" - those who connect to it have the ability to shape, influence and define it
- The newcomers will have significant impact on the Internet's future

Next billion Internet users

- There are many challenges (new and old) to providing access to the next billion Internet users
- Example
 - The next billion have limited resources
 - The next billion speak new and less “economically attractive” languages
 - The next billion live in more sparsely populated areas
- The Internet Society believes that one of the major challenges is the issue of interconnection

Why Interconnections?

- Efficient interconnections are crucial for
 - Reduced costs of access
 - Improved Local and Relevant content
 - Better end user experience
- In Africa, regional communications are entirely dependent on global connectivity
- Examples
 - Most cross-border Internet traffic exchange occurs in Europe and North America
 - Example: Internet packet from Kampala to Nairobi



Scale 1:51,400,000
Azimuthal Equal-Area Projection
0 800 Kilometers
0 800 Miles
Boundary representation is not necessarily authoritative.

The solution for interconnections

- Internet Exchange Points (IXPs) Connecting Networks
 - Allow networks to interconnect directly, via the exchange, rather than through one or more 3rd party networks
 - Many advantages, but the primary reasons are cost, latency, and bandwidth
- IXPs
 - IXPs are meeting points
 - IXPs facilitate access to high speed connections
 - There are provincial, national and regional IXPs

Internet Exchange Points

- So far 300 IXPs worldwide
- Africa has the fewest
 - Only 19 of the 53 nations in 2010
- Why?
 - Limited amount of local online content and traffic
 - Limited political will/understanding
 - Limited understanding by ISPs
 - Lack of enabling environment
- Result – large capital outflows!

Internet Exchange Points ...

- More IXPs, more cost savings, by keeping local traffic local and avoiding international links
 - 1MB of international bandwidth cost 10,000 USD per month
 - Approx. 20% of traffic is local but is routed internationally
 - In 2007, Sub-saharan Africa had 8.6 Gbps bandwidth
- IXP – set up cost less than 40,000 USD
- Pay-back in a few months!

Interconnection negotiation

- Two questions arise in any interconnection negotiation:
 - How will the data be transported between the two parties?
 - What will be the commercial terms of the relationship?
- Transport
 - national network to access the undersea cables (back-haul)
 - international link (long-haul)
- The commercial terms of an interconnection relationship fall into two broad categories
 - transit
 - peering

Transit & Peering

- Transit

- Some transit providers, are international networks that have the ability to move packets across the globe
- Networks normally pay a third party (a transit provider) for the service of accessing the networks to which they are not directly interconnected

Peering

- Separate networks voluntarily interconnect to exchange traffic
- Peering may have no fee to both parties (settlement-free or bill-and-keep) or may have a cost that's lower than transit (fee-based peering)
- More Peering, Less Transit
 - By interconnecting with more ISPs
 - By interconnecting with more content providers

Regional IXPs

- A regional IXP: scope is regional (several countries) rather than a single country
- Benefits
 - Even more cost-saving
 - Helps integration of regional economies
 - Larger potential for local content
- Requirements/Challenges
 - National IXPs in all countries
 - Liberalization of telecom markets in all countries
 - Existence of regional carriers at a reasonable cost

Conclusion

- IXPs lower the cost of access and improve user Internet experience
- Regional IXPs have additional value to national and provincial IXPs
- Establishing Regional IXPs is more challenging as they cross borders
- Regional communities such as the East African community facilitate the creation of Regional IXPs
- Regional IXPs can also help the integration of countries within a region

Resources

- www.isoc.org/educpillar/resources/ixp.shtml
- African Peering and Interconnection Forum:
Unlocking Africa's Regional Interconnection
11-12 August 2010
Nairobi, Kenya

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Thank you
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Questions?



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