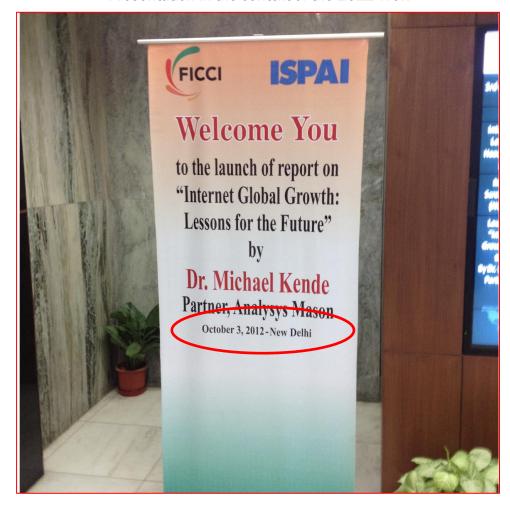


The cost of International Internet Connectivity has been an issue for many years

- ITU-T Study Group 3 has been examining this issue since the 1990s
 - Issues included tromboning of traffic and the high cost of international transit
 - Recommendation ITU-T D.50 in 2000 that Administrations negotiating international Internet arrangements account for the possible need for compensation
- In 2012 the ITU held the World Conference on International Telecommunications (WCIT)
 - Some countries sought to impose the accounting rate regime for voice calls on Internet traffic
 - The European Telecommunications Network Operators (ETNO) was one of the proponents of this change
- In 2022 the 'fair share' debate began in Europe and has spread to other countries
 - The goal is to regulate payments from large content providers to ISPs for delivering traffic
 - ETNO is once again one of the main proponents of this change
- To date, none of these proposals have been implemented, while the Internet keeps evolving to address new issues

Presentation in the context of the 2012 WCIT





While regulation of IIC has been discussed, the value chain has evolved

International **Content Delivery** Internet Exchange Last Mile International **Terrestrial** Internet Network (CDN) Point (IXP) Connectivity Gateway Backbone Connectivity (IIC) Content delivery Internet Exchange Significant increases in International Gateway National backbone Last mile connectivity is International Internet provides backhaul from networks can store Points enable local or a significant cost between international static content in caches regional exchange of international gateway Connectivity globally and domestic capacity element to domestic points of to deliver to end users traffic Liberalisation allows Again, liberalization Many new presence · This can significantly This can significantly submarine cables competition in can increase Liberalisation can lower the costs of landing in coastal landing cables and lower the cost of investment along traffic exchange by with efforts to lower accessing capacity delivering content countries increase investment Content providers Open access content is delivered avoiding the cost of and lower costs are making enables non-Infrastructure only once to the international deployment cache using IIC significant sharing and tromboning discriminatory The caches can be It can also increase streamlined access investment in cables access to cables by any licensed to rights of way can made available the resilience and New satellite lower the latency of through the IXP or constellations to lower the cost of operator exchange Extending this to reach under-served deployment embedded in the landlocked countries network of the ISP areas would significantly Terrestrial backbone is lower costs needed to connect landlocked countries

The only constant is that peering and transit are still commercially negotiated, without regulation



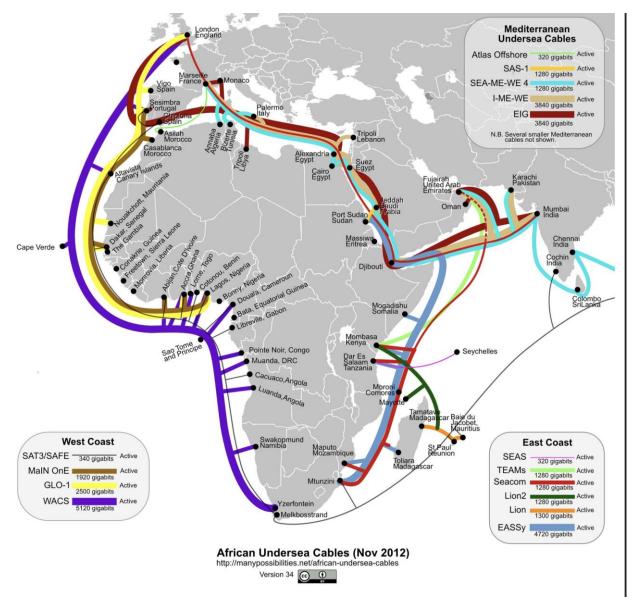
In 2000 there was only one cable landing in three African countries



- SeaMeWe-3 was ready for service in September 1999
 - The capacity was 40 gigabits
 - The landing points were in Djibouti, Egypt
 (2), and Morocco



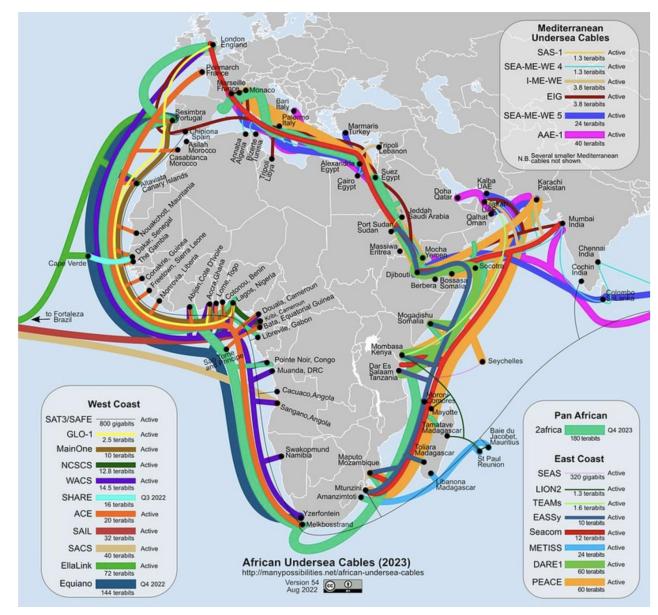
By 2012 there were 15 cables landing in Africa



- The capacity increased significantly
 - 9,880 gigabits landing on West Coast
 - 10,180 gigabits landing on East Coast
 - 10,560 gigabits landing in Mediterranean
 - 30,620 gigabits total
- Landing in 37 of 38 coastal countries (including islands)



A number of new cables have landed, along with other advances



- The capacity increased significantly
 - 364.6 terabits landing on West Coast
 - 169.22 terabits landing on East Coast
 - 74.2 terabits landing in Mediterranean
 - 180 terabits pan African
 - 788.02 terabits total
- Owners include Meta (2africa) and Google (Equiano)
- Exponential increase in capacity submarine cable capacity:
 - .040 terabits in 2000
 - 30.62 terabits in 2012
 - 788.02 terabits in 2023



Many CDNs have begun to place caches in Africa



- Content providers including Google (at left), Meta, and Netflix have developed their own CDNs
- 18 3rd party CDNs have edge servers in 33 countries in Africa (CDN Planet)
- Regional Hubs are beginning to develop, in South Africa, Kenya, Senegal, Nigeria, and Ghana



There have been significant gains across the value chain

International International **Content Delivery** Internet Exchange Last Mile **Terrestrial** Internet Network (CDN) Point (IXP) Connectivity Gateway Backbone Connectivity (IIC) IXPs grew from 1 in The amount of CDN caches are Population covered by International There are still 2000, to 24 in 2012, at least a 3G mobile regulatory challenges terrestrial backbone is increasing in Africa, bandwidth usage per and can lead to to 59 today (Packet user (kbit/s) for IIC increasing to provide network · Has grown in Africa further investment Clearing House) · Has grown in Africa backhaul and crossfrom 11.1 in 2015 In Africa, of the border connectivity from 22.2% in Points of presence These become 2010 to 82.4% in to 84.9 in 2022 countries reporting, (PoPs) connect a magnets for CDNs and The global average 9 have an The number of intra-2022 African routes is network to the rest can become regional · The global average is 232.6 international of the Internet. gateway monopoly. increasing, with more hubs like AMS-IX is in is 94.8% often with peering Europe Africa has the fastest 6 have only partial capacity growth rate in the competition, and Active mobile · Data centers are world, followed by Asia 25 have full broadband competition where content and subscriptions · Has grown in Africa Transit and capacity services are stored prices in Africa are · This helps to keep and processed from 1.7% in 2010 to 42% in 2022 falling faster than IIC prices high, elsewhere, but still particularly for land-The global average higher locked countries is 67.4%

Increased international capacity and localized content will lower IIC prices in Africa



Regulating IIC is not the solution to the remaining challenges

- Internet users
 - Has grown in Africa from 2.0% in 2005 to 37.1% in 2023
 - The global average is 67.4%
- Affordability
 - 2GB of data cost 5% of income for Africa
 - 1.5% of income for the global average
- All developing country categories lag similar to Africa, in spite of significant efforts to achieve universal and meaningful connectivity

- Imposing cost regulations on international capacity (transit or traffic) will not solve the problems
 - It could lead to less investment in new international capacity if the returns are decreased through regulation
 - It could also raise the cost of services delivered using international capacity if traffic is taxed
- Other ways to lower price and increase traffic
 - Liberalize international gateways and ensure open access is possible at borders
 - Harmonize regional regulations to create a single market for transit and traffic to promote development of hubs
 - Ensure an enabling regulatory environment for data centers and CDN and cloud servers



Contact details

Michael Kende

Senior Advisor

Michael.Kende@analysysmason.com

Bonn

Tel: +49 176 1154 2109 bonn@analysysmason.com

Cambridge

Tel: +44 (0)1223 460600 cambridge@analysysmason.com

Dubai

Tel: +971 (0)4 446 7473 dubai@analysysmason.com

Dublin

Tel: +353 (0)1 602 4755 dublin@analysysmason.com

Hong Kong

hongkong@analysysmason.com

Kolkata

Tel: +91 33 4084 5700 kolkata@analysysmason.com

London

Tel: +44 (0)20 7395 9000 london@analysysmason.com

Lund

Tel: +46 8 587 120 00 lund@analysysmason.com

Madrid

Tel: +34 91 399 5016 madrid@analysysmason.com

Manchester

Tel: +44 (0)161 877 7808 manchester@analysysmason.com

Milan

Tel: +39 02 76 31 88 34 milan@analysysmason.com

New Delhi

Tel: +91 124 4501860 newdelhi@analysysmason.com

New York

Tel: +1 212 944 5100 newyork@analysysmason.com

Oslo

Tel: +47 905 59 075 oslo@analysysmason.com

Paris

Tel: +33 (0)1 72 71 96 96 paris@analysysmason.com

Singapore

Tel: +65 6493 6038 singapore@analysysmason.com

Stockholm

Tel: +46 8 587 120 00 stockholm@analysysmason.com



