INTERNATIONAL INTERNET CONNECTIVITY

Contribution to the Seminar on Costs and Tariffs organized by BDT
17-18 May 2011, BOTSWANA

Pauline TSAFAK DJOUMESSI
MINISTRY OF POSTS AND TELECOMMUNICATIONS
Yaoundé, CAMEROON
Pauline.tsafak@ties.itu.int

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1. IIC AND INTERNET REGULATION

1.1 Before WSIS

- Internet infrastructure placed under the authority of the Internet Corporation for Assigned Names and Numbers (ICANN)

Established in 1998, ICANN:

- is the key pivotal body for the Internet's functioning
- has a monopoly over the technical management of the naming and addressing system
- is legally under the supervision of the United States Department of Commerce

The United States derives a twofold benefit from its control over ICANN

1. IIC AND INTERNET REGULATION

1.1 Before WSIS

The United States derives a twofold benefit from its control over ICANN:

- In financial terms: Information exchanges between root servers and domain name owners represented an annual cost in the order of several tens of millions of euros in 2002
- In strategic terms: the potential for exercising diplomatic pressure on third countries (a measure of discretionary power over whether or not a national or sectoral domain name can be created)

1. IIC AND INTERNET REGULATION

1.1 Before WSIS

Criticisms of ICANN's functioning:

- Operational centralization and opacity, reflected in a certain fragmentation in its work
- Lack of representativeness: as originally composed, ICANN had no members from the Internet user community
- Unilateral nature of decisions: it was with a view to Internet regulation by a representative and legitimate body with multi-party oversight that the United Nations organized the WSIS events in 2003 and 2005

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

- On 21 December 2001, the United Nations General Assembly adopted a resolution approving the holding of WSIS, in two phases. The Summit included the private sector and civil society as fully-fledged participants in a multilateral conference.
- The first phase took place in Geneva, from 10 to 12 December 2003, and the second in Tunis, from 16 to 18 November 2005

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.1 Conclusions of WSIS Geneva

At the end of the first phase of WSIS, held in Geneva in 2003, the majority of States, headed by China, Brazil and South Africa, stated their preference for intergovernmental management of the Internet infrastructure through a transfer of powers from ICANN to ITU or the United Nations

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.1 Conclusions of WSIS Geneva

- The private sector and the United States Government expressed themselves in favour of maintaining the existing system
- The Geneva phase of the Summit ended with the adoption of a Declaration of Principles and a Plan of Action

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.1 Conclusions of WSIS Geneva

- The Geneva phase also ended with two issues left pending owing to a lack of consensus: the question of the financing of policies for combating the digital divide and the question of Internet governance
- The United Nations Secretary-General set up two separate working groups - one on the digital divide and one named the Working Group on Internet Governance (WGIG) - to study these two issues with a view to their discussion during the Tunis phase of the Summit

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.1 Conclusions of WSIS Geneva

WGIG's mission was to study a reform of the existing mechanisms for Internet regulation. Its report was published on 18 July 2005. It proposed the following four alternatives for organizational models:

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.1 Conclusions of WSIS Geneva

- Confinement of ICANN's role to a quasi-technical one through the creation of an "International Internet Council", independent of the United Nations and performing administrative functions in place of ICANN, IANA and the Department of Commerce
- Creation of a Global Internet Council, a United Nations entity to take over supervision of ICANN from the United States
- Enhancement of the role of ICANN's Governmental Advisory Committee by transforming it into a transparent forum for the discussion of Internet regulation

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.1 Conclusions of WSIS Geneva

- Creation of three new entities:
- WICANN, under intergovernmental control, replacing ICANN and responsible for the addressing system
- a global Internet governance forum providing a space for discussion among governments, companies and the public
- a global Internet policy council to coordinate work on Internet-related regulation issues

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.2 WSIS Tunis, 2005

The WGIG report was examined during the preparatory meeting for the Tunis phase of WSIS. Discussion focused on the question of the democratization and internationalization of the system for technical management of the Internet. Three opposing currents emerged:

- Developing countries were critical of the United States' domination of the Internet's technical management through its authority over ICANN

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.2 WSIS Tunis, 2005

- The United States was in favour of maintaining the status quo, retaining its prerogatives over ICANN for fear of exposing the network's governance to the influence of undemocratic countries
- The European Union urged stability and preservation of the existing model, while recommending that account be taken of government stakes in terms of internationalization of the network's management. It declared itself favourable to the creation of an international forum to serve as a space for dialogue in which Internet-related issues could be discussed within a framework encompassing the public sector, the private sector and civil society.

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.2 WSIS Tunis, 2005

- The parties came to an agreement stipulating maintenance of the status quo regarding the control exercised by ICANN and the US Department of Commerce over the Internet infrastructure, and the creation of an Internet governance forum
- The Tunis phase of WSIS thus resulted in a two-pronged interim solution, enabling a partial step forward with the creation of a consultative and multi-party forum on Internet governance, while leaving intact the authority exercised by the US Government over the Internet infrastructure

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.2 Internet Governance Forum

- The Forum was given a mandate to discuss public policy issues relating to Internet governance in order to foster the sustainability, robustness, security, stability and development of the Internet. That mandate is set out in § 72 of the *Tunis Agenda for the Information Society*.
- Since the Tunis phase of WSIS, the Internet Governance Forum has been organized on an annual basis

1. IIC AND INTERNET REGULATION

1.2 Reform of Internet governance at WSIS

1.2.2 Internet Governance Forum

- The inaugural meeting was held in 2006 in Athens (Greece). It resulted in a convergence of views on the idea that the prime objective of the IGF should be the development and building of capacities.

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.1 Tariff system

2.2 Reasons for the high cost of IIC in Africa

2.3 A number of solutions for reducing the cost of IIC in Africa

2.4 Opportunities for less costly IIC development in Africa

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.1 Tariff system

In the PSTN, international telephone calls were set up by means of the "half-circuit" model based on a bilaterally negotiated accounting rate. This model has since evolved into a system which is governed by the least-cost routing market, but still within the spirit of revenue-sharing.

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.1 Tariff system

The international Internet charging system is altogether different, since it is based on the so-called "full-circuit" model

By way of illustration, when an end user in Cameroon sends an e-mail message to a correspondent in the United States it is the Cameroonian ISP that bears the cost of the IIC from Cameroon to the United States.

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.1 Tariff system

- However, when a United States end user sends e-mail to Cameroon, it is still the Cameroonian ISP that bears the IIC cost, and ultimately the Cameroonian end user who bears the brunt by paying higher subscription fees
- This divergence in the charging model has been the subject of discussions within ITU-T's SG3 since 1998

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.2 Reasons for the high cost of IIC in Africa

- Limited bargaining power of developing-country ISPs
- Low level of development of telecommunication infrastructure at the regional and local levels
- Low level of cross-border connectivity and non-existence of a cross-border carrier (a consequence of the previous point)

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.2 Reasons for the high cost of IIC in Africa

- Genuine absence of competition with respect to infrastructure
- The small (but growing) number of national and regional Internet exchange points (IXPs)
- Greater concentration on the international bandwidth market, implying less competition and strong downward price rigidity
- Structural problems associated with the low level of demand in LDCs

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.3 A number of solutions for reducing the cost of IIC in Africa

- Creation of national and regional IXPs

  Direct benefits stemming from the creation of an IXP:

  - lower IIC cost
  - reduced latency
  - international bandwidth savings

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.3 A number of solutions for reducing the cost of IIC in Africa

- In more general terms, the creation of IXPs enables:
  - exchange of local traffic at the national and regional levels
  - more outgoing traffic (higher volumes and more varied content)
  - signature of transit agreements with developed-country ISPs, with cost-sharing

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.3 A number of solutions for reducing the cost of IIC in Africa

Generally speaking, however, the IXP solution is meaningful for developing countries only where traffic levels are sufficiently high for exchanges at the local level, whence the need for content development

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.3 A number of solutions for reducing the cost of IIC in Africa

- Development of cross-border connectivity using fibre-optic cables between national IXPs
- Strengthening the capacities of ISPs, regulatory bodies and national ISPs in regard to the creation and operation of IXPs
- Development at the national and transnational levels of high-speed telecommunication infrastructure deployment strategies
- Sensitizing governments to the benefits to be derived from development of such infrastructures and of national and regional IXPs

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.4 Opportunities for less costly IIC development in Africa

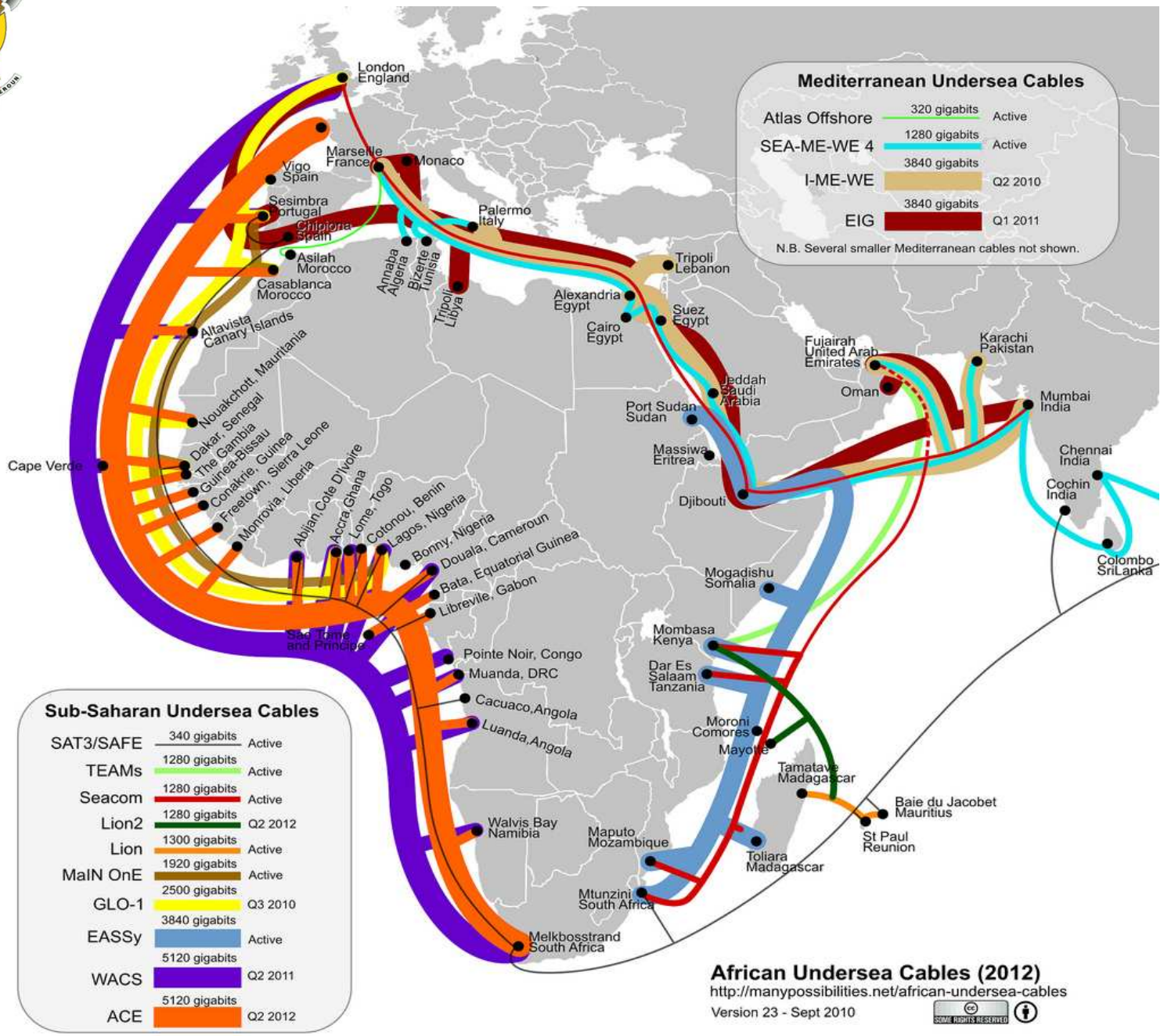
- Potentially strong demand
- In recent years, Africa has seen major investment in the construction of new submarine cables that will make for a 4000% increase in international capacity
- The increasing number of submarine cable offerings, which will bring down Internet costs and improve economic growth in the short and medium terms

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.4 Opportunities for less costly IIC development in Africa

By way of illustration :

- West coast cables and their capacities:
  - ACE: 5.12 Tbit/s
  - WACS: 5.2 Tbit/s
  - GLO-1: 2.5 Tbit/s
  - Main One: 1.92 Tbit/s
- East coast cables and their capacities:
  - EASSY: 3.84 Tbit/s
  - Seacom: 1.28 Tbit/s


Mediterranean Undersea Cables
Atlas Offshore 320 gigabits Active
SEA-ME-WE 4 1280 gigabits Active
I-ME-WE 3840 gigabits Q2 2010
EIG 3840 gigabits Q1 2011
N.B. Several smaller Mediterranean cables not shown.
Sub-Saharan Undersea Cables
SAT3/SAFE 340 gigabits Active
TEAMs 1280 gigabits Active
Seacom 1280 gigabits Active
Lion2 1280 gigabits Q2 2012
Lion 1300 gigabits Active
MaIN OnE 1920 gigabits Active
GLO-1 2500 gigabits Q3 2010
EASSy 3840 gigabits Active
WACS 5120 gigabits Q2 2011
ACE 5120 gigabits Q2 2012
London England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Asilah Morocco
Casablanca Morocco
Palermo Italy
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Guinea-Bissau
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Cape Verde
Abijan,Cote D'Ivoire
Accra,Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Walvis Bay Namibia
Melkbosstrand South Africa
Maputo Mozambique
Mtunzini South Africa
Toliara Madagascar
Tamatave Madagascar
Baie du Jacobet Mauritius
St Paul Reunion
Moroni Comores
Mayotte
Mombasa Kenya
Dar Es Salaam Tanzania
Mogadishu Somalia
Djibouti
Massiwa Eritrea
Port Sudan Sudan
Jeddah Saudi Arabia
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
African Undersea Cables (2012)
http://manypossibilities.net/african-undersea-cables
Version 23 - Sept 2010
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2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.4 Opportunities for less costly IIC development in Africa

- Highly promising fibre-optic cable development projects at the national and transnational levels, one example being the Central African Backbone (CAB) project
- An increasing number of IXPs: there are an estimated 22 IXPs in 18 African countries

2. INTERNATIONAL INTERNET CONNECTIVITY IN AFRICA

2.4 Opportunities for less costly IIC development in Africa

- The dynamism shown by the African Internet Service Provider Association (AfrISPA) in the setting up of IXPs, strengthening of ISP capacities and awareness-building among the various telecommunication development partners (governments, telecommunication sector enterprises, regulatory bodies, etc.)

3. EVOLUTION OF SG3's DISCUSSIONS ON IIC SINCE 1998

The question of international Internet connectivity first appeared on the agenda of SG3 during the 1997-2000 study period. Under the terms of reference of the working party entrusted with this question, the aim was to identify the main differences between the Internet and PSTN, and in particular to:

- determine which components of the international infrastructure play a part in the Internet and fall within the framework of the GII

3 EVOLUTION OF SG3's DISCUSSIONS ON IIC SINCE 1998

- identify cost issues
- propose, if appropriate, a set of equitable remuneration principles for application among international circuit providers

At the end of this initial phase of the work, SG3 agreed that the model for cost-setting in the PSTN could not be applied to the Internet

3. EVOLUTION OF SG3's DISCUSSIONS ON IIC SINCE 1998

- WTSA-2000: adoption of Recommendation D.50, the objective of which is to establish the principle of negotiated arrangements for the transmission of international Internet traffic
- June 2004: adoption of an appendix to Recommendation D.50, entitled "General considerations for charging criteria and options for international Internet connectivity"

3. EVOLUTION OF SG3's DISCUSSIONS ON IIC SINCE 1998

- SG3 entrusted a new mandate to the rapporteur group consisting in the study of methodologies for measuring traffic flow on the Internet, for use within the framework of commercial arrangements. The discussions on this question began in the 2005-2008 study period and are continuing in the current 2009-2012 period).

3. EVOLUTION OF SG3's DISCUSSIONS ON IIC SINCE 1998

- There are diverging views as to the adoption or otherwise of a recommendation on the measurement of Internet traffic flow
- A further amendment to Recommendation D.50 was adopted by WTSA-08, introducing the possible application of network externalities as one of the elements subject to compensation

3. EVOLUTION OF SG3's DISCUSSIONS ON IIC SINCE 1998

- Resolution 101 (Rev. Guadalajara, 2010) of the Plenipotentiary Conference, on Internet Protocol-based networks, among other things calls on Study Group 3, which has responsibility for Recommendation ITU-T D.50, to complete as soon as possible its studies that have been ongoing since WTSA-2000

3. EVOLUTION OF SG3's DISCUSSIONS ON IIC SINCE 1998

Progress made at the 2011 meeting:

- Adoption of a supplement to Recommendation D.50, on general considerations for traffic measurement and options for IIC
- Approval of an amendment 2 to Appendix 1 of Recommendation ITU-T D.50
- Undertaking by SG3 to pursue its studies in the interests of finalizing a draft document (annex, new recommendation, …) on the measurement of Internet traffic flow

3. EVOLUTION OF SG3's DISCUSSIONS ON IIC SINCE 1998

By its Resolution 23, on Internet access and availability for developing countries and charging principles for international Internet connection, WTDC-10:

- created a framework for cooperation between ITU-T and ITU-D, enabling them to organize and coordinate activities that promote:
  - information sharing among regulators on the relationship between charging arrangements for international Internet connection
  - the affordability of international Internet infrastructure development in developing and least developed countries

4. RECOMMENDATIONS FOR IMPROVING IIC IN AFRICA

- Implement the solutions set out in § 2.3 above
  and in particular:
- Develop the broadband telecommunication infrastructure at the national and transnational levels
- Increase the number of Internet exchange points
- Improve, and increase the density of, national content
- Encourage the construction and opening up to competition of submarine fibre-optic cable landing points
- Complete the ITU-T SG3 studies for the adoption of a recommendation on the Internet traffic flow measurement methodology, thereby making Recommendation ITU-T D.50 applicable, with a view to facilitating the negotiation of transit agreements with revenue-sharing between ISPs
- Encourage regulators to participate in workshops organized by TSB and BDT on the subject of IIC, in the interests of strengthening their capacity