

Draft WGIG issue paper on International Internet Connections (IIC)

This paper is a 'draft working paper' reflecting the preliminary findings of the drafting team. It has been subject to review by all WGIG members, but it does not necessarily present a consensus position nor does it contain agreed language accepted by every member. The purpose of this draft is to provide a basis for the ongoing work of the group. It is therefore not to be seen as a chapter of the final WGIG report, but rather as raw material that will be used when drafting the report. This draft working paper has been published on the WGIG website for public comment, so it will evolve, taking into account input from governments and stakeholders.

Background

- In the telecommunication sector, when an international telephone call passes from one country to another, the operator in the country that originates the call has traditionally made a compensatory payment to the operator in the country that terminates the call.
- ITU estimates that, between 1993-98, net flows of settlement payments from developed countries to developing ones amounted to some US\$40 billion.
(<http://www.itu.int/ITU-T/studygroups/com03/accounting-rate/>)
- Historically these revenues were used to subsidize universal service and/or to finance investment in telecom infrastructure.
- On the other hand, International Internet charging mechanisms developed differently, with most of the non-American ISPs paying the full cost of the leased lines connecting their countries to a U.S. international gateway, together with port charges to connect to a U.S. Internet backbone. This remained despite the fact that a great part of the traffic on the lines was arguably attributable to U.S. Internet users accessing content located in other countries.
- In the mid 1990's, Telstra, the incumbent provider in Australia, then 50.1% owned by the Australian government, began to call for some sort of international leased line cost sharing based on quantities of traffic going in each direction – similar to the accounting rates/settlements approach in traditional telecom.
- Telstra took the issue to 1998 APEC Telecommunications Ministers Meeting at TELMIN3 and an ICAIS (International Charging Arrangements for Internet Services) Task Force was created, with a mandate to report back to ministers at TELMIN4, Cancun, Mexico, 24-26 May 2000.
- The Australian government (Australia) also took the issue into a regional traffic group of the ITU [TAS-Tariff group of Asia and Oceania region] and brought the issue into ITU SG3, via a draft recommendation endorsing a cost sharing arrangement, and calling for government oversight of presently commercial agreements.
- CITEL – which is the Inter American Telecommunications Commission, an OAS organization - received a contribution from Mexico at their 26 June- 1 July 2000 meeting.
- Australia then took the issue up in trade talks. On 5 December, 2000, Australia circulated a paper to the Members of the Council for Trade in Services at the WTO, asking that telecommunications services negotiations include, among other items, international charging arrangements where there are dominant players, or de facto monopolies.

- In December, 2000, in the negotiation of the United States-Singapore Free Trade Agreement, Singapore proposed that ICAIS be part of a Joint Statement on Electronic Commerce.
- At the ITU SG-3 April 2000 meeting, the issue was contentious but a vote was held.
- Five countries opposed the draft Recommendation – US, Russia, UK, Canada, Netherlands. In spite of this opposition, the draft Recommendation was submitted for adoption by the ITU World Telecommunication Standardization Assembly, WTSA, Montreal, 2000. A majority vote is all that is required in these situations. The US and Greece took exceptions.
- The draft was adopted as Recommendation D.50 that *recommends* “that administrations involved in the provision of international Internet connections negotiate and agree to bilateral commercial arrangements enabling direct international Internet connections that take into account the possible need for compensation between them for the value of elements such as traffic flow, number of routes, geographical coverage and cost of international transmission amongst others.”
(<http://www.itu.int/rec/recommendation.asp?type=folders&lang=e&parent=T-REC-D.50>).

Issue (what?)

- ICAIS – International Charging Arrangements for Internet Services – is the term for a proposed change in Internet connectivity compensation between networks. This arrangement suggests that Internet Service Providers (ISPs) exchange traffic internationally on a half-circuit model with bi-directional payments, regardless of whether such traffic is carried on private or public facilities. The proposal is based on circuit network assumptions, rather than on the Internet’s architecture.
- The objective is to change the costs of global Internet access, in particular for developing countries. It creates international subsidies for Internet access. Some economies want to require ISPs exchanging traffic to share the cost of international leased lines and to move to a “settlement” of Internet traffic. Today, the Internet works on a full circuit model, with ISPs building out to a market, where they then establish an Internet point of presence, or in some cases, a shared Internet exchange point (IXP). The concern of developing countries is driven by the lack of international connectivity infrastructure and the need to access content in other regions, thus resulting in high international connectivity costs. The underlying issue, however, is whether or not, or to what extent, Governments or regulators should be involved in Internet traffic exchange between ISPs – i.e., regulating the Internet.
- ICAIS is a complex issue which has several facets, but the underlying themes are:
 - a) move to a telecom settlement model for the Internet because it is not considered “fair” that the developing countries should have to pay to come to an Internet hub/access point in the developed world; and
 - b) adopt a North-South subsidy model as a permanent contributory solution to the Digital Divide.
 - c) The need to establish a new regulatory regime of oversight of international connectivity including QoS, rates, types of agreements, etc

Business Perspective:

- The issues underlying ICAIS that are troublesome to business are:
 1. ICAIS assumes that governments should have some oversight in setting the kinds of arrangements and pricing options in interconnection between ISPs;
 2. the conceptual approach of ICAIS is antithetical to how the Internet is architected (ISPs “build” to markets, and locate Internet exchange points (POPS) according to traffic needs and foreseeable business plans); and

3. the present model of the Internet, which is “settlement free” and based on commercial negotiations should change to adopt the telecom settlements model for traffic exchange.
- ICAIS would shift the present full circuit model of the Internet, with two primary financial agreements of transit and peering or hybrid models thereof, into a half circuit model, with “settlement of traffic”. There are serious concerns related to these concepts, including that today’s networks do not provide the kinds of accounting mechanisms needed to support such a shift. The proposal of developing such a mechanism in an APEC supported research initiative has not to date demonstrated its scalability to deal with the international connections now in use at the Tier one level.
 - Traffic patterns are already shifting, and as infrastructure is built out, and as teledensity increases, with the advent of local or regional ISPs, Internet traffic that is local/regional, is staying within the country/region.
 - For countries lacking market opportunity, such as some of the least developed economies, the situation is unique, and different. ICAIS is also not the solution to their needs.
 - Many businesses feel that governments or regulators should not concern themselves with the internal operations of private networks, absent market dominance or abuse.
 - The Internet has flourished the most in markets where competition and open access for ISPs exist. Thus business entities feel that governments should avoid regulating commercial arrangements among ISPs and instead concentrate efforts on accelerating their commitments to open telecommunications markets to full and fair competition.
 - No laws or regulations prohibit ISPs from agreeing to share leased line costs; however, such arrangements should not be made mandatory and therefore imposed on ISPs. A compulsory structure for traffic exchange agreements would force ISPs to limit how and with whom they exchange traffic. Commercial agreements must be able to evolve as the Internet evolves.

Developing Country Perspective:

- International Internet charging arrangements fall within two categories: Peering (Sender Keep All) or Transit (customer-provider relationship).
- These international arrangements that currently apply to global Internet interconnections, have emerged not only from the historic development of the Internet (US centric) and its technical characteristics (dynamic paths – multi-homing – traffic traversing many ISPs’ networks) but also from business models and the dynamic economies of major Internet operators.
- Nature of Internet topology and traffic (asymmetric – best effort) makes it difficult to introduce other charging and settlement practices that would rely on metering of traffic flows.
- ISPs in developing countries, wishing to connect to the Internet, pay the full costs of international leased lines (transit model) to connect to ISPs in developed countries.
- Users at both ends benefit of those links when established. While usage is asymmetric for services such as web access (most of the content being located in developed countries), yet the links are equally utilized by users at both ends for services such as email.
- Traffic patterns are starting to be more and more symmetric with emerging VoIP services and P2P applications.
- International leased line costs, although having lately decreased greatly, are still considered expensive for ISPs in developing countries, and constitute a big percentage of Internet access costs in those countries.
- In some regions, the problem is even more articulated due to the absence of national and regional Internet peering and exchange points, which cause even local traffic to be routed internationally via

hubs established in developed countries, thus utilizing the international links.

- Previous studies have concluded that settlement mechanisms that apply to international voice traffic are not suitable for the nature of the Internet and cannot be directly applied.
- The implementation of Recommendation D.50 has led to the establishment of effective competition in the international market for international Internet connections in many, if not all regions of the world. (http://europa.eu.int/information_society/topics/ecom/doc/all_about/international_aspects/itu/ec_ond50.pdf)
- This system works well in industrialized countries, but for developing countries access to the Internet often goes via relatively expensive satellite links or other transmission links which ISPs in developing countries have to cover themselves. Many developing country operators consider this a problem which can only be resolved if ISPs in other countries agree to share the costs of the international link capacity according to the level of traffic exchanged between the ISPs concerned. (http://europa.eu.int/information_society/topics/ecom/all_about/international_aspects/main_areas_work/itu/index_en.htm)
- But even if lower costs are made available to ISPs in developing countries, the fact remain that the flow of revenue is reversing.
- As more telephone and fax traffic shifts to the Internet, What will replace the yearly US\$7-10 bn from settlements?

Attribution to category / ies

“Equitable Distribution of Resources”

- Global Internet connectivity costs are inequitably allocated. ISPs in developing countries invest to establish connectivity to Internet backbones in developed countries, while ISPs in those countries, inherently benefit from these established links to connect to ISPs in developing countries.

“Access for All”

- High costs, borne by ISPs in developing countries, are then passed to end customers, thus making Internet access unaffordable by introducing an additional cost barrier.

“Stable and Secure Functioning of the Internet”

SWOT Analysis

Strengths:

- For international Internet backbone operators, current charging arrangements are flexible, settlement-free and based on commercial negotiations.
- International consensus/understanding that some forms of cost sharing of international Internet traffic ought to be established.
- Examples in more developed regions already show significant economic and operational benefits.

Weaknesses:

- ISPs of developing countries pay higher charges for international Internet connectivity than their counterparts in developed countries.
- Internet-based businesses in developing countries prefer to relocate to developed countries, where costs of global Internet connectivity is much cheaper.

- Users in developing countries pay higher costs for Internet services than users of developed countries, resulting in an increased digital gap.
- Non-regulated services layer, historically the settlement process has been based on ad-hoc bilateral agreements, depending on the relative strength of parties involved.
- Consensus on the urgent need to establish effective intra-regional IXP/peering agreements is not seen as priority in the poorer regions.

Opportunities:

- The recent development of national and regional Internet exchanges and hubs is providing better utilization of international capacities by keeping local/regional traffic local/regional, and encouraging content providers of developed countries to mirror their content in those regional exchanges.
- Increased competition in international bandwidth supply has led to a significant increase in international capacities, resulting in continuous reductions of international leased line costs.
- Significant examples of some regions (Asia, European Union) of strong cost reductions and service efficacy improvements with combined national and regional IXPs and peering arrangements should motivate Africa, South /Central America, Eastern Europe, poorer Asian countries to do the same.
- RIRs organized now in all regions could serve as a pivotal entity for intra-regional peering/exchange.
- There are possibilities for actual reduction in bulk bandwidth with strong positive effects in the "first mile" (the end-user, community networks and the smaller ISPs).

Threats:

- A trend towards more symmetrical traffic is expected to continue with the increased usage of services such as business-to-business, peer-to-peer and VoIP.
- Regional geopolitical differences/conflicts
- Resistance to change by tier-1 (mostly USA-based) operators
- Decisions taken without regard to end-users or smaller services providers
- Without the adoption of a settlement regime that supports some form of cost distribution among Internet providers, there are serious structural problems in supporting a highly diverse and well populated provider industry sector. These problems are exacerbated by the additional observation that the Internet transmission and retail markets both admit significant economies of scale of operation. The combination of these two factors leads to the economic conclusion that the Internet market is not a long term sustainable open competitive market that is capable of supporting a wide diversity of players both large and small. This aggregation is already well underway in today's Internet, and direction of the Internet market will be forged through the tension between this aggregation pressure and various national and international public policy objectives that relate to the Internet industry.

(<http://ispcolumn.isoc.org/2005-01/interconns.html>)

Actors (who, with whom?)

- While ICAIS has been recently restricted in terms of active work to the ITU SG3 Joint Rapporteur group, APEC has continued to monitor the work, and has continued its study of ICAIS technologies. CITEL has had intermittent interest in the issue and continues to monitor activity.

Forums (where?)

(a) who participates

(b) nature of forum

- ITU Study Group 3 started discussing the issue of “International Internet Connectivity (IIC)”, since 1998. In October 2000 the ITU World Telecommunications Standards Assembly approved ITU-T Recommendation D.50 regarding “Peering” or “Transit” arrangements between ISPs and Internet backbone providers. The Recommendation is voluntary, and suggests that parties involved take into account the possible need for compensation for elements such as traffic flow, number of routes, geographical coverage and the cost of international transmission among others when negotiating commercial arrangements. Although this may work well for developed countries, yet for developing countries, international Internet connectivity remains a serious problem, as agreed by Study Group 3.
- Study Group 3 agreed in June 2001 to pursue further studies on IIC, and established two Rapporteur Groups, one for developing further guidelines to facilitate the implementation of Recommendation D.50, and the other for examining the possibility of using traffic flow as a main factor of negotiation for IIC. In June 2004, Study Group 3 adopted Amendment 1, on “General considerations for charging criteria and options for international Internet connectivity”, which complements Recommendation D.50. However, the study on the traffic flow methodology was not concluded and work continues during a new study period 2005-2008.
- In general, Recommendation D.50 recognized that, the way to reduce the costs of connectivity in high cost regions can best be achieved through commercial IIC arrangements.
- AfrISPA, the African Internet Service Provider Association, presented in October 2002, its “Halfway Proposition”, which recommends creating traffic aggregation points within Africa and Digital Arteries to carry this traffic. The proposition suggests active participations from ISPs, National Regulators and Policy Makers, as well as the ATU/AU/NEPAD and G8 Donor Governments.

Governance mechanisms (how?)

(a) objectives of the rules system

(b) content of principles, norms and rules

- There is no international governance mechanism.
- The Recommendation D.50, is voluntary, and only suggests that parties involved take into account the possible need for compensation for elements such as traffic flow, number of routes, geographical coverage and the cost of international transmission among others when negotiating such commercial arrangements. And also it is not recognized by all countries, US and Greece made reservations and stated that they would not apply it in their international charging arrangements.

<http://www.itu.int/ITU-T/studygroups/com03/iic/index.html>

Additional comments

- The alternatives to a governance (regulatory) mechanism are:
 - Development of regional IP backbones
 - Establishment of local and regional IXPs
 - (Leverage for negotiating better conditions with backbone providers in the north).