Internet technical community perspective on the proposed amendments to the ITRs

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International Telecommunication Regulations (ITRs)

The International Telecommunication Regulations (ITRs) refer to the global treaty dating back to 1988. Currently signed by 178 countries, the ITRs aim to establish general principles for the provision and operation of international telecommunications.

The technical community agrees that the ITRs play an important role in facilitating global and international telecommunications. However, given some of the proposed amendments currently under discussion, we would urge Member States to consider the technological differences between the voice and data models.

This presentation will provide some technical perspective on why some of the proposed amendments would not assist, and may hinder, the growth, development and innovation of the global Internet.
## Difference between voice and data networks

<table>
<thead>
<tr>
<th>Voice networks</th>
<th>Data networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Intelligences is in the core</td>
<td>* Intelligences is on the edges</td>
</tr>
<tr>
<td>* Circuit Switching</td>
<td>* Packet Switching</td>
</tr>
<tr>
<td>* Sent voice travels through a dedicated path and has to arrive in order to be understood.</td>
<td>* Sent objects are fragmented into packets, packets do not necessary use the same path and do not have to arrive in the same order.</td>
</tr>
<tr>
<td>* Centralized</td>
<td>* Decentralized, no single point of failure</td>
</tr>
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</table>
These differences and many others mean that the methodologies and terminologies used by policy-makers cannot be transferred directly from one system to the other.

In other words the Internet cannot be incorporated into the current framework by simply adding "and the Internet" to the ITRs.
The Internet

Some often mistakenly think that the Internet is this one big cloud or pool full of centralized content, and that end users just attach themselves to its ends.

It also seems that one dedicated wire connects end users directly to their desired content.

The reality is "THERE IS NO ONE BIG INTERNET"
The Internet

It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies.
The Internet

These networks have to be fully interconnected so that users on a network can access content/services and information hosted on other networks.

The Internet carries an extensive range of information resources and services, such as the interlinked hypertext documents of the World Wide Web (WWW) and the infrastructure to support email and other online services.
Data traffic exchange

Without the establishment of an exchange point (IXP) in a country, that enables local ISPs to connect directly together, domestic traffic will have to leave the country through its International connections in order to retrieve the local content. This will add unnecessary costs, latency and worsen the overall user experience.
Data traffic exchange

- The establishment of an IXP in the country enables local ISPs to connect directly together and exchange domestic traffic, typically with settlement-free peering, thereby reducing and saving cost on international transit while reducing latency (by avoiding local traffic to be carried internationally).
- Domestic websites hosted abroad may ‘come home’ in order to reduce foreign hosting and transit charges.
- IXPs also help build ccTLDs and e-gov.
When the IXP begins to build critical mass, it will also begin to attract content providers, along with business, academic, and government users. Thereby it becomes the center of a vibrant Internet ecosystem in the country or region.

The IXP can begin to attract international content and connectivity providers, becoming a regional hub for Internet traffic.
Kenya & Nigeria experience with IXPs\textsuperscript{[1]}

<table>
<thead>
<tr>
<th>Benefit</th>
<th>KIXP</th>
<th>IXPN</th>
<th>Summary</th>
</tr>
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<tbody>
<tr>
<td>Latency</td>
<td>Reduced from 200-600 ms to 2-10 ms</td>
<td>Reduced from 200-400 ms to 2-10 ms</td>
<td>Noticeable increase in performance for end users</td>
</tr>
<tr>
<td>Local traffic exchange</td>
<td>1 Gbit/s peak</td>
<td>300 Mbit/s peak</td>
<td>Savings on international transit of over $1 million per year in each country</td>
</tr>
<tr>
<td>Content</td>
<td>Google network present locally, along with rehoming of domestic content</td>
<td>Same as in Kenya</td>
<td>Increase in usage and corresponding revenues for mobile data traffic</td>
</tr>
<tr>
<td>E-government</td>
<td>Kenya Revenue Authority gathers taxes online</td>
<td>Usage by education and research networks</td>
<td>Social benefits from e-government access to IXPs</td>
</tr>
<tr>
<td>Other benefits</td>
<td>An increasing amount of regional traffic exchanged at KIXP</td>
<td>Financial platforms hosted locally</td>
<td>Further economic benefits resulting from IXPs</td>
</tr>
</tbody>
</table>
ITU recommendation for IXPs[2]

“If invited, regulators can play a helpful role as neutral arbiter in the setting up of national IXPs”

“For regional IXPs, regulators can help clear the regulatory obstacles that exist at a sub regional level”

“Where there is no competition on either data carrier or the International gateway, it is important that the regulator makes it a central priority to lower cost of leased lines the cost of purchasing bandwidth through the monopoly international gateway”

“IXPs may need to obtain agreement from the regulator to start operations but it is not appropriate for them to be licensed. Since the aim is to provide a piece of “common carriage” infrastructure the purpose of which is not to make profit but to save countries hard currency, it is important that it should have no additional financial burdens imposed on it.”
Terminologies with different meanings in voice and data networks

- **Hubbing**

**A.31 Hub**
A transit centre (or network operator) that offers to other operators a telecommunication traffic termination service to nominated destinations contained in the offer.

**A.32 Hubbing**
The routing of telecommunication traffic in *hubbing mode consists in the use of hub facilities to* terminate telecommunication traffic to other destinations, with full payment due to the *hub*.

![Diagram showing hubbing concept]

- Hubbing rate: 0.04 $/min
- Out payment: 0.06 $/min
- Hub traffic: 0.02 $/min
- Transit traffic: 0.03 $/min
Terminologies with different meanings in voice and data networks[4]

• Misuse & fraud

A misuse of an E.164 international numbering resource occurs where the use of that numbering resource does not conform to the relevant ITU-T Recommendation(s) assignment criteria for which it was assigned or when an unassigned numbering resource is used in the provision of a telecommunication service.

In the data networks

Proxies: Intercept web fetches and cache the downloaded data. When another user requests the same URL the proxy will use the cached version of the content, rather than forwarding the request on to the original site.

Firewalls: Interception and discarding of packets on the fly.
Terminologies with different meanings in voice and data networks

• **Quality of service**

A misuse of an E.164 international numbering resource occurs where the use of that numbering resource does not conform to the relevant ITU-T Recommendation(s) assignment criteria for which it was assigned or when an unassigned numbering resource is used in the provision of a telecommunication service.

In the data networks

Setting a higher priority for real time application packets (voice and video) than non real time application packets, to enhance the overall performance of the network.
Global Internet Registry for IPv6

What are the issues that need to be addressed?

• Proper documentation of resources
  Each Regional Internet Registry (RIR) operates and maintains a publicly published data base with all related information on the allocated IP address space. [5]

• Help with the uptake of IPv6 on a national or global level
  Major content providers are joining ISOC’s World IPv6 launch initiative on the 6th of June. [6]

Networks that have IPv6 global presence in the African region have increased by 200% in 2011 [7]
Global Internet Registry for IPv6

The current Internet registry system is built around five Regional Internet Registries (RIRs), each allocating space to a predefined geographical region out of a big block of IP addresses (a /12 in IPv6 terms) that they, in turn, have obtained from a central pool that is managed by IANA.

When this address space is allocated, the receiving organization advertises the space so that other networks worldwide can find that space. These advertisements are stored in global “routing tables”, which are stored on routers or networked computers. The bigger the routing tables become, the more memory is required on the routers, which means additional costs to network operators, and may require upgrading the router itself.
Global Internet Registry for IPv6

When a geographical region is all advertised from a single, contiguous block (/12), it makes it easier to aggregate these advertisements and thus minimize the number of entries in routing tables, thus bringing down memory and cost.

If the distribution of IP addresses were to be handled differently (say, a global Internet registry allocating to countries, rather than network operators) this would result in less opportunity to aggregate, and more entries in the routing tables.
Routing and Security

The Internet Engineering Task Force (IETF) is the organization that develops and promotes Internet standards. The SIDR WG at the IETF focuses on securing inter-domain routing.

Border Gateway Protocol (BGP)

Border Gateway Protocol is the protocol backing the core routing decisions on the Internet. It maintains a table of IP networks or 'prefixes' which designate network reach-ability among other networks.

Border Gateway Protocol (BGPSEC)

Currently the SIDR WG is focused on the development of BGPSEC - extensions to BGP that allow path validation.
Routing and Security

Resource Public Key Infrastructure (RPKI)

Resource Certification is a security framework for verifying the association between Internet number resources (Internet addresses and/or Autonomous System Numbers) and their rightful holders.

Domain Name System Security Extensions (DNSSEC)

DNSSEC is a suite of specifications for securing certain kinds of information provided by the Domain Name System (DNS) as used on Internet Protocol (IP) networks.
In order to regulate spam and content each packet must be inspected before reaching its destination in order to determine whether it should be considered spam or not. The problem with this is:

• Contradict the previously discussed number misuse proposal, which would regulate against packets being routed anywhere else other than their original destination.

• Be a direct vitiation to all personal privacy and security aspects, essentially giving an organization the jurisdictional right to inspect all data communications, a concept that does not even exists in existing voice models.

• Content regulation is subjective and open to perception.
Recommendations

• There are obvious differences between both the voice and data network models, these differences make regulating both models under the same set of regulations impractical.

• More collaboration and participate more in Internet technical and policy forums

  AFNOG & AfriNIC public policy meeting, Gambia (May 12 – May 18)

  ICANN meetings

  Internet Governance Forum (IGF), Azerbaijan (November 6 - November9)

  IETF, 3 meetings every year in different locations around the world

• Local issues that can be resolved at a local level (technically or policy) do not need to be in an international treaty.
References

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1. IPv6 Enabled Networks- RIPE NCC
Thank you

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