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10 February 2022

Shri Sanjeev Kumar Sharma
Advisor (Broadband and Policy Analysis)
Telecom Regulatory Authority of India
Mahanagar Door Sanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi – 110002
India
(via email)

Dear Mr Sharma,

**Re: Consultation Paper on Regulatory Framework for Promoting Data Economy Through Establishment of Data Centres, Content Delivery Networks, and Interconnect Exchanges in India**

The Internet Society is pleased to submit our comments in response to the *Consultation Paper on Regulatory Framework for Promoting Data Economy Through Establishment of Data Centres, Content Delivery Networks, and Interconnect Exchanges in India.*

The Internet Society is a global not-for-profit organisation that supports and promotes the development of the Internet as a global technical infrastructure, a resource to enrich people's lives, and a force for good in society. Working through a global community of chapters and members, the Internet Society collaborates with a broad range of groups to promote the technologies that keep the Internet secure, and advocates for policies that enable universal access.

We commend the Telecom Regulatory Authority of India for initiating this public consultation process. Such open processes allow multistakeholder input which help achieve balanced and better outcomes. They also reduce the risk of creating a set of priorities that reflect only the interests of any one group or entity.

Our submission below addresses the Internet Exchanges part of the consultation.

*Q.38: Do you think that presently there is lack of clear regulatory framework/guidelines for establishing/operating InterconnectExchanges in India?*

Our comments:
Given the current IXP landscape in India, we believe clarity is needed on regulatory guidelines. The current IXP environment is mixed in nature. A few IXPs operate under some type of licensing while the National Internet Exchange of India (NIXI) does not operate under any license. Introducing a licensing framework for IXPs would potentially create a more restrictive operating environment for existing and future IXPs. Operating guidelines or frameworks, based on industry best practices and geared towards fair competition, collaboration and cooperation, may better suit the IXP industry and its further development.

*Q.39: What policy measures are required to promote setting up of more Internet Exchange Points (IXPs) in India? What measures are suggested to encourage competition in the IXP market?*

Our comments:
First there is a need for a more precise definition of what qualifies as an IXP e.g., this could include criteria such as a minimum of three peers, being independent, neutral, etc.

As well, we recommend adopting policy measures that incentivise the establishment of IXPs such as:
- Providing tariff relief and tax exemptions for IXP equipment. Tier 2 and 3 cities could be prioritised under such schemes
- Promoting wider industry awareness of the need for IXPs, and encouraging local carriers, telcos and content providers to connect to IXPs
- Mandating the sharing of essential facilities, civil works, and passive telecommunication infrastructure (e.g., masts, cabinets, ducts, dark fiber)
- Facilitating communities of practice by increasing the level of support for relationship building, technical training, and skills development to ensure that ISPs / Telcos can more effectively use the existing IXPs, and help in the establishment of new IXPs.

*Q.40: Whether there is a need for separate light-touch licensing framework for operating IXPs in India? If yes, what should be the terms and conditions of suggested framework? Do justify your answer.*

Our comments:
We believe that there is a need to consider any unintended consequences that may arise from the establishment of an IXP regulatory framework, light-touch, or otherwise. Most liberalized Internet markets have an initial IXP that is setup to improve local traffic routing efficiency, and this is a positive indicator of a growing Internet economy. The maturity of the Internet peering ecosystem often results in the emergence of new private or community-operated peering locations (IXPs) that offer choices to operators in the market. Barriers to entry through strict regulations or licensing could be detrimental to establishing IXPs and the development of the local Internet industry.

In addition, this would introduce a new entry barrier for potential IXP operators, especially for those in Tier 2 and 3 cities across the country. It is well documented that a single operator can become complacent in the absence of alternative options. Therefore, eliminating barriers to entry for new IXP(s) in any market and avoiding the creation of an IXP monopoly is also a check and balance for complacency. This ensures competition and continued innovation in technical operations in the IXP(s).

Experiences drawn from South Africa and the UK show that the emergence of new IXPs without any regulatory barriers was instrumental in advancing the peering ecosystem. Perhaps one approach to formalising IXPs in India could be something similar to the PM WANI framework (https://dot.gov.in/pm-wani), where an IXP could be required to register itself. The framework could lay out the operating guidelines as well as the requirements for what qualifies as an IXP.

*Q.41: What business models are suitable for IXPs in India? Please elaborate and provide detailed justifications for your answer.*

Our comments:
IXP models are particular to local operating environments and market factors. From what we observe around the world, they range from non-profit community based to commercial operations run by the private sector. In general, IXP models evolve in the direction of their stakeholders as the peering ecosystem matures.

However, the most critical element of any IXP business model is neutrality which ensures that the primary purpose of such a facility is peering and not necessarily selling or buying bandwidth. We suggest not prescribing any suitable business model for IXPs in India. Instead, we recommend letting the market evolve freely and encouraging sharing of experiences and best practices on governance, sustainability, ownership, and scalability.

*Q.42: Whether TSPs/ISPs should be mandated to interconnect at IXPs that exist in an LSA? Do justify your response.*

Our comments:
In our experience, mandatory interconnection is not a preferred practice. TSPs/ISPs that connect to local IXPs tend to consider business implications.

For instance, it is common and accepted practice for a transit provider(s) not to peer with its customers at an IXP for two reasons. First, it is technically difficult for the transit provider to differentiate which traffic, destined to its customer, should go via the peering or transit link. Second, peering with a customer takes away the commercial incentive for the transit operator. Equally, connecting to an IXP does not mean that the network will announce all its networks at that location for business reasons. This makes it difficult to enforce optimal peering for networks, especially those who feel compelled to be at peering locations where they do not wish to be present. Thus, it may be more meaningful for policy and regulations to provide incentives for peering instead of strict rules that are difficult to enforce and encourage malpractice.

*Q.43: Is there a need for setting up IXP in every state in India? What support Govt. can provide to encourage setting up new IXPs in the states/Tier-2 locations where no IXPs exist presently?*

Our comments:
In many markets, the initial IXP is often organically established through collaboration between the local stakeholders to address a growing need to exchange local traffic and grow the local Internet ecosystem. These IXPs are commonly referred to as "Community IXPs". They are an outcome of stakeholders' awareness, collaboration, and market readiness.

The Government can play a facilitative role in fostering the establishment of the initial IXP through stakeholder mobilization, collaboration with IXP experts, and establishing an enabling policy and regulatory environment. Policy measures such as providing tariff relief and tax exemptions for IXP equipment, promoting awareness of the need for all local carriers, telcos, and content providers to connect to IXPs, mandating the sharing of essential facilities, civil works, and passive telecommunication infrastructure (such as masts, cabinets, ducts, dark fiber), and encouraging the establishment of communities of practice to support relationship building, technical training, and skills development can all help encourage the establishment of new IXPs in Tier 2 and 3 cities.

*Q.44: Whether leased line costs to connect an existing or new IXP is a barrier for ISPs? If yes, what is the suggested way out? What are other limitations for ISPs to connect to IXPs? What are the suggestions to overcome them?*

Our comments:
Leased line costs to connect to an existing or new IXP can be a barrier for small ISPs. However, the overall cost burden is calculated based on the cost savings between having to buy transit and the settlement-free traffic exchange at the IXP. Regulatory interventions to subsidize the cost of leased lines for smaller IXP to connect to an IXP could help reduce this barrier.

*Q.45: Is the high cost of AS number allocation an impediment for small ISPs to connect to IX? If yes, what is the suggested way out?*

Our comments:
Any ISP would need IP addresses to provide service and should have its own AS number. IP addresses and AS numbers are part of an ISP's business operating expenses and are usually factored into its business plan. The costs for Internet resources such as AS numbers have more to do with running an ISP efficiently, rather than connecting to an IXP.

In India's case, there is also IRINN which was set up to support Indian ISPs. As per the IRINN website, the resource fees are cheaper than the Regional Internet Registry (APNIC) along with localised customer support.

*Q.46: What other policy measures are suggested to encourage investment for establishing more number of IXPs? Any other issue relevant with IXP growth may be mentioned.*

Our comments:
An enabling policy and regulatory environment that eliminates barriers and provides incentives to network operators to connect to IXPs is key. Tailored incentives for those who wish to establish an IXP would help attract interest and investment. We have offered some suggestions to this effect in our responses to questions above.

We thank you for this opportunity to provide comments, and trust you will find our responses useful. Please do not hesitate to contact us if we can be of further assistance.

Yours sincerely,

Rajnesh D Singh
Regional Vice-President, Asia-Pacific
Internet Society