IIXP Establishment in KSA

**Response to the consultation paper
"ASSESSMENT OF THE ESTABLISHMENT OF
INTERNATIONAL INTERNET EXCHANGE POINTS
(IIXPS) IN THE KINGDOM OF SAUDI ARABIA"**

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1.1   Executive Summary

IIXPs are currently the backbone of the internet, it is used by ISPs, companies, and content providers to reduce their connectivity costs and increase the quality. Having an IIXP in the Kingdom Of Saudi Arabia is an essential step to promote the internet. Many national ISPs and companies will use the local IIXP to host their content instead of other international facilities. In return, they reduce their cost and provide better services for their customers in KSA. The following definition is excerpted from the Internet Society organization (ISOC)[1] "Internet Exchange Points (IXPs) keep Internet traffic local, improve the quality of Internet services, provide resilience in domestic infrastructure, and reduce costs. IXPs are also growing in importance as critical infrastructures".

1.2   Effect of IIXP on FBPs

We need to thoroughly study if having an IIXP will affect FBPs operation and sales or not. At first look, it seems yes it will affect their sales but at the end all traffic coming or going to the IIXP will be served by the FBPs which mean higher capacities will be purchased by IIXP members to the IIXP. The following is a summary of the advantages and disadvantages of the IIXP on FBPs assuming that it is handled by neutral entity.

A. **Advantages**

1. It will open new type of business and promote selling large national transmission capacity to the IIXP.

2. Selling bandwidth to International providers from Europe and US to the IIXP in Saudi Arabia.

3. Content providers will collocate in the IIXP because it is neutral, which in return will lower FBPs needs for international capacities. Currently, FBPs can't offer hosting to content

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[1] The Internet Society (ISOC) is a nonprofit organization founded in 1992 to provide leadership in Internet related standards, education and policy. They are dedicated to ensuring the open development, evolution and use of the Internet for the benefit of people throughout the world.

providers (such as Yahoo.com and Maktoob.com) in their premises because it is not neutral environment.

B. Disadvantages

1. ISPs and entities holding ASN (Autonomous System Number) can peer with each other which reduce the income of selling IP level products.
2. Other Member of the IIXP will also benefit from content providers which reduces their need for IP level capacities.

1.2.1   Conclusion

FBPs may try to stop the IIXP because it mainly affects their IP product sales, CITC should not stop the IIXP because of this. FBPs can generate more sales from transmission capacities to and from the IIXP, and they can make new business model from the IIXPs.

1.3   Effect of IIXP on End Customers

For the end customers (either home or business) it will be a huge enhancement. The following are summary of main IIXP advantages:

1. It reduces the costs of the internet and internet services in KSA.
2. It will reduce the latency which enhances the user experience and the quality of the service.
3. It will reduce the effect of Cable cut on Saudi Arabia when many international content providers are hosted in the IIXP.
4. Popular services hosted in the IIXP can serve more customers because of cheap internet capacities.

1.4   Challenges for IIXP success

1. Regulations that allow the success of both FBPs and IIXPs.
2. FBPs may seek to prevent the development and success of the IIXP.
3. Support from the stakeholders including CITC, FBPs, large ISPs, and content providers.
4. A neutral entity that is willing to invest in IIXP.

2   Observations on the proposed Options

The evaluation of the proposed options will be based on the assessment in the previous section.

2.1   Option 1: IIXP operated by CITC

CITC had done it before and it was an unsuccessful. To be successful, it is recommended that CITC should initiate and support a third party or a consortium of ISPs, and content providers (national, and international) to create the exchange. This will attract the FBPs to join the IIXP and provide support for it.

2.2   Option 2: IIXP by FBP or commercial entity

FBPs already have the license to do so but were not successful because they are not a neutral entity, and they will not offer IP product for free. As for the commercial entity, it would be neutral which makes it the best solution that attracts international content and IP providers. The only problem is the lake of investors for organization with small profit or none profit at all.

2.3   Option 3: Do not establish IIXP in the kingdom but require direct interconnection for IP traffic between FBPs

Establishing IIXP and ensuring localization of the IP traffic is two different unrelated subjects. Even if IIXP is established that doesn't mean we can ensure the localization of IP traffic. The peering of FBPs is required to ensure the localization of IP traffic. That is said; not having a neutral IIXP in Saudi Arabia will affect the growth and the quality of the internet in KSA. IIXP are one of the main pillars for internet growth and quality, the case of Kenya KIXP is clear example on that (1).

3 Recommendation

3.1 Suggested Solution

Having an IIXP in KSA is not an option; it is a must for the kingdom three policy goals. It is the next natural step in the development of the internet in Saudi Arabia. Building an IIXP is not the main problem but who should own it and operate it. The suggestion is a mix between option #1 and #2 by having a consortium of main ISPs, national and international content providers, main Telecom hotel licensees, and at least one FBP lead by CITC to create the first IIXP. In the first stage the IIXP should be operated by the consortium and while operating it, they should prepare the handover of the operation to neutral non-profit entity. The following are the suggested steps for the success of the IIXP:

1. Release a regulation for hosting contents inside KSA.
2. FBPs should provide reliable redundant transmission links to the datacenters facilities.
3. CITC should invite large international content providers such as Akamai, Limelight, yahoo.com, and Maktoob.com to build their nodes in the IIXP. Some of them are interested but they refused to do so due to the lake of regulation and a neutral entity. CITC should naturalize all obstacles for them.
4. Stakeholders should start hosting their content and peering with each other in the IIXP.

With the above steps remaining FBPs will find that connecting to the IIXP will reduce their costs and increase the quality provided to their customers.

3.2 IIXP versus Virtual IIXP

CITC is demanding a teir-4 Data center for the IIXP which is currently too strict due to lake of options and it will also increase the costs on IIXP members. Members vary in their requirements, and in order to make it a cost effective solution for all the members of the IIXP, it should provide more options. This can be solved by the Virtual IIXP concept in the consultation paper. However, it is suggested that the IIXP license should also allow the licensee to do virtual IIXP. The following are the main drivers for it:

1. **Expandability:** Usually public IXPs rent a space in a datacenter based on current requirements and expand gradually. This reduces the initial costs but they will risk the space availability in the data center. Restricting IIXPs to one datacenter will render it, at certain

point, not expandable and that creates a monopoly which increases the rental costs as it is hard to move the IIXP from one data center to the other.

2. **Reliability:** one of the main requirements for IXPs is to be reliable. Some of the content providers require two nodes per IXP in two different locations to start hosting their content.

3. **Flexibility:** IIXP can offer different prices in different location. This will create the needed competition between datacenters providers.

One main condition that needs to be in place in order to restrict Virtual IIXP from competing with FBPs which is limiting the virtual IIXP to a single city and certain number of locations per city. Otherwise, the IIXP will start to compete with FBPs. Other restriction methods described in the consultation paper is not technically feasible as the backhauling may also be between two different ASNs.

3.3 IIXP Members

For the members, it should be opened to anyone having at least an AS number. Other technical requirement may be set during the establishment of IIXP policies and procedures. These are common requirements in most IXPs in the world.

There are still some points that need to be raised in order to find a proper solution for it. The following points may need further discussions:

1. IIXP members (mainly ISPs) will try to co-locate all their services in the IIXP datacenter. This gives them clear advantage over their competitors and FBPs will not support the IIXP. A proposed solution is to have a price policy for accessing the IIXP regardless to the location of the physical equipments of the member. In this case, the cost would be the same for all members.

2. Currently content providers (national and international) don't have a license. Do they need one? If not then do they need one to be part of the IIXP? And what is the regulation?

3. How the international members will export their equipments to the IIXP? It is suggested to have a standard proposed by the IIXP for all international members.

4 Answers for the Questions

4.1 The market situation

1. *CITC goals. Are the goals that CITC has identified – promotion of the Internet, transformation of the Kingdom into an Internet hub, and localization – appropriate? Should CITC adopt any additional goals?*

   The Goals are appropriate but for the localization goal it would be better to also add to it promoting localized content hosting. Many locally owned sites are hosted in international facilities even though its main customers are in Saudi Arabia. They are doing so because of the very high costs for hosting it locally. CITC should promote hosting services locally as it is hard to promote KSA as an internet hub while its content is hosted outside KSA.

2. *Growth of the Internet. Is the Kingdom adequately promoting the growth of the Internet? Why is the broadband penetration rate in the Kingdom lower than the broadband penetration rate in other, less developed countries?*

   Usually the main driver for mass market is the need and simplicity. If the government and companies made their services online the penetration will increase. But currently it is expensive for companies to host their services locally. We hope that IIXP will solve this.

3. *International Hub. Is the Kingdom fulfilling its potential as a regional Internet content and traffic hub? To what extent is domestic content being hosted outside the Kingdom? Why? Why isn't more international content hosted in the Kingdom? Why doesn't more international Internet content transit through the Kingdom? What impact does the current situation have on consumers?*

   To make the Kingdom an international hub, carriers and content providers need a clear regulations. Until today, there is no regulation on accepted contents in the kingdom which prevent international content providers from hosting it locally. Also, the high hosting prices prevent domestic content providers from hosting their sites inside KSA.

4. *Localization. To what extent has domestic Internet traffic been localized? How has that been accomplished? Is localization being accomplished in the most efficient manner? Are there any adverse effects resulting from actions currently being taken to localize domestic Internet traffic?*

   Peering should be enforced between FBPs only.

4.2   Policy options

5. *Establishment of an International IXP. Should CITC establish an International IXP? Would this be an effective means to achieve the three goals identified by CITC? Would the establishment of an International IXP raise any security concerns? How could these be addressed? What measures, if any, need to be taken to ensure that any International IXP does not undermine the existing filtering regime and the Government's ability to conduct lawful intercept of Internet traffic?*

IIXPs are a must for any country that wants to increase the quality and penetration of the internet. For the security concerns, it is technically possible to design it with two main separate networks national and international and install the filtering between them. Lawful interception can easily be done as all the equipments are located in the IIXP.

6. *Advisory Committee. If CITC establishes an International IXP, should it establish an Advisory Committee? How would the Advisory Committee be constituted? What authority should the Advisory Committee have? What role should CITC play in the work of the Committee?*

The recommendations for some of these questions are presented in the suggested solution section.

7. *Sale of IP transit at an International IXP. If CITC establishes an International IXP, should FBPs be allowed to sell domestic and international IP transit there, or should all FBPs that participate in the International IXP be required to peer?*

We should use the standards of the internet. Peering usually done between two ASNs having mutual benefits, otherwise, it should be transit. There is no national and international traffic concept in the internet, it is just internet connection.

8. *International Internet traffic. Are there any commercial or regulatory impediments to exchanging international Internet traffic at the IIXP? Would this have any impact on the existing filtering regime and the Government's ability to conduct lawful intercept of Internet traffic?*

Allowing the exchanging of international internet traffic in the IIXP will serve the promotion of the kingdom as an internet hub. As for the security concerns, it is technically possible to design it with two main separate networks national and international and set the filtering between them. Lawful interception can easily be done as all the equipments are located in the IIXP.

9. *Hosting the International IXP in a data center. If CITC establishes an International IXP, should it seek to attract a privately owned and operated data center to host the IIXP? Should there be any restrictions on who should own or operate the data center? Is issuance of an RFP the most appropriate means to select a private operator? If not, what method should be used? What selection criteria should be used to select the data center operator? Are private investors likely to construct such a data center? What actions can CITC take to encourage private investment? If no qualified private investor is prepared to build the data center, should CITC do so itself?*

It should be either owned by national company or consortium of national and international companies. Building a data center is a safe investment especially when there are clear regulations. For the IIXP data center selection, as suggested in previous section, it is recommended to start with RFP to select two data centers with two different tiers in one city. The RFP responses should include the rental cost for any IIXP member so that members can decide which data center to go with.

10. *Obligations of a data center hosting the International IXP. If CITC establishes an International IXP and hosts it in a data center, what requirements should CITC impose on the data center operator? Should the data center be required to be certified as a tier 4 data center? Should the data center be required to offer any specific services? Would any special requirements be needed to get government and private sector entities to host content in the data center?*

Teir-4 data centers are costly and will increase the hosting prices. It is better that members have two options teir-4 and teir-3. Other standard requirements (such as 24/7 security and access) should be stated in the RFP. It is recommended to have price study in the second consultation.

11. *Establishment of a virtual IIXP. If CITC establishes an International IXP, should it seek to foster the development of a multi-site virtual IIXP, with nodes in multiple locations? What factors should CITC consider before doing so? Should CITC own the International IXP indefinitely or should it transfer ownership to a non-profit consortium prior to expanding it to multiple sites? Should all users of the International IXP become members of the consortium? What membership requirements should be imposed? What type of governance structure should be adopted? Would such an entity be economically self-sufficient or would government subsidies be required? Should CITC have a permanent membership in any consortium?*

Having a regulation for virtual IIXP is a requirement for the success of IIXPs. It gives their customers the flexibility of choosing between different data center tiers based on their budget.

Also it makes the IIXP more neutral as it is hosted in more than one telecom hotel company. More on this can be found in the previous section

12. *Operation of the virtual IIXP. If a multi-site virtual IIXP is established, how should CITC select the data centers in which to locate additional nodes? Should CITC impose any geographic, ownership or other restrictions on the data centers in which the International IXP locates additional nodes? How should the International IXP obtain connectivity among multiple data centers? How should the International IXP recover the cost of this connectivity?*

The market should decide the location of the IIXP. Quality wise, it is better to be hosted in Jeddah (assuming multi site per city option proposed earlier). Hosting the IIXP in two different cities would make it compete with FBPs which is undesirable.

13. *Commercial IIXP. Rather than establishing an International IXP, should CITC seek to attract a commercial entity to open an International IXP in the Kingdom? Would seeking to attract a commercial International IXP be an effective means to achieve the three goals identified by CITC? What actions should CITC take in order to attract a commercial IIXP to the Kingdom? Should CITC allow a commercial IIXP operator to operate both the IIXP and the data center? Should CITC impose limits on the number of commercial International IXPs it will license? What conditions should CITC impose? What should CITC do if no commercial entity chooses to establish an International IXP in the Kingdom? Would the establishment of a commercial International IXP raise any security concerns? How could these be addressed?*

It is recommended to promote single IIXP in the kingdom sponsored by CITC. Once it is successful, we can study the feasibility of releasing a Class license. Issuing a class license at first may not attract international content providers because of the lake of direct support from CITC.

14. *International IXP established by a single FBP. Should CITC seek to encourage a single FBP to open an International IXP in the Kingdom? Would this be an effective means to achieve the three goals identified by CITC? Why haven't any FBPs sought to open an International IXP? What actions should CITC take in order to encourage an FBP to do so? What should CITC do if no FBP chooses to establish an International IXP in the Kingdom? Would an operator-owned International IXP be likely to act in a neutral manner? If not, what actions should CITC take? Would other FBPs, ISPs, and other market participants be likely to exchange traffic and host content at an International IXP/data center operated by an FBP?*

FBPs can't open IIXP because they are not neutral entity. Some of them tried and failed.

15. *International IXP established by a FBP consortium. Should CITC seek to encourage a consortium of FBPs to open an International IXP in the Kingdom? Would this be an effective means to achieve the three goals identified by CITC? What actions should CITC take in order to*

encourage the FBPs to do so? What should CITC do if the FBP chooses not to establish an International IXP in the Kingdom? What if some, but not all, FBPs are willing to form a consortium? Would an International IXP owned by an FBP consortium be likely to act in a neutral manner? If not, what actions should CITC take? Would other FBPs, ISPs, and other market participants be likely to exchange traffic and host content at an International IXP/data center operated by an FBP? Should CITC have a permanent membership in any consortium?

It is hard to make competing FBPs work together.

16. *Voluntary Interconnection. Should CITC require FBPs to enter into commercial agreements to exchange Internet traffic either by arranging for individual direct links between each of the FBPs or by agreeing to route all Internet traffic by means of a national backbone network? Would this be an effective means to achieve the three goals identified by CITC? What should CITC do if the FBPs do not to enter into these agreements?*

CITC should enforce the peering policy between FBPs and includes it in the license.

17. *Mandatory Peering. Should CITC require FBPs to peer with each other for the exchange of Internet traffic? Would this be an effective means to achieve the three goals identified by CITC? Would this require CITC to establish quality of service standards? Would it be feasible to do so? What is the best manner to establish such standards?*

Same as #16

18. *Other options. Are there any other options, beyond those identified in this Consultation Paper, that CITC should consider? If so, please describe the option, including the actions that CITC would need to take in order to implement it. Would this option be consistent with international best practices? Would it achieve the three goals identified by CITC? What impact would it have on network security and CITC's ability to impose content requirements?*

The recommended option is described in previous section. However, it is recommended that IIXP license should include virtual IIXP license. Otherwise, it will be hard to succeed as it doesn't have a backup.

19. *Modification of Reference Interconnection Offer. Should CITC require the incumbent to offer to other FBPs domestic IP transit pursuant to its RIO? Is there likely to be demand for this service? What methodology should be used to establish the price of this offering? Are other FBPs likely to request access to this service at an International IXP? Would this be technically feasible? What service level requirements should be imposed? Are there other means to allow other FBPs to purchase domestic IP transit from the incumbent at an IIXP?*

No modification is needed because the domestic IP transit products should not exist. FBPs should sell IP transit only because this is the standard of the internet. Domestic IP traffic should remain local by mandating the peering between FBPs.

20. *ISP secondary peering. Should ISPs be allowed to collocate at a data center and exchange traffic directly? Should ISPs be permitted to peer directly and/or through an IIXP switch? Who should provide the physical connectivity within the data center linking ISPs?*

If ISPs can't co-locate and peer with other members in the IIXP then **simply there is no need to build one**. The main role for IIXP is to allow anyone with ASN to peer with anyone. It should be international IXP and that means it is open to all ISPs.

21. *Additional CITC actions. What additional actions, if any, should CITC -- alone or in conjunction with other governmental entities -- take to foster the growth of the Internet in the Kingdom, help to transform the Kingdom into an international Internet content and transport hub, and promote localization? In particular, what policy or regulatory changes would be necessary to facilitate international Internet traffic exchange in the Kingdom and the transit of international Internet traffic through the Kingdom? How can CITC encourage content hosting in the Kingdom? What do content providers require in order to host content at a data center? What special measures would encourage international content hosting without impeding security and filtering requirements?*

We need regulations for locally hosted equipments owned by international carriers and content providers. Also, what is the regulation for international (static or dynamic) content hosted in KSA?

5   References

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