السادة هيئة تنظيم قطاع الاتصالات المحترمين ؛

الموضوع: إخطار طلب ملاحظات على مسودة القرار التنظيمي
الخاص بنقاط الربط على الإنترنت(IXP)

تحية طيبة و بعد ،

بالإشارة إلى الموضوع أعلاه ولاحقاً لكتابكم الوارد إلينا رقم (ظ/4/17/1/10063)
بتاريخ (2019/11/06) بخصوص إخطار طلب ملاحظات على مسودة القرار التنظيمي
الخاص بنقاط الربط على الإنترنت(IXP) فإن شركة الناي للإستشارات المعلوماتية
والإتصالات تدعم مسودة الهيئة بخصوص نقاط الربط على الإنترنت (IXP) لما تعود على
السوق المحلي في الأردن بالمنفعة والإزدهار وعليه فإن شركة الناي تقدم الملاحظات التالية:

• ورقة القرار التنظيمي
1. النقطة (2.6): يفضل أن تكون المشاركة في ال (IXP) مفتوحة ولا تقتصر
على المرخصين المحليين.
2. النقطة (4.1.1): لا نرى اي تعارض في أن يكون ال(IXP) قائم على
(Non-Profit) أو (Profit).
3. النقطة (4.1.6): إذا كان ال (IXP) قائم على الربحية (For Profit) فعلى
ال(IXP) تحمل المصاريف الرأسمالية والتشغيلية.
4. النقطة (7.1): يفضل أن تكون المشاركة في ال (IXP) للشركات المحلية
والدولية.
5. النقطة (15.0): ما هو تعريف ال(Special License) .

● مسودة التعليمات التنظيمية

1. النقطة (2.2): هل يجي توقيع الشركات الغير مرخصة والشركات الدولية عقد ترابط (Interconnection Agreement) .

2. النقطة (2.9): يجب أن يتم تحديد نسبة مئوية من سعة خطوط الربط مع الـ(IXP) للتأكيد على جودة الخدمات المقدمة من الـ(IXP).

3. النقطة (3.1): ما هو تعريف الـ (Special License) .

4. النقطة (3.11): ما هو تعريف الـ (Special License) .

5. النقطة (4.1): تعتبر نسبة التوافرية 99% قليلة ويجب زيادتها لضمان جودة الخدمات المقدمة.

- مرفق الملاحظات على المسودة التنظيمية لنقاط الربط على الإنترنت (IXP).

وتفضلوا بقبول فائق الإحترام والتقدير ،

المدير التنفيذي للعمليات

المهندس مهند حباق

AQABA
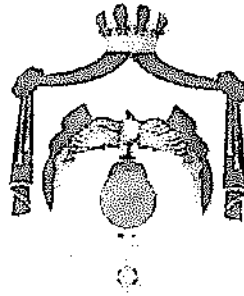+962 3 2013376
+962 3 2013371
Al-Makateb Area, Al-Bostean
Neighborhood, 3rd Floor

AMMAN
+962 6 5854616
Zahran St. Al-Hussein
Complex, 7th floor office #715
P.O. Box 143675 Zip code 11814

THE HASHEMITE KINGDOM OF JORDAN

Telecommunications Regulatory Commission (TRC)

-APPENDIX I-

Of

Regulatory Decision for Establishing an

Internet Exchange Point (IXP) in Jordan

Telecommunications Regulatory Commission

TRC Board Decision No. (1-12/2019) Date (27/10/2019)

TELECOMMUNICATIONS REGULATORY COMMISSION (TRC)

INTERNET EXCHANGE POINT (IXP) INSTRUCTIONS

Issued Pursuant to Articles 6(a), 6(b), 6(e) of the Telecommunications

Law No. (13) for the Year 1995 and its amendments, and Article (56) of the General Policy for the Information and Communications Technology and Postal Sectors, 2018

1 INTRODUCTION

This document is supplementary to the Regulatory decision issued by TRC on ( ), the document will tend to illustrate more in depth look of main pillars of establishing an Internet Exchange point in Jordan, from a technical perspective.

Note: any difficulties to explain any term, word or a definition please review section 2 "Definitions" of the Regulatory decision.

Items which will be covered within this appendix are:

- Interconnection
- Peering
- Quality of Service (QoS)
- General Provisions
- IXP Operations

2 INTERCONNECTION

Requisites for the interconnection and peering with IXP:

2.1 In those instances where the intended members have reached agreement, the TRC will then have 30 days in which to approve the agreement or require changes by the parties in order to comply with the Interconnection Instructions.

2.2 Interconnection Agreements shall be submitted to the TRC for approval and shall be considered to be approved if no comments are provided by the TRC within 30 days of submission NaiTel: does non-local non-ISP company need to sign the interconnection agreement with the IXP?

2.3 IXP shall be versatile enough to accommodate all type of interconnect links as per Interconnection Instructions.

2.4 Any IXP member must at a minimum announce all its regional routes to the IXP router at that IXP location.

2.5 All IXP members are entitled to receive these routes using a single BGP session with the IXP router. This will guarantee the exchange of regional traffic within IXP, referred to as forced regional multi-lateral peering

2.6 In the case where one IXP member is already providing transit to another IXP member, the exchange of regional routes mentioned in above, may also happen using a separate private connection between the members

2.7 IXP members shall announce only those routes that belong to their Autonomous System. Aggregating traffic from other members in the region and connect to the IXP through a single connection.

2.8 The IXP router shall only exchange information but not carry any transit traffic unless indicated in the member's agreement

2.9 All IXP members must ensure that they suitably and proactively upgrade capacity from time-to-time so that they do not end up dropping traffic that other peers are exchanging with them
NaiTel: Percentage of link utilization need to be specified to ensure quality of the traffic exchanged
2.10 All IXP members shall not filter or block information but transmit traffic smoothly with no delay or jitter

2.11 If data rate transmission and IP network's equipment usage is high, and the processing power for any device or channel, and/or transmission port load of IPXs or one of the service providers reaches over 80% continuously, the device or equipment should rapidly upgraded and an immediate increase of capacity is advised.

2.12 The routing policy here also applies to "large" content providers to directly peer at any of the IXP nodes. They will be treated like stand-alone Data Centers. For this they need to adhere to the following criteria: a. they must have their own AS number b. The content hosted by them should be in accordance with Jordan laws (i.e they should not be hosting obscene content or promoting gambling or anti-national content, or any other content that violates either the ISP license condition or any other Jordanian Laws or regulations)

2.13 A telecommunications Licensee leasing line bandwidth to other Licensee shall ensure that they are connected to the IXP in terms of these Instructions

3 Peering

3.1 Non-governmental organization established by special license holders to establish information and communication network for cross-country and provide internet service shall establish IXP. **NaiTel: what is the special license? what are these companies?**

3.2 IXPs shall be connected to each point. IXP connection topology shall be organized at Layer2

3.3 Members who will exchange cross-country traffic should provide not less than 10Gbps uplink speed

3.4 In order to increase local internet traffic and improve quality, ISP shall connect to one of the IXPs and if provide internet service for public organizations, shall connect to the IXP located at the National Datacenter

3.5 Rights and obligations of parties connected to IXPs shall be regulated by the BA mentioned in section (2.17). BA draft between the Host and any ISP member specifying all technical conditions and all other details, and shall be reviewed and approved by TRC Jordan

3.6 Connection line connecting IXPs shall be not less than 10Gbps and connection lines connecting ISP shall be not less than 1Gbps in terms of capacity

3.7 BGP, one of the dynamic connection types, shall be used for IXP

3.8 IXPs shall offer the same service and technical conditions for ISP

3.9 IXPs shall organize activities regarding creation and update of routing table which will be used in local internet traffic exchange

3.10 Only own network information or IP address obtained from NITC and/or RIPE NCC shall be transmitted to IPXs

3.11 Local traffic routing shall be done according to the routing table generated by the use of eBGP from routing table of special license holders registered at IPXs
NaiTel: what is special license

3.12 If transmission facility utilization reaches 80% in the IXP, either transmission facility channel or equipment shall be extended.

3.13 ISP shall have transmission channel and connection completely separate from any other internet connection transmission channel and connection, and shall not put speed limit for transmission facility, channel and IP network equipment and for its software.

4 QUALITY OF SERVICE (QoS)

Below table 3.1, illustrates requisites for the Quality of Service:

No.	Quality of Service Requirements
1	All critical components of the IXP should be up for 99.00 % of time in a quarter. These critical components are mainly IXP routers/Switches, interface module on which the links of the ISPs are terminated and any other equipment which affects the IXP traffic. Non critical faults which do not affect IXP traffic like failure of one power supply module should be rectified by IXP within max of 12 hours
2	Switching architecture of IXP shall be non-blocking, so that it does not introduce any delay
3	Uninterrupted power shall be ensured to the equipment of the ISP and IXP router itself in the IXP node. Power availability can be 99.00% in a quarter
4	IXP shall ensure proper environment (Proper Air conditioning with Humidity control) for housing equipment's of IXP members
5	Augmentation of IXP members' bandwidth to IXP: - IXP member shall augment its bandwidth to IXP, if the utilization of the existing link exceeds 80% of the capacity for 4 hrs. in a day and for 7 days. Such capacity management shall be through increase of capacity and not through reduction routes announced. The augmentation should normally be completed within a period of one month after IXP reported to the concerned IXP member. This time should be extendable by one more month in valid cases like IXP member having tangible problem and in case some additional equipment's are required to be procured
6	Facility for ensuring security of IXP equipment like access control, monitoring and keeping records of entry in equipment room etc

7	IXPs shall regularly and transparently distribute information to ISP in conformity to quality level determined by the following indicators:
	  ● Packet loss
	  ● Packet delay
	  ● Packet Utilization
	  ● CPU usage information of IXPs and IXP member
	  ● Connection types of all IXP members connected to IXPs and their load
	  ● IXPs shall ensure reliable and constant service and monitoring (24 x 7 x 365) activities.

5 GENERAL PROVISIONS

*Below table 3.1, illustrates requirements of generic operations:*

No.	General Provisions Requirements
1	It shall be an obligation of an IXP to accept interconnection with ISP in accordance with the following : • It shall be the obligation of every Internet Service Provider to interconnect its computer system and to keep it interconnected at all times (24/7) to the IXP for the purpose of facilitating the efficient routing and interconnection of Internet Protocol transit networks within Jordan and of minimizing the use of international Gateways for Internet Protocol traffic between Internet users in Jordan. • It shall be the obligation of every IXP member to distribute and receive routing information for local traffic data to or from all members of the IXP.
2	The IXP Host shall be entitled to demand such a reasonable extent of traffic data and engineering data from IXP members as is necessary and proportionate for it to be able to perform its functions efficiently.
3	Any data collected by the IXP Host in terms of these Instructions shall be kept confidential subject to any obligation of disclosure in accordance with the applicable legislations.
4	The IXP members shall comply with the telecommunications law and regulations in respect of any data collected in pursuance of these Instructions

6 IXP OPERATIONS

Below table 3.1, illustrates requirements of day-to-day functional operations of IXP:

No.	IXP Operations Requirements
1	IPX shall have a system to ensure reliable and continuous operation, and information security control and monitoring. System data shall be stored at least 6 months or as stipulated in the data retention instructions
2	The following principles shall be complied to solve troubleshooting. Those are: • When troubleshooting occurs, immediately inform related parties by using fully automated control system. • Involved IXP members shall quickly repair and troubleshoot. • Record troubleshooting type/classification, period and solutions, and analyze. • Host should agree with all ISP members to define proper down-time in the BA
3	IXP Data center standard security operations should be according to ISO 27001

The Hashemite Kingdom of JORDAN
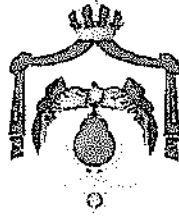
Telecommunications Regulatory Commission

Consultation on draft Regulatory Decision
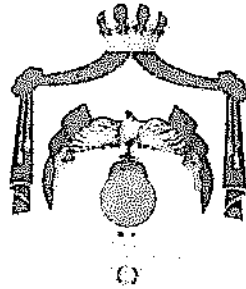
Date of Issuance: 4/11/2019
Duration to submit the notes/observations: 30 Days
Subject: Draft Regulatory Decision for Establishing an Internet Exchange Point (IXP)

According to Article (56) of the General Policy for the Information & Communications Technology and Postal Sectors 2018 TRC is committed to encourage the establishment of commercial Internet Exchange Points (IXPs).

This commitment is considered one of the main measures that will give additional resilience for the provision of services to customers in other countries, thereby improving the attractiveness of Jordan as a location for hosting services and call centres. Thus, the Board of commissioners has issued according to its decision number (1-12/2019) dated (27/10/2019) the draft Regulatory Decision for Establishing an Internet Exchange Point (IXP) in Jordan and its specialized technical attachment.

THE HASHEMITE KINGDOM OF JORDAN

Telecommunications Regulatory Commission (TRC)

Regulatory Decision For Establishing an

Internet Exchange Point (IXP) in Jordan

Telecommunications Regulatory Commission

TRC Board Decision No. (1-12/2019) Date (27/10/2019)

Table of Contents

TELECOMMUNICATIONS REGULATORY COMMISSION (TRC)

REGULATORY DECISION FOR

ESTABLISHMENT OF INTERNET EXCHANGE POINT (IXP) IN JORDAN

Issued Pursuant to Articles 6(a), 6(b), 6(e) of the Telecommunications

Law No. (13) For the Year 1995 and its amendments, and Article (56) of the General Policy for the Information and Communications Technology and Postal Sectors, 2018

1 CITIATION

1. The following terms constitute the TRC's Regulatory Decision on the Provisioning of a National Internet Exchange Point (IXP) to facilitate network interconnection through a centralized physical network access point, which is expected to minimize the upstream traffic connected to international Gateways of Internet service provider's (ISP) members in the IXP, thus avoiding additional costs, moreover exchanging and caching local Internet traffic, improving the bandwidth and the quality of Internet ecosystem traffic in Jordan.

This Regulatory Decision shall come into effect as of the date of their approval by the Board of Commissioners.

2 DEFINITIONS

The following words and phrases shall have the meanings assigned thereto hereunder, unless the context indicates otherwise. Any words and phrases not defined hereunder shall have the meanings ascribed thereto in the Telecommunication Law and the Regulations issued pursuant thereto:

2.1 **"Policy"**: Government of Jordan's GENERAL POLICY FOR THE ICT AND POSTAL SECTORS issued on 2018.

2.2 **"Telecommunications Law"**: means the Telecommunications Law (Law No. 13 of 1995 of Jordan, and its amendments.

2.3 **"TRC"**: The Telecommunication Regulatory Commission of Jordan.

2.4 **"License"** means the authorization granted by the TRC, or the contract or license agreement signed between the TRC and a Person (including all appendices and schedules

attached thereto), to allow a Person to establish, operate, and manage a Public Telecommunications Network, or provide Public Telecommunications Services, or use Radio Frequencies pursuant to the provisions of the Telecommunications Law and the by-laws and instructions issued pursuant thereto.

2.5 "IXP": Internet Exchange Point established in Jordan, also called IX, or peering point. Both a physical networking location and a logical networking strategy, which facilitates interconnection between Internet-based networks, through which ISP (ISPs) and Content Delivery Networks (CDNs) exchange Internet traffic between their networks.)

2.6 "Member": The Licensee who connects or participates in the IXP.
    Naitel: Anyone interested in IXP beneftis can join the IXP, why it is only limited to licensee?

2.7 "CDN": Content Delivery Network or Content Distribution who owns a geographically distributed Network of servers which work together to provide fast delivery of Internet content and delivering high availability and high performance by distributing the service spatially relative to end-users, with quick transfer of assets needed for loading Internet content including HTML pages, javascript files, stylesheets, images, and videos, including traffic from major sites like Facebook, Netflix, Amazon..Etc, once a CDN connects to an IXP in a country, the web traffic from the country to the CDN becomes local and provides upstream saving and increases performance for IXP members and help protect websites against some common malicious attacks.

2.8 'Interconnection': means the physical and logical linking of the Telecommunications Systems in order to allow the Users of one Telecommunications Systems to communicate with Users of the same or another Telecommunications Systems or to access services provided by another Licensee. And it is subject to Interconnection's Instructions issued by TRC.

2.9 'Person': means any individual, company, corporation, partnership, joint venture, consortium, government or governmental entity.

2.10 'Point of Interconnection' (or POI) refers to any technically feasible point where the Networks of Licensees are interconnected.

2.11 'Private Telecommunications Network' means the Telecommunications System operated for the benefit of a single Person or a single group of Persons under common ownership to serve their own needs.

2.12. 'Public Network Operator' means a Licensee that is an operator of a Public Telecommunications Network.

2.13 'Public Telecommunications Network' or 'Network' means a Telecommunications System or a group of Telecommunications Systems for the offering of Public Telecommunications Services to Users pursuant to the provision of the Law.

2.14 'Public Telecommunications Services' means a telecommunications service provided for compensation to the general public or any category thereof, in accordance with the Law.

2.15 'Telecommunications System' means any transmission or switching device or other device or Computer system or instrument used to convey, receive or transmit Telecommunications signals for the purpose of providing Public or Private Telecommunications Services as the case may be.

2.16 "Traffic " means any computer data relating to a communication by means of a computer system, generated by a computer system that forms part in the chain of communication, indicating its origin, destination, path or route, time, date, size, duration or type of underlying network service;

2.17 "Bilateral agreement (BA)": an agreement (one-to-one agreement) between two networks to exchange traffic.

2.18 'Interconnection Agreement' means an agreement made between two interconnected Licensees in accordance with the requirements of these Instructions.

2.19 "Transit": An arrangement in which a network provides access to another network through to enable its connection to a third party network. Transit arrangements typically provide access to an array of networks not limited to one country. In many cases one Internet transit arrangement with a large network can provide a small, remote network with access to the rest of the world

2.20 "Host": the authority or organization which will be responsible for providing the IXP's physical location.

2.21 "Internet Service Provider" (ISP) : means any telecommunications licensee who holds a license to provide access to Internet and other data networks services under the telecom law in Jordan.

2.21 "Class License" means a License to provide Public Telecommunications Services and/or operate Public Telecommunications Networks (i) not requiring the use of Scarce Resources, or (ii) requiring the use of Scarce Resources that have been specifically exempted by the TRC from an Individual License requirement.

2.22 **"Individual License"** means a License to provide Public Telecommunications Services and/or operate Public Telecommunications Networks that use in the provision of some or all services or operation of networks Scarce Resources that have not been specifically exempted by the TRC from an Individual License requirement.

2.23 **Local internet traffic** means traffic generated when local users access to the digital contents

2.24 **Border Gateway Protocol (BGP)** is a standardized exterior gateway protocol designed to exchange routing and reachability information among autonomous systems (AS) on the Internet.

2.25 **Autonomous system (AS)** is a collection of connected Internet Protocol (IP) routing prefixes under the control of one or more network operators on behalf of a single administrative entity or domain that presents a common, clearly defined routing policy to the Internet.

2.26 **"eBGP"** is the protocol used to transport information to other BGP enabled systems in different autonomous systems (AS).

2.27 **"Routing Information Base RIB":** is is a routing table which is a data table stored in a router or a networked computer that lists the routes to particular network destinations, and in some cases, metrics (distances) associated with those routes.

2.28 **NITC:** means National Information Technology Center is Jordan. 2.29 **RIPE NCC** (is an open and voluntary organization of European ISP, the Regional Internet Registry for Europe, the Middle East and parts of Asia..

2.30 **"Computer data"** means any representation of facts, information or concepts in a form suitable for processing in a **computer system**, including a program suitable to cause a **computer system** to perform a function;

2.31 **"Computer system"** means any device or a group of interconnected or related devices, one or more of which, pursuant to a program performs automatic processing on **computer data;**

2.32 **"Internet protocol"** (IP) is the method or protocol by which data is sent from one terminal to another on the Internet. Each terminal (known as a host) on the Internet has at least one IP address that uniquely identifies it from all other terminals on the Internet.

2.33 **"Internet"** is a global information system that is: logically linked together by a globally unique address, based on internet protocol (IP) or its subsequent enhancements/up gradations; able to support communications using Transmission Control Protocol (TCP/IP) suite or its subsequent enhancements/up gradations, and all IP compatible protocols.

2.34 "**Peering**" the term used for exchanging traffic on the IXP. Peering is a bilateral agreement between two ISPs. There is no rule that governing how to peer with all other ISPs on the IXP. It is up to the individual ISP who they want to peer with.

2.36 "**User**" means any person using the services of an a telecommunications licensee.

2.37 **Interconnection Instructions**: Instructions issued by TRC Board Decision No.(2-1/2005) Dated (5/1/2005) And amended by TRC Board Decision No.(18-11/2010) Dated(15/6/2010).

2.38 "**Neutral Entity**": an entity which does not favor any Licensee, company or Government.

3 GENERAL PRINCIPLES

The actions taken by the TRC pursuant to this regulatory decision shall take the following into consideration:

3.1 Implemented in an objective and impartial manner.

3.2 Conducted in accordance with best standards of transparency taking into consideration the need to protect the national interest.

3.3 Conducted in according the approvals issued by TRC with the corporation of the IXP Host.

3.4 IXP members to comply with any decision and directive given by TRC in respect of matters concerning the duty to interconnect to an IXP provided for in this Instructions and shall promptly take such measures as TRC may direct them to take for the purposes of implementing or of facilitating the implementation of this Instructions.

4 PROVISIONING OF (IXP) IN JORDAN

4.1 The IXP shall have, but are not limited to, the following characteristics:

4.1.1 The **Host** should be a Neutral entity, and shall be responsible also for day-to-day operations, in addition to the ability to allow for-profit/Commercial and revenue to members by facilitating BA's and encouraging international CDN's to join.
Naitel: We don't see any issue of keeping the IXP model open "for-profit and non-profit"
4.1.2 Each member shall provide required devices and equipment required to connect to the IXP, initial equipment will include all devices for functioning on Layer 2 only on the establishment phase, once a CDN wishes to connect, members who share services with the CDN should allow Layer 3 (IP traffic).

4.1.4 There will be no limitation for the number of members allowed to join the IXP, taking into consideration any future issued decisions in this concern from TRC.

4.1.5 If any entity wishes to offer a new additional or redundant physical location for the IXP, TRC will supervise the establishment until launch, considering any further regulatory decision that will be issued by TRC on this matter.

4.1.6 The Capital expenditures (CAPEX) and operating expenses (OPEX) cost of the IXP will be divided on all members in coordination with the Host.

NaiTel: if the IXP is for-profit, then the host shall carry out the needed CAPEX/OPEX associated with the IXP

4.1.7 Any future member shall endure the costs and expenses as decided by the Host, taking into consideration the expenses and cost endured by previous members.

4.1.8 If a member wishes to withdraw from the IXP at any stage, a formal letter should be conveyed to TRC explaining the detailed reasons, TRC has the right to study the request and issue the required decision accordingly.

5 INTERCONNECTION

5.1 By default, Transit traffic will be not open, unless two members sign an interconnection agreement approved from TRC and it shall be subject to Interconnection Instructions issued by TRC on this behalf, more details on Interconnection are available in APPENDIX I accompanying this document.

6 QUALITY OF SERVICE (QoS)

6.1 The IXP shall be subject to the Quality of Service (QoS) obligations issued by TRC, more details on Quality of Service are available in (APPENDIX I) accompanying this document.

7 GENERAL PROVISIONS

7.1 IXP is an interconnection point of ISP ISPs in Jordan. The main goal is to enable the traffic exchange locally without routing through international networks. However IXP can also be used for routing of internet traffic between the networks in Jordan and the peer or downstream networks of IXP participants in other countries. IXP serves and IXP members who holds licenses, and local and international Research and Education networks as well as international network services providers and Internet exchanges via licensed networks.

NaiTel: the members of the IXP shall be open for local and international companies as per the TRC regulation

More details regarding General Provisions are available in APPENDIX I accompanying this document.

8 FEES AND TARRIFS

8.1 The IXP management (the Host) has the right to set up the tariff policy/ per unit according to agreed parameters (Data traffic, bandwidth, etc...).

8.2 Tariff policy shall be approved by the TRC.

9 MANAGEMENT OF OPERATIONS

9.1 IXP shall have a system to ensure reliable and continuous operation, and information security control and monitoring. System data shall be stored at least 6 months or as stipulated in the data retention instructions.

9.2 The following principles shall be complied to solve troubleshooting. Those are:

9.3 When troubleshooting occurs, immediately inform related parties by using fully automated control system.

9.4 Involved IXP members shall quickly repair and troubleshoot.

9.5 Record troubleshooting type/classification, period and solutions, and analyze.

9.6 Host should agree with all ISP members to define proper down-time in the BA.

9.7 More details on operations which regard to system interference and reporting are specified in the APPENDIX 1 accompanying this document.

10 Dispute resolution

NaiTel: what is the definition of special license?

10.1 Any unresolved dispute between IXP members or between them and the Company with a special license or between any of the previous parties and the IXP Host regarding the terms and conditions of interconnection to the IXP or relating to any matter concerning the implementation of these Instructions may be brought before TRC for resolution by any party to such dispute.

10.2 In deciding upon any dispute referred to in these Instructions the TRC shall employ easily accessible and in principle, inexpensive procedures to resolve such dispute in a fair, transparent and timely manner.

10.3 The existence of a dispute about the terms and conditions of interconnection to the IXP or with regard to any matter concerning the implementation of these Instructions shall not exempt, suspend or postpone the obligation of an ISP to interconnect to the IXP in terms of these Instructions.