

Telecommunications Regulatory Authority

CONSULTATION PAPER

License to Establish and Operate an Internet Exchange

In the Sultanate of Oman

3rd March 2008

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1. BACKGROUND

In accordance with article (3) set out in the Telecommunications Regulatory Act issued by Royal Decree No. 30 / 2002 and its Executive Regulations and the Telecom Sector Policy, TRA is in the process of issuing class I license for establishing and operating an Internet Exchange.

The Exchange will offer a network access point (NAP) which will enable Internet Service Providers (ISPs) to link to the global Internet backbones by aggregating their traffic before sending it via leased circuits to the Internet backbones, thus reducing the need for each ISP to set up its own direct peering which will result in reducing ISP's costs and prices. The Internet Exchange may also act as a connection point for the exchange of local traffic between ISP's in Oman.

Internet Exchange is further expected to reduce International bandwidth requirement, reduce latency for domestic traffic and cost savings. Further better Quality of Service and reduced customer tariffs are also possible.

2. COMMENTS INVITED.

TRA seeks through this Public Consultation paper, written comments from interested parties, especially operators and investors on the conditions set out in this document.

All comments will be taken into consideration. The Authority is however not bound to accept any or all received comments.

3. FORM OF RESPONSE, SCHEDULE AND PROCEDURES

- Interested parties are requested when providing their comments to specify contact details including address and contact number.
- All comments must be submitted not later than 31 / 3 / 2008.
- Replies in relation to the present Public Consultation may be submitted to the Authority along with an electronic copy to any of the following means:
 1. **By Mail:** P.O. Box 579, Ruwi, P.C 112-Sultanate of Oman.
 2. **By Hand:** TRA Head Quarter - 2nd Floor – Oman Oil Company Building, Al-Qurum.
 3. **E-mail:** Licensing@tra.gov.om

4. DISCUSSION

4.1 Present Internet Status:

4.1.1 The internet, a communications platform riding on network access technologies such as fixed line, mobile cellular, wireless terrestrial and satellite, has increasingly gained widespread recognition as a knowledge infrastructure. The internet dial up service was first introduced in 1996 and ADSL in 2004 in the country. At present Internet Services are being provided mainly by the fixed line Operator Omantel. Telecommunications Regulatory Authority has already opened up the ISP market segment for competition. However, no new ISPs have come forward. One of the main reasons is lack of infrastructure support for potential ISPs. Local loop un-bundling is yet to be implemented in Oman, though a Consultation Paper on the same has already been floated for public consultation and responses are awaited. Another Consultation Paper on "Opening Up of Telecom Market" has also been floated. New Broadband Access Technology options are also being explored. Omantel also is executing a major initiative towards provisioning of Broadband services and quantum jump in the growth is expected in coming months. Individual ISPs are also expected to meet the requirements for security and interceptions which tend to increase the cost. Further each ISP in the normal circumstances needs to link to the global internet backbone through international leased circuits. Multiple ISPs are likely in coming months, provided necessary shared infrastructure is made available.

4.1.2 A growth trend of internet subscribers from 2002 to 2007 is given in the figure. 1. There is an average annual growth of 9% during last five years mainly attributed to ADSL.

4.1.3 At the end of 2007, there were total 70,290 internet subscribers. The subscriber base grew by 10% from 2006, representing a penetration rate of 2.7 per 100 inhabitants. The breakdown of users at the end of 2007 was 70.8% dial up, 27% ADSL and 2.2% others as shown in Figure 2.

Figure.1: Internet Subscribers Trend (2002-2007)
Technology

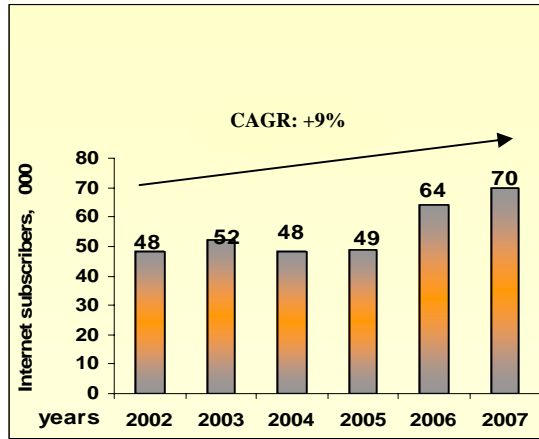
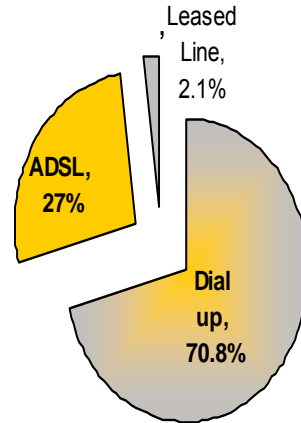


Figure.2: Internet Subscribers by Technology



4.1.4 Practically every country in the world is now interconnected through IP network. In a number of countries more than 50% population is using the internet. Oman is lagging behind in terms of internet users having quite low penetration as compared to the world average and in the regional countries in terms of household penetration.

4.2 Action Plan for Faster Growth of Internet Services

4.2.1 Oman needs an implement-able methodology to facilitate the establishment of Internet Exchange Points for peering within the country. TRA intends to issue a Class I license for the establishment and operation of Internet Exchange that will operate as a distinct entity, not affiliated to any single ISP and maybe operated on a cost recovery basis. The prime benefit of an Internet Exchange is that it allows ISPs to reduce their international traffic (and hence their international bandwidth requirement) by routing a proportion of their traffic within Oman.

4.2.2 Set Up and Management of Internet Exchange

The internet exchange could be set up under the aegis of Telecom Industry as a non-profit, neutral body. Alternately government could also provide support in the form of one time funding for the initial capital expenditure. Consortium of the operators can then manage the operation, administration, expansion, up-gradation and other funding requirements. Better Quality of Service, reduced requirements for bandwidth, reduction in access charges, and retention of domestic internet traffic within the country would facilitate growth of broadband services in the Sultanate through multiple ISPs providing competitive and affordable tariffs to the telecom users throughout Oman

4.2.3 Mandatory Interconnection

Telecommunications Regulatory Authority could make it mandatory for all ISPs and other Class I licensees to have mandatory interconnection to the Internet Exchange for routing of their international internet/ broadband traffic.

4.2.4 Settlement and Regulatory Issues

Regulatory principles and interconnect tariffs for traffic exchange between ISP A and ISP B through Internet Exchange would also have to be established. This will call for measurement of traffic in say Gbytes between each source and sink of the traffic. Settlement mechanism will also have to be established.

4.2.5 Fees

Membership Fees, joining charges for each interconnection agreement for transit through Internet exchange, connectivity charges depending upon the Port Capacity hired by each ISP, rack space including electricity, charges for changes in port capacities etc. would need to be identified. Rules for transparent functioning of Internet Exchange will also need to be framed.

4.3 International Experience

Internet Exchanges are operational in many countries.

4.3.1 UK

- London Internet Exchange (LINX) is owned by 200 ISP and content service providers.
- London Internet Providers Exchange (LIPEX) has 56 members.
- London Network Access Point is a neutral not for profit independent peering point providing infrastructure support with 43 members.
- Manchester Network Access Point is a neutral, not-for-profit Internet Exchange with 29 members.

4.3.2 Australia

- West Australia Internet Exchange provides peering support to Western Australia Internet association members.
- Equinix Sydney is a solution for Internet Service Providers, Content Service Providers.
- Globalcenter Internet Exchange is the first successful neutral commercial internet exchange in Australia.
- Victoria Internet Exchange

4.3.3 Hongkong

- Hong Kong Internet Exchange was established and coordinated by Information Technology Services Centre of the Chinese University of Hong Kong for intra-Hongkong Internet traffic routing.
- Equinix Internet Business Exchange is a solution for Internet Service Providers, content service providers.

4.3.4 India

- National Internet Exchange of India provides internet peering infrastructure support to all ISPs in India. There are located at Noida and Mumbai.

4.3.5 Singapore

- Singapore Open Exchange is a public/ neutral Internet Exchange Point hosted by National University of Singapore.
- Equinix Internet Business Exchange is a solution for Internet Service Providers and content providers to expand geographically without incurring the cost of building new data centers.

4.3.6 Indonesia Internet Exchange (IIX)

- All active ISPs in Indonesia including Govt. owned TelekomNet and IndonesiaNet are connected to IIX which is administered by the Association of Internet Service Providers of Indonesia(APJII).

5. ISSUES FOR DISCUSSION

Following Issues are open for comments, observations and detailed responses:

- Q1. The installation of Internet Exchange only affects the amount of International capacity (i.e. from the IX to a Network Access Point) in that the overall need is reduced by the amount of traffic that is peered through the exchange. Many Internet Exchanges do not offer international capacity. They focus purely on peering and leave ISPs to set up their own connection to a NAP. However, given the high cost and scarcity of the long-haul links needed to reach an Internet NAP, it is proposed that the Internet Exchange in Oman could act as an aggregation point for international traffic. Please give your view on the proposal?**
- Q2. In your view, who should be granted a license to establish and run an Internet Exchange in the Sultanate? Answer should have detailed explanation and reasoning.**
- Q3. Should the Internet Exchange be initially established with Government funding and subsequently run as a neutral not-for-profit (cost base) organization through cost sharing by ISPs and to be transferred later to be managed by national licensed ISPs in the Sultanate.**
- Q4. Should the Internet Exchange be established and run by a private company as a neutral not-for-profit (cost base) organization. The company will be mandated – as a license condition – to provide access to any service provider without discrimination and the tariffs offered to the service providers could be regulated by the**

TRA during such time the licensee enjoys a significant market power. Please comment if this option will lead to faster and more efficient implementation? Any other alternatives on how and who should establish and operate the Internet Exchange with detailed reasons will be welcomed for consideration.

Q5. Comments should be provided on following issues:

- a) Interconnection architecture**
- b) Routing Principles**
- c) Segregation of domestic and International traffic**
- d) Number and Location of Internet Exchange(s)**
- e) Up-gradation and Maintenance Issues**
- f) Quality Of Service**
- g) Structural and Funding**

Q6. Kindly provide your view on the enclosed draft license for the Internet Exchange?