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Telecommunication Development and Network Division / IEE
International Telecommunication Union

FUTURE INTERNET EXCHANGE
MANAGEMENT FOR THE ASIA-PACIFIC INFORMATION SUPERHIGHWAY
INCHEON, REPUBLIC OF KOREA, 1-2 SEPTEMBER, 2015
1. INTRODUCTION
2. MONGOLIA
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1. INTRODUCTION

Programme: Telecommunication/ICT networks, including conformance and interoperability and bridging the standardization gap

The objective of this programme is to assist ITU Member States and ITU-D Sector Members and Associates in maximizing the use of appropriate new technologies for the development of their information and communication infrastructures and services.

Promoting Internet exchange points (IXPs) as a long term solution to advance connectivity, and supporting ITU members with deployment/transition to IPv6-based networks and applications, in collaboration with relevant expert organizations.
widely accepted best practices for the design, installation and operation of IXPs. Issues concerning peering as an effective way for Internet Service Providers (ISPs) to improve the efficiency of operations and interconnection business relationships including related policy and regulatory challenges.
2. MONGOLIA: Number of Internet Subscribers / Mobile and Landline Telephone Density (2014)

<table>
<thead>
<tr>
<th>Year</th>
<th>Dial-Up</th>
<th>DSL</th>
<th>Optical cable</th>
<th>Coaxial cable</th>
<th>GPON/EPON</th>
<th>FTTH</th>
<th>Wi-Fi</th>
<th>Wi-MAX</th>
<th>VDSL</th>
<th>VDSL2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 year</td>
<td>33</td>
<td>158,616</td>
<td>105</td>
<td>105</td>
<td>1,734,414</td>
<td>165,9</td>
<td>11,700</td>
<td>11,394</td>
<td>2312</td>
<td>1,662,140</td>
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<tr>
<td>2013 year</td>
<td>271</td>
<td>40,812</td>
<td>107,885</td>
<td>105</td>
<td>1,55,107</td>
<td>24,322</td>
<td>13,444</td>
<td>24,322</td>
<td>2,154</td>
<td>841,143</td>
<td></td>
</tr>
<tr>
<td>2014 year</td>
<td>29,241</td>
<td>166,000</td>
<td>1,734,414</td>
<td>11,700</td>
<td>16,394</td>
<td>82</td>
<td>2312</td>
<td>1,662,140</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mongolia Investment & Revenues in ICT Sector (2014)
International Bandwidth /Percentage of Internet Connection Types (2014)
Most of the traffic is routed through fibre over China and Russia.

Gemnet and Mobicom both have Internet capacity via terrestrial and submarine fibre through China to Los Angeles.

Gemnet and ICNC have capacity via Russia to Frankfurt. And all three providers have a small amount of capacity to Hong Kong (China) as well.
A distributed network architecture may be called a peer-to-peer network, if the participants share part of their own hardware resources, e.g. processing power, storage capacity, network link capacity, printers, etc. These shared resources are necessary to provide the service and content offered by the network, e.g. file sharing or shared workspaces for collaboration. They are accessible by other peers directly, without passing intermediate entities. The participants of such a network are thus resource (service and content) providers as well as resource (service and content) requestors.
**Peering** is the business relationship whereby ISPs reciprocally provide to each other connectivity to each others’ transit customers.

![Diagram](attachment:image.png)
With the client-server architecture, there are number of technologies for the control of optical networks such as Generalised MPLS (GMPLS) and Optical User Network Interface (O-UNI). These protocols play a significant role in large carrier optical networks particularly where there are thousands of connections and strict service agreements are in place. However, for a small number of connections, other approaches not requiring a centrally managed network may be possible.
peer-to-peer broadband optical architecture

- multiple optical network domains equally control the links among them without centralised control and mutually provide transit service to each other based on an open access policy.
4. FUTURE INTERNET EXCHANGE

- Over-the-Top (OTT) Internet Television: 2014

- Leading OTT-TV players
  - Amazon Instant Video
  - Apple TV
  - BBC iPlayer
  - BigFlix (India)
  - Google Android TV
  - Google Play
  - LeTV (China)
  - Netflix

![Netflix Growth in Streaming Subscribers and Revenues (Worldwide)](attachment://image.png)
5. CONCLUSION

- Internet Exchange Points need to facilitate IPv6 peering in addition to the existing IPv4 peering (by making IPv6 addresses available for the peering LAN, and via upgrading any Route Servers to support IPv6)

- Partnership with UKM University in Malaysia to assist Developing Countries

- Peer-to-peer optical networking has some unique functional requirements. It is very important to address these requirements, which guide future development. During the establishment of an end-to-end connection, each segment of the connection between domains is set up on a peer-to-peer basis. Both domains connecting to an inter-domain link have equal authority in terms of its control. Central guiding intelligence and arbitration of conflicts are necessary. But day-to-day management and per connection control should be decentralized