
CONSULTATION PAPER ISSUED BY

**THE INFO-COMMUNICATIONS MEDIA DEVELOPMENT
AUTHORITY**

ON

**IMPLEMENTATION OF IP-BASED INTERCONNECTION IN
SINGAPORE**

**Submission by StarHub Ltd to the
Infocomm Media Development Authority**

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Introduction:

1. StarHub Ltd ("**StarHub**") thanks the Info-comm Media Development Authority of Singapore (the "**Authority**") for providing the opportunity to comment on its proposals to implement IP-based interconnection in Singapore.
2. Generally, we are agreeable with the Authority's broad proposals. However, the actual detailed implementation needs to be further discussed amongst the relevant parties, including detailed reviews of the technical specifications for IP interconnection.
3. StarHub's responses to the Authority's proposals are attached below. We sincerely appreciate the Authority's consideration of our comments.

StarHub's Response to the Authority's Questions:

Question 1:

IMDA invites views and comments on whether operators should follow a standardised set of technical requirements to implement IP-based interconnection at domestic POIs across all operators' networks that are interconnected to provision voice services.

4. StarHub agrees that a standardised set of technical requirements should be implemented for IP-based interconnection at the domestic POIs. This ensures technical consistency and avoids any incompatibilities amongst the operators' networks.

5. We would also add that the implementation of IP-based interconnection should be limited **only** to the domestic interconnectivity between the operators. Connectivity within the individual operators' networks, or with overseas providers should be outside of the scope of this exercise.

Question 2:

IMDA invites views and comments on whether the Proposed SIP, based on IETF and 3GPP specifications, is appropriate and suitable to be implemented at the POIs.

6. We agree that the proposed SIP, based on IETF and 3GPP specifications, can be implemented for IP-based interconnection. However, this applies only for voice traffic, and not to other forms of non-voice inter-operator communications (e.g., those found in Voice-over-Long-Term Evolution ("VoLTE")).

7. To implement the full features of VoLTE between the mobile network operators ("MNOs") in Singapore, separate commercial and technical discussions needs to take-place (bearing in-mind the potential high costs involved). Our understanding is that the Proposed SIP applies only to voice traffic, and not to other forms of non-voice inter-operator communications.

Question 3:

IMDA invites views and comments on the proposed approach to finalise the offerings of the RIO services related to IP-based interconnection, before commencing the migration to IP-based interconnection

8. We agree with this proposal. However, any changes to the RIO need to be carried out in an open and transparent process, and subject to feedback from other operators. This is necessary to ensure that all operators are fully aware of and have been consulted on the technical changes needed.

Question 4:

IMDA invites views and comments on the feasibility of IMDA's proposals to revise the technical implementation of FNP service in an IP-based interconnection environment.

9. We would disagree with any move towards an "all-call-query" ("ACQ") method for FNP as this would involve significant changes and disruptions to the operators' networks. We

have discussed this matter with our vendor, and continuing a “query-on-release” (“QOR”) method for FNP would work under an IP environment, so long as operators agree on a common signalling function to use as the “release” message. As there is no technical or commercial driver to move to ACQ, we strongly believe that QOR should remain in place.

Question 5:

IMDA invites views and comments on IMDA’s preliminary views on network security and QoS under an IP-based interconnection environment.

10. We would be concerned with a reduction in the QoS enjoyed by customers. In devising the specifications for IP-based interconnect, the Authority and the operators should strive to maintain a similar QoS standard as compared to the current Time Division Multiplexing-based voice services used today. To ensure an end-to-end consistency in QoS for voice traffic, all operators in Singapore should adopt the same technical standards for IP-based interconnection.

11. However, we have significant concerns with the Authority’s proposals to implement additional network security-related regulatory obligations on the industry. As the Authority is aware, interconnection between operators is typically based on a point-to-point connection which is dedicated for voice traffic. This allows a safe and trusted exchange of traffic which minimises security issues.

12. In this regard, we believe that point-to-point connectivity should also be used in future for IP-based interconnect. We do not support having common domestic exchange points for interconnection. Such an approach increase security risks and potentially complicates the technical setup between operators.

13. As a point of clarification, it is also necessary for operators to understand the architecture for interconnection with Singtel under an IP-based interconnection regime. Currently, there are four Singtel domestic exchanges, and operators will need time to plan if the number (and location) of these exchanges is going to be changed in future.

Question 6:

IMDA invites views and comments on IMDA’s preliminary views on the broad migration approach.

14. We agree with the broad migration approach proposed by the Authority. However, significantly more discussion will be needed on the actual technical implementation details. We look forward to receiving further updates from the Authority and Singtel on this matter.

Conclusion:

15. In conclusion, StarHub's key comments are as follows:

- We support the implementation of standardised technical requirements for IP-based interconnection at the domestic POIs. Our understanding is that intra-operator connectivity, or connectivity to foreign operators, is outside the scope of this exercise.
- We have no objections to the Proposed SIP, based on IETF and 3GPP specifications. However, this can only apply to voice traffic, and not to advanced VoLTE features. Any implementation of VoLTE interconnection needs to be further discussed amongst the MNOs.
- We agree with making changes to the RIO to facilitate IP-based interconnection. This must be an open and transparent process, taking in feedback from all impacted operators.
- We support maintaining a QOR method for FNP, with operators agreeing on a common signalling message for the "release" message. We disagree with the implementation of ACQ for FNP as this would be costly, disruptive and unnecessary.
- Domestic interconnection should be based on point-to-point connectivity to maintain the current level of network security. We strongly disagree with any obligation to implement additional network security measures simply due to the move towards IP-based interconnect.

16. StarHub is grateful for the opportunity to comment on this matter and we appreciate the Authority's consideration of our comments. We would be happy to meet with the Authority to discuss this matter further.