SINGAPORE TELECOMMUNICATIONS LIMITED, SINGAPORE TELECOM MOBILE PTE LTD AND SINGAPORE TELECOM PAGING PTE LTD

RESPONSE TO CONSULTATION PAPER – PROPOSED REGULATORY FRAMEWORK FOR TELEPHONY SERVICES OVER WIRELESS BROADBAND ACCESS NETWORKS AND INTERCONNECTION FRAMEWORK FOR TELEPHONY SERVICES

1. INTRODUCTION

1.1 Singapore Telecommunications Limited, Singapore Telecom Mobile Pte Ltd and Singapore Telecom Paging Pte Ltd (collectively referred to as **SingTel**) refer to the Info-communications Development Authority of Singapore (**IDA**) consultation paper dated 5 July 2007 on the proposed regulatory framework for telephony services over wireless broadband access networks and interconnection framework for telephony services (**Consultation Paper**).

1.2 SingTel welcomes the opportunity to make this submission on the Consultation Paper and the various issues identified by the IDA.

1.3 SingTel's submission is structured as follows:

Section 1 – Introduction;

Section 2 – Executive Summary;

Section 3 – Detailed Response; and

Section 4 – Conclusion.

1.4 SingTel would be pleased to clarify any of the views and comments made in this submission, as appropriate.

2. EXECUTIVE SUMMARY

2.1 The key points made in this submission for the IDA's consideration are as follows:

(a) SingTel agrees that telecommunication networks are progressively migrating towards IP-based technology. However, while the move towards IP-based networks and fixed-to-mobile convergence will require the development of new commercial and technical models for interconnection, SingTel believes it is still too premature to seek a major overhaul of the existing interconnection framework or move towards new interconnection charging models.

(b) SingTel believes that the current framework for PSTN interconnection can readily accommodate interconnection between PSTN networks and IP-based networks (including WBA networks). Certainly, the deployment of IP-based networks in Singapore does not warrant a change in the PSTN interconnection charging model.

(c) SingTel generally agrees with the IDA's proposed conditions for the allocation of number levels, including the IDA's proposal to allocate number levels '3', '6', '8' and '9' to WBA network operators. SingTel agrees that the allocation of number levels '3', '6', '8' and '9' depends on the WBA network operator satisfying the number allocation criteria for the underlying telecommunication service to be provided.

(d) SingTel believes that number levels '8' and '9' should <u>not</u> be available for telephony services which <u>do not</u> fulfil the "mobility requirement" (i.e. different service characteristics). It would be inconsistent to allocate number levels '8' and '9' to network operators that are not able to provide mobility similar to the existing 2G and 3G mobile network operators.

(e) SingTel does not believe that BAK arrangements will be a feasible and practical interconnection charging regime for <u>all</u> forms of telephony services in the long term. While BAK may prove useful in some situations, it is important to realise that such an approach has significant limitations and may not be an appropriate interconnection charging model in all cases. Going forward, it may be appropriate for charging arrangements to vary between different classes of services, depending on volumes of exchanges, the time of exchange, quality of service and security.

(f) SingTel believes that the interconnection arrangements for the PSTN should not be changed abruptly. In addition to the continued relevance of the PSTN interconnection charging model for the foreseeable future, any change to the existing PSTN

interconnection charging model (where the PSTN operators recover the cost of terminating calls in their PSTN networks from the originating operator) will inevitably require corresponding changes at the retail level, including tariff changes, system modifications and consumer re-education. These transitional costs would need to be quantified and recovered by SingTel consistent with the cost causation principles that underpin Singapore's interconnection regime.

(g) SingTel agrees that the settlement arrangements under the Extended Interim Framework should be maintained for interconnection arrangements involving Level 3 Operators. Level 3 Operators should pay corresponding origination, transit and termination charges for calls originating, transiting through or terminating on the fixed-line networks and recover the costs through their service offerings to their subscribers.

(h) SingTel agrees that the cost of origination or termination on an IP-based network is likely to be insignificant. Level 3 Operators do not have access networks of their own, but simply ride on the existing access network infrastructure of the FBOs. Therefore, SingTel agrees with the IDA that there is no need to establish origination or termination charges for calls originating/terminating on Level 3 Operators' networks.

(i) SingTel does not believe that the cost of opening up new number levels (such as level '3') should be borne according to the BAK arrangement. This is an over-simplification. The existing arrangements between PSTN and mobile network operators (such as those in relation to levels '6', '8' and '9') to absorb their own costs associated with opening up new number levels is established only for similarly-situated operators (i.e. FBOs with access networks). The same arrangement is not applicable to FBOs with no access networks and SBOs.

(j) SingTel agrees with the IDA's proposal that the opening up of new access codes should be borne by the access code providers. The nature of calls to access code providers are uni-directional. Furthermore, the access code providers are providing the call services and earning the revenue associated with such calls. Based on the principle of cost-causality, the access code providers should rightly bear the cost of opening up new access codes, as the access code provider causes the cost to be incurred and also earns the revenue for calls to the access code. The access code providers should also bear the cost of the interconnection links.

(k) SingTel generally agrees that the hub operators in wholesale agreements with Level 3 Operators should recover a transit charge – for each call which a hub operator

receives and conveys to the Level 3 Operator, the hub operator should recover only a transit charge. This arrangement eliminates the concern of the hub operator recovering more charges than necessary for the onward conveyance of traffic to the Level 3 Operator.

(l) With regard to Level 3 Operators in wholesale agreements with hub operators, SingTel believes that it is not necessary for the Level 3 Operators to enter into separate interconnection agreements with the operators at the other end of the call. Indeed, this would be inconsistent with industry practice to date. In such wholesale interconnection arrangements, calls from the Level 3 Operator will be conveyed by the hub operator for termination to the other third party network at the relevant interconnection termination rate applicable under the existing interconnection agreement between the hub operator and the other third party network operator.

(m) SingTel generally supports the proposed POI Interconnection Arrangement. SingTel agrees that the operator making the choice of indirect interconnection will be responsible for the transit charges payable to its elected transit operator. The proposed POI Interconnection Arrangement would establish the correct incentives and would result in operators making decisions regarding direct or indirect interconnection by having appropriate regard to the economic (i.e. cost minimisation) and technical matters, rather than revenue generation possibilities.

(n) SingTel believes that the existing interconnection link arrangements between PSTN operators and mobile network operators should be maintained, given that there is no overriding or compelling reason for change and the potential impact on the manner in which retail fixed-line telephony services are charged to end users if a change is eventually required. Mobile network operators should continue to bear the cost of the interconnection links and continue to recover this cost through their service offerings to their subscribers.

(o) SingTel does not envisage any implementation complexities in moving from the current arrangements to the proposed POI Interconnection Arrangement. Essentially, under the proposed POI Interconnection Arrangement, the transit operator would have to recover the transit charges from “the operator making the choice of indirect interconnection”. The quantum of the transit charges should not be affected.

3. DETAILED RESPONSE

Long term market and technology outlook

IDA invites views and comments on the long-term market and technology outlook, in particular, the increasing deployment of IP-based networks and the increasing pace of FMC.

IDA also invites views on the impact of these developments on IDA's existing interconnection framework and number allocation framework.

3.1 The IDA has requested comments on the long-term market and technology outlook, and the impact of these developments on the IDA's existing interconnection framework and number allocation framework.

3.2 SingTel agrees with the IDA that telecommunications networks are progressively migrating towards IP-based technology. However, while the move towards IP-based networks and fixed-to-mobile convergence will require the development of new commercial and technical models for interconnection, SingTel believes it is still too premature to seek a major overhaul of the existing interconnection framework or move towards new interconnection charging models.

3.3 Migration towards IP-based networks is occurring incrementally and is currently focused on the network 'core' and transport layers. For the foreseeable future, operators will continue to use traditional switched technology in their access networks as the primary means of providing telecommunications services. For these reasons, the existing PSTN interconnection charging model remains relevant even with the progressive deployment of IP-based networks.

3.4 The current PSTN interconnection framework has already proven sufficiently robust to cope with the introduction of IP-based networks in Singapore. Interconnection of the PSTN with existing IP-based systems, including SingTel's Mio Voice Service and StarHub's Digital Voice Service, has occurred within the existing PSTN interconnection charging model.

3.5 In any case, future interconnection charging models remain in a state of flux. Industry based forums, such as the GSM Association and the International

Telecommunications Union, are still developing the underlying technical models for the interconnection of 'next generation networks'.

3.6 Charging models are unlikely to become clear until the technical arrangements to be used for quality of service based interconnection stabilise. At this point, it is not yet clear what technical approaches or interconnection charging models will evolve and prevail, and it may be the case that various commercial models may co-exist in the future.

3.7 In other countries where operators have commenced deploying 'next generation networks', such as the United Kingdom and France, regulators have refrained from specifying the interconnection charging models that are to apply going forward. In the United Kingdom, Ofcom has stated:[1]

> *"Whilst the current interconnect regime is well defined, it is not yet possible to specify the future model…as clearly"*.

3.8 In short, SingTel believes that the current framework for PSTN interconnection can readily accommodate interconnection between PSTN networks and IP-based networks (including WBA networks). Certainly, the deployment of IP-based networks in Singapore does not warrant a change in the PSTN interconnection charging model.

[1] Ofcom, *Next Generation Networks: Developing the regulatory framework*, 7 March 2006, paragraph 4.61.

Number allocation and criteria

IDA invites views and comments on IDA's proposed conditions for the allocation of each number level in the light of industry trends. In particular, for convergent services offered over multiple platforms, do you agree that the numbers allocation conditions can be met as long as the service, as a whole, fulfils the number allocation criteria?

IDA invites views and comments on IDA's proposal to allocate number levels '3', '6', '8' and '9' to WBA operators for the provision of telephony services. In particular, do you agree that there is no need to include a requirement for "mobility" as a criteria for the allocation of level '8' and '9' numbers? If you propose to include the requirement for "mobility", please assist by defining "mobility", and determining when the requirement is met or unmet.

3.9 The IDA has requested comments on the proposed conditions for the allocation of each number level, including the IDA's proposal to allocate number levels '3', '6', '8' and '9' to WBA network operators for the provision of telephony services.

3.10 SingTel generally agrees with the IDA's proposed conditions for the allocation of number levels, including the IDA's proposal to allocate number levels '3', '6', '8' and '9' to WBA network operators. SingTel agrees that the allocation of number levels '3', '6', '8' and '9' depends on the WBA network operator satisfying the number allocation criteria for the underlying telecommunication service to be provided.

3.11 SingTel notes that the IDA has also requested comments on its proposal to make number levels '8' and '9' available for telephony services even if they do not fulfil the "mobility requirement".

3.12 SingTel considers that telephony services which do not fulfil the "mobility requirement" clearly differ in characteristics from the existing 2G or 3G mobile services. The association of distinct number levels to specific types of telecommunication services allows consumers to immediately understand the capabilities and functionalities which are available to them and the corresponding charging structure. Consumers continue to have a reasonable expectation that specific number levels will be attended by specific forms of functionality. Network operators providing telephony services using level '8' and '9' should provide mobile services and meet the same mobility requirements applicable to 2G and 3G mobile network operators.

3.13 In short, based on the principle adopted by the IDA in paragraph 12 of the Consultation Paper, *"…similar number levels may be assigned to services with similar basic characteristics, regardless of the platform the service is riding on or the technologies used"*[2], number levels '8' and '9' should not be available for telephony services which do not fulfil the "mobility requirement" (i.e. different service characteristics). It would be inconsistent for the IDA to allocate number levels '8' and '9' to network operators that are not able to provide mobility similar to the existing mobile network operators.

3.14 In respect to convergent services offered over multiple platforms, SingTel agrees that the number allocation conditions can be met as long as the service, as a whole, fulfils the number allocation criteria. This is consistent with the technology-neutral approach.

[2] IDA, *Proposed regulatory framework for telephony services over wireless broadband access networks and interconnection framework for telephony services*, 5 July 2007, paragraph 12.

Interconnection settlement regime

IDA invites views and comments on the proposed interconnection settlement regime for telephony services, in particular, whether:

a) the "Bill and Keep" interconnection regime is a viable long term interconnection regime for all forms of telephony services, and if so, at what stage should we move over to such a regime?

b) the interconnection settlement regime in the medium term should be based on the number level that reflects the service characteristics, regardless of platform or technology used;

c) the settlement arrangements under the Extended Interim Framework should be maintained for interconnection arrangements involving Level 3 operators.

BAK as interconnection charging regime for all forms of telephony services in the long term

3.15 The IDA has requested comments on whether the BAK is a viable long term interconnection regime for all forms of telephony services. Generally, SingTel agrees that the BAK is a feasible and practical interconnection charging regime for WBA operators for voice services.

3.16 SingTel does not believe that BAK arrangements will be a feasible and practical interconnection charging regime for all forms of telephony services in the long term. While BAK may prove useful in some situations, it is important to realise that such an approach has significant limitations (one of which is highlighted by the IDA in paragraph 24 of the Consultation Paper) and may not be an appropriate interconnection charging model in all cases.

3.17 In any event, it would be a mistake to assume that because BAK has been appropriate for some forms of interconnection, it will be appropriate going forward for all network operators or all forms of telephony services. For example, the defining characteristic of 'next generation networks' is differential quality of service and interconnection between these networks may need to support certain levels of quality of service. The additional costs associated with providing a certain quality of service to an interconnected network may not be incurred on a symmetrical basis or be

needed consistently across retail services. BAK may not allow recovery of these costs in a fair way.

3.18 Going forward, it may be appropriate for charging arrangements to vary between different classes of services, depending on volumes of exchanges, the time of exchange, quality of service and security. For example, if a network operator incurs costs in providing a different quality of service to support an interconnecting operator's retail service that the terminating network operator does not require in the reverse direction for its own retail services, it may be appropriate for the charging arrangement to pass this cost through to the interconnecting operator.

3.19 For these reasons, overseas regulators have acknowledged it is far too early to determine whether BAK will be an appropriate model for all future interconnection between network operators. Indeed, while in the United Kingdom, Ofcom has indicated that BAK arrangements may be used by similar sized operators[3], it has also acknowledged that this will depend on the tariff structures at the retail level and various other factors that cannot yet be accurately predicted:[4]

> *"In summary, our initial thinking is that the move to NGNs might ultimately lead to a number of indirect impacts on call termination. However, it is not yet clear if and when those changes will materialise. Therefore, a pragmatic approach may be to wait until it is clearer how those changes are likely to play-out, before commencing a further review of fixed call termination." (our emphasis).*

3.20 SingTel believes the more likely outcome than all network operators moving to BAK is that various interconnection charging models will co-exist at the same time. Not only will IP-based networks co-exist with existing networks, but there are likely to be multiple interconnection charging models for new IP-based networks, depending on various factors, including different types of services, different retail charging arrangements chosen by the customer of the service provider, the level of the network at which interconnection occurs and the type of providers which are interconnecting.

3.21 The only safe prediction at this point in time is that interconnection will be more varied and complex than is currently the case and therefore fixing a single model such as BAK may well pre-empt the development of these varied commercial outcomes in

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3 Ofcom, *Next Generation Networks: Developing the regulatory framework*, 7 March 2006, paragraph 4.70.

4 Ibid, paragraph 4.71.

the new IP world and result in unknown and unintended consequences on the industry and industry development.

3.22 SingTel agrees with the IDA that *"A switch to the BAK regime for interconnection between Level 3 Operators and fixed-line operators now may have a significant impact on the manner in which retail fixed-line telephony services are charged to end users…"*[5].

3.23 SingTel believes that the interconnection arrangements for the PSTN should not be changed abruptly. In addition to the continued relevance of the PSTN interconnection charging model for the foreseeable future, any change to the existing PSTN interconnection charging model (where the PSTN operators recover the cost of terminating calls in their PSTN networks from the originating operator) will inevitably require corresponding changes at the retail level, including tariff changes, system modifications and consumer re-education. These transitional costs would need to be quantified and recovered by SingTel consistent with the cost causation principles that underpin Singapore's interconnection regime.

3.24 Consumers have become accustomed to the existing charging arrangements for fixed telephony services and the PSTN provides consumers with affordable services at a reasonable quality. Given the issues for customers in moving away from the existing arrangement and the costs associated with doing so (for consumers and operators alike), SingTel does not consider it appropriate to change the existing arrangements of PSTN operators.

3.25 As an example of the confusion and inconvenience to consumers, today, SingTel fixed line customers are not charged for receiving incoming calls. Instead, SingTel recovers the costs of the voice call from an interconnected operator whose customer has originated the call. If the existing PSTN interconnection charging model is changed to, say BAK, then SingTel would not be recovering any costs from the calling party and would instead need to recover its costs from its customer who is receiving the call (i.e. say, through the introduction of a retail tariff for incoming calls).

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5 IDA, *Proposed regulatory framework for telephony services over wireless broadband access networks and interconnection framework for telephony services*, 5 July 2007, paragraph 29.

3.26 SingTel believes that the current PSTN interconnection charging model is sufficiently robust to carry forward into the IP-based world. At the very least, it is inappropriate to decide at this point in time whether this model will need to be replaced.

3.27 First, it is unclear at what point it can be said that PSTN has been replaced by IP-based networks as the primary means of delivering basic voice services. PSTN upgrades will be incremental in nature, commencing at the 'core' and moving towards the 'edges' of the network. Voice services will be provided over 'hybrid' switched and IP-based infrastructure.

3.28 Even in the long run, while some next generation networks convert voice into IP packets at the subscriber's premises, other 'next generation network models', such as that being deployed by British Telecom, will still involve analog and switched elements. The exact time a basic voice service is considered to no longer be primarily provided over the PSTN will therefore be somewhat artificial.

3.29 Figure 1 below explains the various ways in which telecommunications services can be (and will be) provided using both PSTN and IP-based technology. In the following diagram, the demarcation point between IP-based network infrastructure and circuit based infrastructure is at the point of installation of the analog termination adapter (**ATA**).

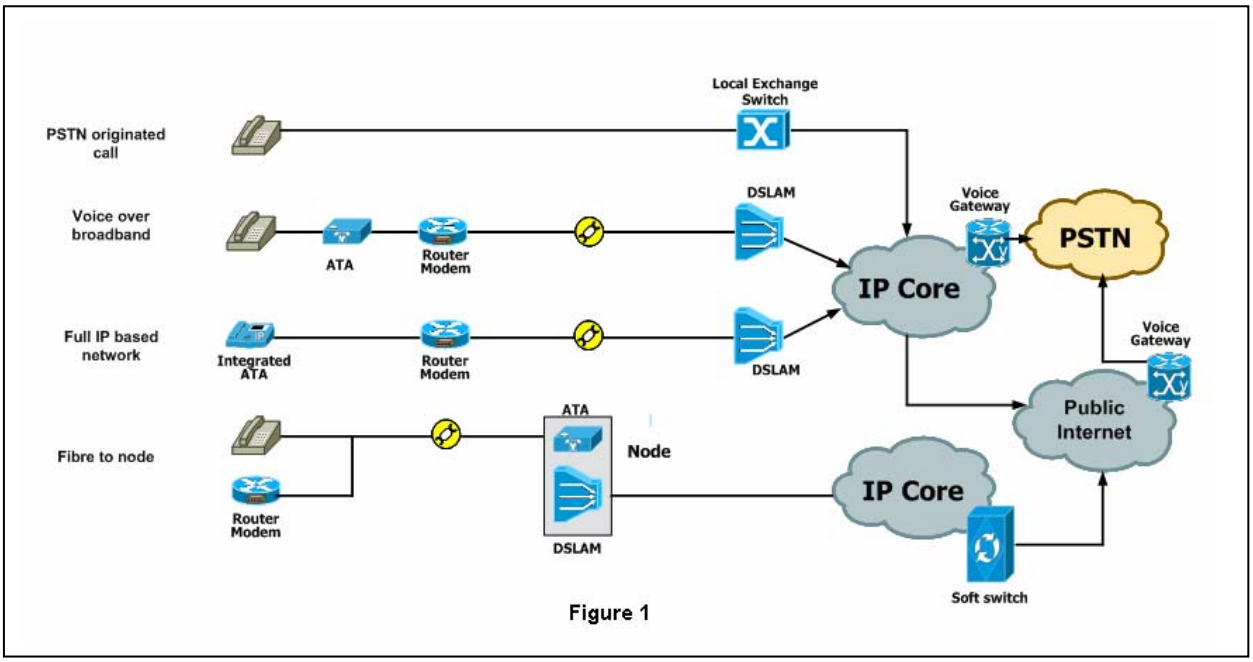

Figure 1

3.30 Second, any charging model that is adopted will need to ensure that SingTel can recover the costs associated with termination, whether that service is provided by means of traditional technologies or IP. It is questionable whether alternative arrangements, such as BAK, will ensure that SingTel can cover the costs associated with the termination of calls on the PSTN, particularly where the CPP model prevails at the retail level for voice calls.

3.31 In SingTel's view, the appropriate interconnection model is less about the type of technology that is used to terminate voice calls than the commercial arrangements that exist for the recovery of costs from end-users and interconnected parties. The current model may well prove as appropriate for some services in the future IP world as it has been in the current switched world.

Interconnection settlement regime in the medium term

3.32 The IDA has requested comments on whether the interconnection settlement regime in the medium term should be based on the number level that reflects the service characteristics, regardless of platform or technology used.

3.33 SingTel generally agrees with the IDA that the interconnection settlement regime in the medium term should be based on the number level that reflects the service characteristics, regardless of platform or technology used. Furthermore, the interconnection settlement regime should consider the commercial arrangements that exist for the recovery of costs from end-users and interconnected parties.

Interconnection settlement regime for Level 3 Operators

3.34 The IDA has requested comments on whether the settlement arrangements under the Extended Interim Framework should be maintained for interconnection arrangements involving Level 3 Operators.

3.35 SingTel agrees that the settlement arrangements under the Extended Interim Framework should be maintained for interconnection arrangements involving Level 3 Operators. Level 3 Operators should pay corresponding origination, transit and termination charges for calls originating, transiting through or terminating on the

fixed-line networks and "*recover the costs through their service offerings to their subscribers*"[6].

3.36 SingTel agrees that the cost of origination or termination on an IP-based network "*is likely to be insignificant*"[7]. Level 3 Operators do not have access networks of their own, but simply ride on the existing access network infrastructure of the FBOs. Therefore, SingTel agrees with the IDA that there is "*no need to establish origination or termination charges for calls originating/terminating on Level 3 operators' networks*"[8].

6 Ibid, paragraph 30.
7 Ibid, paragraph 30.
8 Ibid, paragraph 30.

Opening up of new number levels

IDA invites comments on whether

a) the cost of opening up new number levels should be borne according to a 'BAK' arrangement, i.e., each operator bears its own cost of opening up a new number level, except in the case of opening of access codes e.g. 00x, 15xx, 1800; and

b) the hub operators in wholesale agreements with Level 3 operators should be considered as transit providers, and whether Level 3 operators in such agreements would still need to enter into separate interconnection agreements with the operators at the other end of the call.

3.37 The IDA has requested comments on whether the cost of opening up new number levels (i.e. levels '3', '6', '8' and '9') should be borne according to a BAK arrangement, where each network operator bears its own costs for opening up new number levels, except in the case of opening of access codes e.g. 00x, 15xx, 1800.

3.38 SingTel does not believe that the cost of opening up new number levels (such as level '3') should be borne according to the BAK arrangement. This is an over-simplification. The existing arrangements between PSTN and mobile network operators (such as those in relation to levels '6', '8' and '9') to absorb their own costs associated with opening up new number levels is established only for similarly-situated operators (i.e. FBOs with access networks). This is the underlying principle.

3.39 The same arrangement is not applicable to FBOs with no access networks (e.g. FBOs providing international services with submarine cable or satellite transponder capacity only) and SBOs (**Non-Access Network Operators**). Non-Access Network Operators have not invested in rolling-out access network infrastructure and have different business models from FBOs with access networks.

3.40 Consistent with the existing approach and the underlying principle, SingTel proposes that between any two (2) FBOs which both have access networks, each FBO should absorb its own costs associated with opening up the other FBO's new number levels. This arrangement is also applicable to WBA network operators which have nationwide access networks.

3.41 The same arrangement is not applicable to Non-Access Network Operators. Non-Access Network Operators must bear the cost of opening up their number levels in FBOs' access networks. This distinction between Non-Access Network Operators and FBOs which have access networks is consistent with the Policy Framework for IP Telephony issued by the IDA on 14 June 2005.

Treatment of access code providers

3.42 SingTel agrees with the IDA's proposal that the opening up of new access codes should be borne by the access code providers.

3.43 As the IDA has correctly noted, the nature of calls to access code providers are uni-directional. Furthermore, the access code providers are providing the call services and earning the revenue associated with such calls. Based on the principle of cost-causality, the access code providers should rightly bear the cost of opening up new access codes, as the access code provider causes the cost to be incurred and also earns the revenue for calls to the access code. The access code providers should also bear the cost of the interconnection links.

3.44 SingTel does not envisage any implementation complexities in requiring the access code providers to bear the cost of opening up new access codes and the cost of the interconnection links.

Commercial wholesale services for interconnection

3.45 The IDA has requested comments on whether the hub operators in wholesale agreements with Level 3 Operators should be considered as transit providers.

3.46 SingTel generally agrees that the hub operators in wholesale agreements with Level 3 Operators should recover a transit charge – for each call which a hub operator receives and conveys to the Level 3 Operator, the hub operator should recover only a transit charge. This arrangement eliminates the concern of the hub operator recovering more charges than necessary for the onward conveyance of traffic to the Level 3 Operator. For the avoidance of doubt, SingTel's response in respect of the responsibility for payment of the transit charge is discussed in paragraphs 3.49 to 3.56 and paragraphs 3.63 to 3.67 below.

3.47 The IDA has also requested comments on whether Level 3 Operators in such wholesale agreements would still need to enter into separate interconnection agreements with the operators at the other end of the call.

3.48 SingTel believes that it is not necessary for Level 3 Operators to enter into separate interconnection agreements with the operators at the other end of the call. Indeed, this would be inconsistent with industry practice to date. In such wholesale interconnection arrangements, calls from the Level 3 Operator will be conveyed by the hub operator for termination to the other third party network at the relevant interconnection termination rate applicable under the existing interconnection agreement between the hub operator and the other third party network operator (see Figure 2).

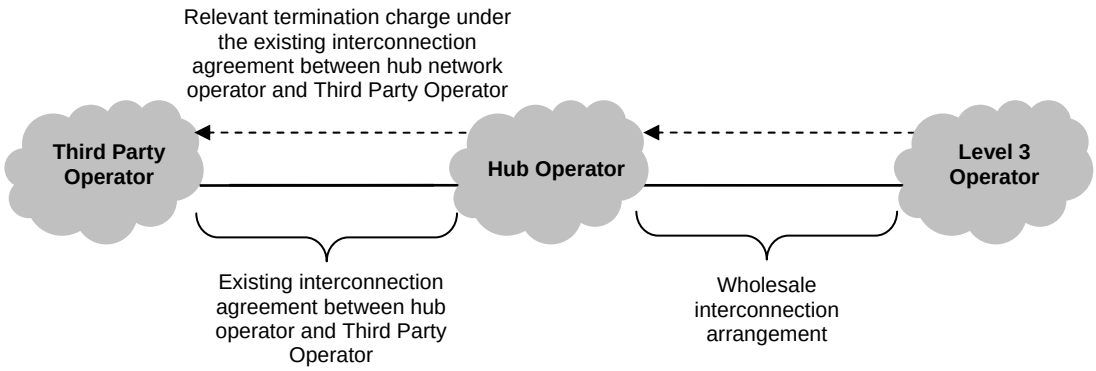

Figure 2: Wholesale interconnection arrangement provided by hub operator, where the Level 3 Operator hubs behind the hub operator for interconnection

Direct and Indirect Interconnection Arrangement

IDA invites views and comments on the proposed POI Interconnection Arrangement, i.e., that each licensee designates a POI for the origination and termination services it provides, and licensees are responsible for all costs on their side of that point of interconnection, including the costs of interconnection links.

What would be the impact of implementing this proposal on technological and economic efficiencies, both for existing operators (fixed and mobile) as well as IP telephony operators and WBA operators that offer telephony services?

What are the challenges to moving from the current arrangements to this proposed POI Interconnection Arrangement?

What are the long-term implications of this proposed POI Interconnection Arrangement as networks evolve over time?

3.49 SingTel supports the IDA's view that "*indirect interconnection need not necessarily be inefficient for operators*"[9] and notes that the IDA is mindful of the fact that "*a number of respondents have raised the concern that the costs of direct interconnection if mandated, could be significant as operators would not only need to deploy dedicated interconnect gateway switches and ensure that such switches are equipped with sufficient ports and capacity, operators would also need to maintain and manage multiple interconnection links*"[10].

3.50 SingTel believes that the current direct and indirect interconnection arrangements, which are established commercially and by having regard to the specific economic and technical considerations of the interconnected operators, have generally served the industry well. SingTel considers that operators should remain free to determine whether to adopt direct or indirect forms of interconnection, having regard to the relevant technical and economic considerations of the operators. SingTel notes that the IDA determines that "*operators should continue to have the flexibility to commercially negotiate and agree on whether to enter into direct or indirect interconnection arrangements with one another*"[11].

9 Ibid, paragraph 38.
10 Ibid, paragraph 42.
11 Ibid, paragraph 38.

3.51 SingTel agrees with the IDA that *"the existing default indirect interconnection arrangement could possibly override the economic considerations and lead to inefficient interconnection arrangements."*[12]

Proposed POI Interconnection Arrangement

3.52 The IDA has requested comments on the proposed POI Interconnection Arrangement, i.e., that each licensee designates a POI for the origination and termination services it provides, and licensees are responsible for all costs on their side of that point of interconnection, including the costs of interconnection links.

3.53 SingTel generally supports the proposed POI Interconnection Arrangement. SingTel agrees that *"the operator making the choice of indirect interconnection will be responsible for the transit charges payable to its elected transit operator"*[13].

3.54 The proposed POI Interconnection Arrangement removes any artificial incentive for a terminating operator to establish indirect interconnection by hubbing behind a transit operator (which can then collect the transit charge from the originating operator) and which may have resulted in some operators making interconnection decisions based on the prospect of revenue generation.

3.55 The proposed POI Interconnection Arrangement would establish the correct incentives and would result in operators making decisions regarding direct or indirect interconnection by having appropriate regard to the economic (i.e. cost minimisation) and technical matters, rather than revenue generation possibilities.

3.56 The proposed POI Interconnection Arrangement would be beneficial to a significant cross-section of the industry and would create the correct economic incentives for operators in respect of the interconnection arrangements.

Responsibility for costs of interconnection links

3.57 SingTel notes the IDA's clarification *"that interconnecting operators are still free to negotiate alternative interconnection link sharing arrangements between themselves should they both agree to do so..."*[14], failing which, *"operators will be responsible for building or leasing capacity to have dedicated links for traffic under direct*

12 Ibid, paragraph 39.
13 Ibid, paragraph 44.
14 Ibid, paragraph 55.

interconnection, or enough capacity for total traffic sent via the transit operator under indirect interconnection, on their side of the POI"[15].

3.58 SingTel agrees with the above IDA proposal in respect of interconnection between two (2) PSTN operators.

3.59 However, SingTel notes that the IDA has also proposed that the above arrangement be applied to interconnection with mobile network operators. SingTel's view is that PSTN operators should not be responsible for building or leasing capacity for interconnection with mobile network operators.

3.60 As the IDA is aware, the cost of interconnection links have not been incorporated in the PSTN operators' retail pricing for fixed-line telephony services, as mobile network operators have always borne the cost of the interconnection links to PSTN operators and recover these costs through their service offerings to their subscribers. These costs should not now be transferred to the PSTN operators.

3.61 A change to the existing arrangements for interconnection between PSTN operators and mobile network operators now may have a significant impact on the manner in which retail fixed-line telephony services are charged to end users, given that the PSTN is still the predominant telephony service network.

3.62 Given that there is no overriding or compelling reason for change, and consistent with existing arrangements, SingTel believes that the existing interconnection link arrangements between PSTN operators and mobile network operators should be maintained; that is, for interconnection between a PSTN operator and a mobile network operator, the mobile network operator should continue to bear the cost of the interconnection links and continue to recover this cost through its service offerings to its subscribers.

Impact and long-term implications of proposed POI Interconnection Arrangement

3.63 The IDA has requested comments on the impact of the proposed POI Interconnection Arrangement on technological and economic efficiencies, both for existing operators (fixed and mobile) as well as IP telephony operators and WBA operators that offer telephony services and the long-term implications of the proposed POI Interconnection Arrangement as networks evolve over time.

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15 Ibid, paragraph 54.

3.64 SingTel believes that the proposed POI Interconnection Arrangement would establish the correct incentives and would result in all operators making decisions regarding direct or indirect interconnection by having appropriate regard to economic (i.e. cost minimisation) and technological efficiencies.

Challenges to moving from the current arrangements to the proposed POI Interconnection Arrangement

3.65 The IDA has requested comments on the challenges to moving from the current arrangements to the proposed POI Interconnection Arrangement.

3.66 SingTel does not envisage any implementation complexities in moving from the current arrangements to the proposed POI Interconnection Arrangement. Essentially, under the proposed POI Interconnection Arrangement, the transit operator would have to recover the transit charges from "the operator making the choice of indirect interconnection". The quantum of the transit charges should not be affected.

3.67 For example, consider Illustration 3[16] in the Consultation Paper (reproduced in Figure 3 below) where the terminating operator prefers indirect interconnection, and designates the POI at the switch of a transit operator, and the originating operator delivers the traffic directly to the transit operator. Assuming that the transit operator recovers a cost of $0.001 per minute of call transit traffic and the originating operator delivers 1,000 minutes of call traffic through the transit operator for termination in the terminating operator network, then the transit operator would simply bill the terminating operator for $1 of transit charges under the proposed POI Interconnection Arrangement (instead of the originating operator, under today's arrangement).

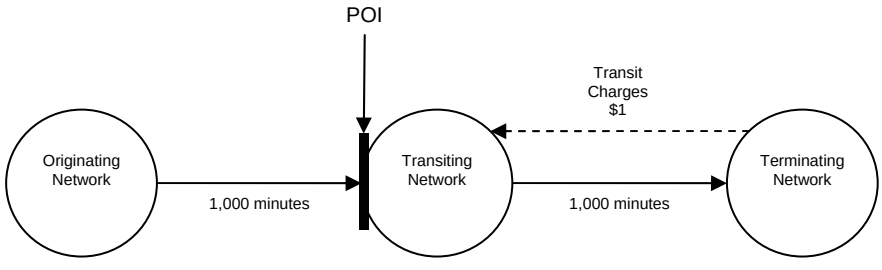

Figure 3

[16] Ibid, pages 22 and 23.

4. CONCLUSION

4.1 In conclusion, SingTel broadly agrees with the IDA's proposed regulatory framework for telephony services over WBA networks and the proposed interconnection framework for telephony services.

4.2 SingTel generally supports the IDA's proposed POI Interconnection Arrangement, which would be beneficial to a significant cross-section of the industry, establish the correct incentives and result in operators making decisions regarding direct or indirect interconnection by having appropriate regard to the economic and technical matters.

4.3 However, SingTel believes that the IDA should require that network operators providing telephony services using level '8' and '9' provide mobile services and meet the same mobility requirements applicable to 2G and 3G mobile network operators.

4.4 SingTel believes that between any two (2) FBOs which both have access networks, each FBO should absorb its own costs associated with opening up the other FBO's new number levels. However, the same arrangement is not applicable to Non-Access Network Operators. Non-Access Network Operators must bear the cost of opening up their number levels in FBOs' access networks.

4.5 Finally, SingTel believes that the existing interconnection link arrangements between PSTN operators and mobile network operators should be maintained, given that there is no overriding or compelling reason for change and the potential impact on the manner in which retail fixed-line telephony services are charged to end users if a change is eventually required.