

23 April 2020

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Deputy Chief Executive (Connectivity Development and Regulation)  
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Dear Ms Chia,

## **Public Version**

### **SuperInternet Comments on IP-Based Interconnection**

SuperInternet ACCESS Pte Ltd ("SuperInternet") thanks the IMDA for the opportunity to respond to its Consultation Paper of 1<sup>st</sup> March 2021 on the implementation of IP-based interconnection in Singapore.

#### **SuperInternet's interest in the consultation**

SuperInternet is a new entrant in the voice market in Singapore and its parent, MNF Group ("MNF"), has operations in Australia, New Zealand, the United States and the United Kingdom. This submission draws on the experience of SuperInternet and the broader global experience of MNF of interconnection arrangements in those other markets. SuperInternet wishes to support the growth and development of the industry in Singapore, and, given its business interests in the wholesale market, it has a commercial interest in industry growth and in the entry of new participants. SuperInternet seeks to be an innovative participant with a forward-looking perspective geared towards the provision of E.164-based services in Singapore and providing wholesale services that bridge PSTN services and the Cloud. Interconnection and fixed number portability are critical issues for SuperInternet's business model and outlook.

#### **Summary**

SuperInternet welcomes the IMDA's proposal to move to IP-based interconnection in the domestic, fixed-line market. It is a forward-looking move that will support innovation and competition in fixed-line services, and, in the process, lead to further investment and growth in the Singaporean economy. SuperInternet's concern is about sustainable investment that will contribute to Singapore's prosperity as a very advanced, digital economy.

SuperInternet agrees with the IMDA's expressed view that all operators should follow "a standardised set of technical requirements to implement IP-based interconnection at domestic POIs" (Consultation Paper, p. 4). SuperInternet believes that this should be a

minimal specification, sufficient for effective and efficient interconnection, but with room for innovation in the development of new fixed-line and multimedia services.

SuperInternet considers that the technical requirements can only be successfully defined if the IMDA convenes and chairs an industry working party, to which all operators should be invited to contribute, to build engagement and consensus. SuperInternet can contribute its own and MNF's experience in developing IP-based interconnection in Singapore and elsewhere. That experience indicates that the minimal specification should be based on the 3GPP standards for SIP, together with at least a partial implementation of IMS to support SIP-based interconnection.

It is vital, in SuperInternet's view, that the specification process not be pre-empted by an initial specification by SingTel. This could bias the final result in favour of SingTel's current arrangements and cause distortion to the fixed-line market. Therefore, SuperInternet disagrees with the IMDA's outlined approach of having SingTel first develop a RIO for industry comment. SuperInternet believes that the proposed industry working party should *precede* any proposals by SingTel.

Fixed-Number Portability (FNP) is an essential component of fixed service competition and must be effectively and efficiently supported in IP-based interconnection. SuperInternet supports the All-Call-Query ("ACQ") method, as outlined by the IMDA, to replace the less efficient Query-on-Release ("QoR") method.

The IMDA has raised concerns about Quality of Service ("QoS") and security issues with IP-based interconnection. SuperInternet can assure the IMDA that there should be no QoS issues if interconnection is appropriately implemented. SuperInternet's experience is that security can be maintained through isolation of facilities from the public Internet and suitable perimeter controls.

SuperInternet believes that a three-year transition period is appropriate to reach consensus on requirements and implement IP-based interconnection throughout the industry in Singapore. This is consistent with the glide-path period for BAK. SuperInternet cautions, however, that the timing should be based on reaching consensus in the proposed industry working party, which may take more or less time than three years, and urges the IMDA to be flexible. SuperInternet sees no need for a "big bang" approach to final cutover to IP-based interconnection. Its experience is that successive cutovers are possible and preferable; the IMDA can assess progress and mandate IP-based interconnection when the industry has shown it is ready.

The Consultation Paper refers to the IMDA's proposal to change the current interconnection charging regime for fixed-line call termination between operations from CPP (Calling Party Pays) to BAK (Bill and Keep). SuperInternet has taken the opportunity of the current consultation to add its views on the proposal to change to BAK at the end of this submission. In summary, SuperInternet's view is that the current charging regime for fixed-line call termination is serving Singapore well and has not resulted in any adverse price or other consequences for end-users and retail customers. SuperInternet's position is that CPP

should be retained. In addition, there are significant issues that need to be fully and carefully considered in any proposed transition to BAK, and, if the IMDA is determined to change to BAK, these issues should be carefully managed in the implementation, even at the expense of the 3-year implementation glide-path that the IMDA has mentioned.

### **Detailed Responses to IMDA'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.*

SuperInternet believes that a common set of standards for the technical requirements of interconnection are vital to make the process cost-effective for all operators. SuperInternet envisages that there will be a growing list of fixed network operators seeking domestic interconnection in Singapore: providing multiple interconnection interfaces to different groups of operators would be complicated, inefficient and costly, and may well impact in very uneven ways with consequences for competition and, in consequence, sector investment and economic growth. Already, SuperInternet has experience of differing technical standards for existing IP-based interconnection in Singapore, due to differing implementations of the Session Border Controller (SBC) by two operators.

It is important, however, that the interconnection arrangements promote competitive access and are suitable for all operators. A minimal specification for IP-based interconnection that is effective and efficient, but which does not limit competitive creativity, is required. Permitting SingTel alone to define the technical standards through its RIO could lead to outcomes that are especially favourable to SingTel and may add to the costs of the industry as a whole and may be a barrier to entry by new operators. An example of this is in the current interconnection arrangements, whereby SingTel requires interconnection at 4 sites (in two hubs), while other operators require only a single POI (duplicated for robustness). In addition, SuperInternet considers that SingTel's current specification is not minimal, but includes features that are favourable to SingTel's interests, which are not required by other operators and which add cost for them.

For this reason, SuperInternet proposes that **the IMDA should convene and chair a working group of industry experts** to define the technical requirements for IP-based interconnection. All current FBO licensees should be invited to contribute. Only through such a process can the IMDA be assured that the technical standards meet the operational requirements of all operators while promoting competition in the fixed-line market and lowering the barriers to entry of new and innovative operators. SuperInternet is willing to contribute its and MNF's own technical standards for existing IP-based interconnection in Singapore and elsewhere to the proposed working group.

Further, SuperInternet proposes that this industry process should *precede* the development by SingTel of amendments to its RIO. This is critical in our view, because it will ensure that the narrative is not distorted at the outset to reflect SingTel's needs, but, rather, to reflect

overall industry needs reflected through the perspective of all operators about the needs of their customers. SingTel's needs are important, but they are a sub-set of total industry needs, and should not be determinative of them. The same result would not ensue if SingTel developed an initial draft RIO and the industry responded with comments, because the first draft of a technical specification invariably sets the parameters and shapes the subsequent discussion. The sequence proposed by SuperInternet of industry discussion and consensus first and SingTel draft RIO second is fairer, better informed and more inclusive at the outset of the process.

SuperInternet believes that the IMDA should ensure that the technical standards are forward-looking and capable of promoting competition and sustainable investment in the sector. In particular, this means that the standards should be based on international best practice without any special features that are unique to Singapore, or, more pointedly, unique to the current dominant licensee. To the largest extent possible (see the comments under Question 2), the standards should comply with the 3GPP recommendations, which are themselves based on IETF RFCs (i.e., IETF standards). IP-based interconnection should also be achieved at the lowest possible level, leaving operators free to innovate with new services or operations at higher levels.

**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.*

SuperInternet supports the IMDA's proposal that IP-based interconnection in Singapore be based on the 3GPP recommended SIP. SuperInternet has already developed, because of arrangements in other markets, a partial implementation of IMS to support voice and multimedia interconnection with the 3GPP SIP standard. SuperInternet believes that all IP-based operators will be moving to (at least) partial implementation of IMS to support their operations, including interconnection, since 3GPP SIP, supported by IMS, is becoming the *de facto* standard.

However, the proposal outlined by the IMDA is not a sufficient specification for a common implementation of IP-based interconnection. The industry working group proposed by SuperInternet above should define in detail the protocols and operations required. Specifically, the working party should define a minimal set of IMS features that must be implemented to support interconnection and should consider, and specify if necessary, actions to be taken in response to the ISUP messages embedded in the SIP packets. The IMDA should ensure that the final recommendations permit innovation in fixed-line services and are competitively neutral.

The IMDA has noted that some operators in other jurisdictions have implemented SIP-I, following the ITU-T. SuperInternet believes that implementing this standard in Singapore would be a backward step: while SIP-I has a richer feature set than SIP, which is beneficial in the transition to IP-based interconnection, its feature set is constraining for future developments, especially in multimedia services, and may be limiting to new competition.

SuperInternet's current IP-based interconnection approach is 3GPP/IETF SIP. IP interconnection develops through the acceptance of new RFCs and the forward-looking approach is to follow the IETF RFCs, with implementation guided by 3GPP. SuperInternet considers that there is an important balance to be struck in standardising on the version of SIP to be used in Singapore, and that this balance is better served by adopting 3GPP/IETF SIP, as proposed by IMDA, than by SIP-I.

**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.*

While SuperInternet agrees that the final agreed arrangements will be embedded in SingTel's RIO, **SuperInternet strongly opposes the proposition that the interconnection arrangements be defined by the current dominant licensee alone**, with only post hoc comments permitted by other operators. This would not take account of the IP-based interconnection arrangements already operating in Singapore, nor would it benefit from the experience of innovative new entrants to the market with an IP-only focus in the provision of voice services.

Instead, as proposed above, SuperInternet believes that an industry working group, chaired by the IMDA, is required to define and support the requirements for IP-based interconnection, with the final result based as far as possible on international standards (3GPP/IETF). SingTel should then be required by the IMDA to specify the agreed requirements, and only the agreed requirements, in its RIO.

SuperInternet believes that simplification of arrangements is key to providing new opportunities for innovation in fixed-line services and for new competitive entrants. Existing practices for fixed-line telephony naturally reflect the priorities and convenience of the industry at the time they were instituted. Such practices need to be carefully reviewed to ensure that their continuation will not stand in the way of innovation or dampen market competition, and, with it, put a brake on sectoral development and economic growth. The focus should therefore be on a minimal set of standards that will satisfy the IMDA's and industry's requirements – namely, high-quality and reliable fixed service IP-based interconnection – while allowing the greatest possible space for service innovation. Only through a working group of industry experts can such a minimal specification be achieved.

**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.*

SuperInternet considers that the FNP service is fundamental to fixed-line competition in Singapore. An efficient and effective process is therefore required.

The current Query-on-Release (QoR) is not fit for purpose for efficient IP-based interconnection because it adds an unnecessary step in call setup. The All-Call-Query (ACQ)

method, if properly implemented, can provide a suitable alternative. The industry working group proposed above should define the SIP process for database interrogation. It is important to note that only one database query is required in the ACQ method, rather than two with QoR (or more, if a number has been ported multiple times).

SuperInternet supports the current arrangements whereby each operator maintains its own number portability database with at least daily updates. These arrangements are consistent with the implementation of innovative new services while supporting the porting of large or complex number ranges in the fixed network. They are also flexible and responsive to the needs of new market entrants. For example, operators are free to lease, on agreed commercial terms, access to the existing database of another operator, if it wishes, and can compare the cost of leasing with the costs of establishing its own, as SuperInternet has done. MNF's experience elsewhere suggests that the operators of central databases are not market constrained, and that transaction and other charges need to be closely regulated to ensure that they do not become excessive relative to cost.

**Question 5:**

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

SuperInternet believes that the IMDA should have no concerns about a degradation of QoS in the move to IP-based interconnection, provided that the specified requirements for interconnection are efficient and effective. The public Internet has proved, over three decades now, to be an effective network for transmission of voice and multimedia services. Its ability to support high quality streaming video is well known. In all these cases, interconnection between various entities is required. The standards exist (and have been implemented) to make these interconnections possible and effective. IP-based networks can and do provide voice quality that is as good as or better than the quality on mobile networks. Mobile operators are moving to IP-based voice because it can be at least as good as other voice carriage while opening up new possibilities for service innovation.

One issue with QoS arises from FNP. If FNP is poorly implemented, with multiple database lookups during call set-up, SuperInternet believes that the additional time for call completion will be perceived as a QoS issue by end-users. This would be undesirable and can be avoided if the FNP process is efficient. As described under the response to Question 4, SuperInternet strongly urges that the FNP arrangements should be efficient and effective. The FNP process must also be scalable as the popularity of number portability grows.

As regards security, SuperInternet notes the IMDA's concerns that interconnection arrangements should be protected from unauthorised access and should be robust in the face of cyber attack. SuperInternet's own existing IP-based interconnections use dedicated interconnect links (i.e., they do not use the public Internet) and are well protected through appropriate perimeter controls. SuperInternet's approach is best practice and widely adopted. In fact, we are not aware of any operators who would use the public Internet for this purpose, nor without appropriate perimeter controls.



SuperInternet notes the IMDA's suggestion that the number of POIs could be reduced with IP-based interconnection. While SuperInternet would not like to see a proliferation of POIs, we note that a reduction of POIs to a very small number or geographically concentrated (for example, two POIs for everyone at the SingTel network boundary) may increase security risks. SuperInternet is of the view that the industry needs to strike a balance between too few POIs – leading to network vulnerabilities – and too many POIs – leading to economic and operational inefficiencies. This is an issue on which an industry working group can contribute valuable collective experience.

**Question 6:**

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

SuperInternet agrees with the IMDA view that "the assessment of whether a co-ordinated single approach or a phased approach is more appropriate can only be carried out at a later stage when there is more clarity on the various aspects of the implementation of IP-based interconnection" (para. 32).

SuperInternet believes that co-ordination with industry can only be achieved by the IMDA convening and chairing an industry working party to discuss and agree on the technical and operational details of the transition to IP-based interconnection. The IMDA's implied approach of having SingTel provide a definition of the technical requirements in its RIO, only followed by industry comments, will likely not achieve a result that is favourable to the industry as a whole or promote competition and innovation.

Given that an industry working party is required, SuperInternet urges the IMDA to be flexible regarding the timing of transition to the new arrangements. SuperInternet suggests that the three-year transition, proposed by the IMDA in relation to the separate issue of BAK, should also be the preferred timescale for the transition to fully IP-based interconnection, but the IMDA should permit the process to take more or less time depending on progress towards agreement. The IMDA should seek to achieve a robust level of industry engagement and consensus in whatever time it takes.

In terms of final transition, SuperInternet sees no need for a final cutover date as such. Cutover to the new arrangements can be done progressively as participants are ready. The use of IP means that trial arrangements are easy to implement, with rollback in the case that issues are identified. SuperInternet believes that the IMDA should promote the use of trial cutovers as part of the transition period and as a way of gaining consensus among the industry players in the working group. An industry-wide trial migration is probably not required as a preliminary step towards final migration.

Once the technical requirements have been agreed, the IMDA should encourage SingTel to complete its RIO and implement the agreed form of IP-based interconnection without delay. SingTel should be required to maintain its existing domestic interconnection arrangements until such time as all other operators have cut over to the agreed IP-based interconnection.

That time should be whatever the IMDA determines to be reasonable, taking account of all relevant considerations, rather than being left to SingTel to determine case by case.

### **Proposed BAK charging regime for fixed-line call termination**

SuperInternet recognises that the issues associated with the BAK, or any, interconnection charging regime are quite separate from the issues associated with the introduction and standardisation of IP-based interconnection. Nevertheless, the matter of BAK was mentioned in the introduction to the Consultation Paper and was included with IP-based interconnection and many other issues in the IMDA's earlier Competition Code consultation in 2019. In addition, as a new entrant, SuperInternet had no practical opportunity to make comments during the period when comments were initially invited.

It might be thought that as a new entrant SuperInternet would naturally favour a BAK interconnection charging regime. However, this is not so. SuperInternet recommends that IMDA retains the CPP charging regime for fixed termination, but with structural changes. Failing that, SuperInternet recommends that IMDA very carefully manages the glidepath to analyse issues and plan around them, taking longer than the proposed 3-year glidepath if needs be.

From industry submissions in response to earlier consultations it appears that there is a substantial part of the industry that favours retention of CPP charging for fixed voice call termination. Overall, the arrangements have served the industry and Singapore well, and have not added costs at the retail level, given the high level of competition in the voice call market. That being the case, it remains appropriate that costs should be borne by those who cause them to be incurred – namely the calling party.

SuperInternet's view, based on MNF's experience in other markets and a review of the industry responses to the IMDA's previous consultations, is that there is no compelling reason (or desire by industry) to change to BAK. The current arrangements have been working well, do not distort competition, and help to support the development costs of new entrants.

One of the problems with any BAK regime is at the border between that regime and other charging regimes, such as for the termination of international calls, where a charge is levied for termination. The incentives can be significant for traffic masking – that is, to hide the identity of inbound traffic and to present it to the terminating operator as if it is locally (or domestically) initiated traffic and hence subject to a BAK regime. These incentives occur whenever there is a material differential between the domestic and international termination charges, but are exacerbated when the domestic charge is removed altogether.

Although, conceptually, BAK and IP-based interconnection are separate issues, they are linked to this extent in the real world – namely that there is no necessary or verifiable calling line identification with IP-based interconnection as there is with SS7 signalling.

Consequently, detection of traffic masking is more difficult in an IP-based environment and requires packet inspection and similar intrusive methods. If the IMDA confirms that it is



going ahead with the change to BAK charging, then it is important to seek industry views on how best to define and implement call verification and anti-scam processes.

MNF's experience in New Zealand suggests that the high-water mark of support for BAK has been reached and passed and that industry consensus is moving in favour of CPP.

SuperInternet's **[text removed].[text removed]** It is inappropriate that what has a cost should be rendered as a free service by regulatory intervention, especially where, as here, the market is being well-served and there is no case based on consumer welfare for the change.

As noted above, CPP can be improved to better reflect costs and also to permit improved retail competition. The charging scheme in Singapore has peak and off-peak rates for interconnection. The designation of peak and off-peak are based on past patterns established in a far less competitive environment by SingTel, and tend to reflect the retail peak and off-peak pricing decisions of SingTel. But much has changed over the intervening decades. Demand patterns have shifted and are not linked to the business hours of earlier times. Best practice in this area is to have a single terminating interconnection rate, and leave it to operators to determine without constraint the time-related retail prices that they offer to their customers in turn. Competition and innovation in retail voice call markets will be fuller and more robust as a result.

SuperInternet is very pleased to engage with IMDA on the matters raised in the present Consultation Paper and in the future. Please do not hesitate to contact Michelle Lim on +61420960949 (email michelle.lim@mnfgroup.limited) for clarification or further comment on any aspect of this submission.

Yours sincerely,

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