



## REPONSE DOCUMENT

Subject: Consultation on IP interconnection

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

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## Respondent's statement of interest in the consultation.

As Singapore's leading B2B SBO Licensed Telecommunication Service provider with a core focus on Hosted PBX and Fixed Mobile Convergence services which was deployed as an ALL IP (SIP) platform since inception in 2017 – we feel uniquely positioned to respond to this consultation. Specifically, we welcome the IMDA's approach to moving all TSP's within Singapore to an ALL IP (SIP) approach and have a vested interest in the outcome of the consultation.

## Summary of the respondent's submission.

Due to Velox Networks unique position as an existing ALL IP network providing services to a range of small and large companies within Singapore, we feel that the move to ALL IP for the incumbent and future TSP's will enable increased competition with a focus on customer quality whilst enabling providers to invest in newer and ground-breaking features without having to constantly overhaul or deploy legacy equipment to meet demand.

Overall, our view is that moving to the IETF/3GPP SIP Implementation for interconnect (regulating points of Interconnection/standardisation and Singtel's ROI), whilst simultaneously matching the existing Mobile Network 'BAK' model – will significantly improve services that are being offered to both consumers and businesses. We believe the FNP should be centralised – specifically **favouring:**

### All Call Query (ACQ)

The operator that originates the call always checks a centralized database and obtains the route to the call. The originating operator then routes the call to Serving Network.

### **Over:**

#### Query on Release (QoR)

The operator that originates the call first checks with the operator to which the number initially belonged, the donor operator. The donor operator verifies the call and informs that it no longer possesses the number. The operator that originates the call then checks the centralized database, as is done with ACQ.

#### Call Dropback

Also known as Return to Pivot (RoP). The operator that originates the call first checks with the donor operator. The donor operator checks its own database and provides a new route. The operator that originates the call then uses this route to forward the call. No central database is consulted.

#### Onward Routing (OR)

The operator that originates the call routes the call to the donor operator. The donor operator checks its own database and obtains a new route. The operator to which the number was designated routes the call to the new operator. This model is called indirect routing.

Velox Networks is also of the view that this should be centralised by the IMDA, instead of relying on Incumbent providers (similar to Syniverse MNP within the UK)

Regarding Network Security and QoS – our view is that this should be split into multiple categories based on the requirements of each member of a 'terminating/originating relationship' whereby, for

some scenarios (especially WITHIN Singapore where infrastructure is vastly superior to other countries) a Site 2 Site VPN may be a more suitable solution, especially for those SBO's who operate within virtual environments such as AWS/GCP/Azure. However, each party may choose to create a dedicated fibre connection, where utmost quality and security is required (Retail vs Call Centre as an example.)

Finally, as an existing ALL IP network, we have no specific view on migration, but would favour a swifter migration timeframe to ensure customer services reach the expected levels quicker.

**Question 1:** IMDA invites views and comments on whether operators should follow a standardised set of technical requirements to implement IP-based interconnection at the domestic Points-of-Interconnection across all operators' networks that are interconnected to provision voice services.

Velox Networks is of the view that there should in fact be a standardised set of technical requirements that all operators must abide by. Setting standards high will enhance existing offerings and allow consumers to experience the highest quality service. POI standards should be set not only for Singtel and the Singtel ROI – but for all FBO license holders. This will enable smaller SBO's to define their own routing opportunities based on FNP – this will also replicate regulation within countries such as the UK where MVNO and OTT providers have far more freedom and competition is a lot higher whilst maintaining great quality services.

**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 Points-of-Interconnection.

Velox Networks is of the view that we support a full transition to IETF/3GPP SIP – this will enable the incumbent operators a faster migration path (due to existing support from widely deployed IMS Solutions) whilst enabling smaller operators to innovate with existing off the shelf solutions like those offered by Oracle/Acme Packet/MetaSwitch etc...

**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.

Velox Networks fully supports the IMDA's proposed changes to the RIO Schedule 1 (Virtual and Distant interconnects). As stated above, we would fully support the RIO being applied to all FBO

holders to improve the quality of competition within Singapore.

#### Question 4: IMDA invites views and comments on the feasibility of IMDA's proposals to revise the technical implementation of Fixed Number Portability service in an IP-based interconnection environment.

Velox Networks fully supports a migration to:

##### All Call Query (ACQ)

The operator that originates the call always checks a centralized database and obtains the route to the call. The originating operator then routes the call to Serving Network.

We would also like this change to include the unbundling of DID's and allow all DID's to be handled as individual rather than ranges. The current market dynamics does not permit "unbundling". As a result, if a customer wishes to migrate from a conventional system to an IP based system, they are obliged to port all DID's within a range even though they may only wish to port over a single DID from within a range. This significantly increases the financial costs when migrating from one service provider to another and reduces the freedom of choice to migrate.

#### Question 5: IMDA invites views and comments on IMDA's preliminary views on network security and Quality of Service under an IP-based interconnection environment.

Velox Networks is of the opinion that IP Interconnect's should be regulated by the IMDA within a specific set of guidelines to ensure security and Quality of Service. We believe this should have a baseline of Site 2 Site VPN and Dedicated Cross Connects depending on the requirements of the terminating partners. An example of this would be Retail Traffic vs Call Centre Traffic.

All operators should have a Session Border Controller/Edge Proxy that can apply filtering and provide firewall capabilities – We would also propose that all TSP's within Singapore provide the IMDA with a list of IP's that traffic can originate and terminate to enabling all carriers to whitelist each other. This should be centralised and maintained within the IMDA and will provide a fixed point for each provider to query traffic.

Velox Networks also agrees with the following baselines for all license holders:

Monitor and analyse signalling messages to detect malicious traffic;

b) Adopt signalling firewalling to filter malicious traffic;

c) Harden interconnect infrastructure such as Signalling Transfer Points ("STP") and Diameter Signalling Controllers ("DSC"); and

d) Perform external network security assessments and penetration tests periodically if domestic exchange points are used.

## Question 6: IMDA invites views and comments on IMDA's preliminary views on the broad migration approach.

Velox Networks believes that the migration approach should be defined by the IMDA and Mandatory, rather than relying on multiple operators to agree and coordinate. Many operators who may have large existing legacy deployments would seek to defer migration as long as possible in order to make a higher 'Return On Investment', rather than serving the community and greater good of telecommunications in Singapore.

We do however agree that there should be an 'open' nationwide trial for operators to test existing and future deployments, that can run for a set period of time alongside existing solutions.

We are realistic in that our view is apathetic towards existing incumbent operators – however, most do have existing SIP based solutions running alongside SS7 solutions. We must also be aware that SIP as a protocol and the related RFC's have been available 2002 – with many other countries either putting IP-to-IP regulation in place, or as an example:

“BT Group CEO Gavin Patterson has set a date of 2025 to switch off ISDN services from its Public Switched Telephone Network (PSTN). BT Group are set to no longer accept any new orders or amendments to services pertaining to any ISDN product as of 2020 with the final termination set for 2025.”