

**i3 forum**

***VoIPX***

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**i3 forum 1st Workshop with Vendors  
Warsaw, Poland (June 15th-16th 2010)**  
international ip interconnection

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**i<sup>3</sup> forum** 

## Mobile Operators (MNOs) were looking for:

- ✓ A way to resolve their **complaints about Voice Carrier traditional model**, for their lack of control on the Carriers path to reach the terminating Operators – typically with many hops, thus deriving in lack of reliable SLAs.
- ✓ A set of requirements that allow **to reach every Service Provider (SP) worldwide terminating traffic in IP for any service (as the Internet) but through reliable and safe End-to-End interconnection**, then also for roaming traffic. And achieve this with minimum CAPEX & OPEX, thus through specialized/wholesale interconnection providers (IPX Providers or **IPXPs**).
- ✓ The **choice to use the above E2E reliable interconnection path at any level**: Transport-Only, Service Transit (Transport + Signalling + E2E Operation for payment, testing,...), Service Transit with bilateral agreement (the IPXP plays a bilateral agent agreement role), Multilateral/Hub Agreement.
- ✓ A way to standardize the satisfaction of the requirements above in the **SP – IPXP interface** so as to have competition among IPXPs and a way to standardize the **interface between IPXPs** so as to assure they could jointly build the IPX Cloud that would match the above requirements.

IPX by GSMA

## But building a new eco-system is complex, much more than just resolving technical issues around IP local IX...

- ✓ **Changing from TDM to IP is not immediate:** TDM equipment has not paid-off yet in many SPs and IPXPs and there is always technical reluctance to change when dealing with massive traffic (even if GSMA IPX PCI Project succeeded in demonstrating feasibility).
- ✓ Voice Carrier business is well established with every player having found a sustainable way to contribute to the business. **GSMA IPX does not include integrated business model sustainability for every player.** Even some requirements face legal-regulatory-competition rules (like while-list / black-list or like disclosing termination rates).
- ✓ **Not all Carriers have the same strategy versus Internet,** meaning they are implementing interconnections through Internet without a clear strategy to keep them separated from a private, reliable E2E path.
- ✓ IPX requirements are **not really extensively requested by SPs now because of implications for themselves regarding convergence** of fixed-mobile, IP services and multiple-layer interconnection convergence. On the other hand, IPX requirements cannot be met in the present competition scenario by just one or two IPXPs alone, but though a strong **common agreements implementation effort.** This complex paradigm evolution needs governance and global migration management.



## Then present status for IPX Implementation:

- ✓ **IPX model - Transport Only has some success**, but simply as GRX++: opening GRX to any kind of traffic and any kind of player, applying to the local interconnection rules (no E2E view or scope).
- ✓ **IPX model - Hubbing rules has had some success for SMS, MMS and Roaming Hubbing**, thanks to the Open Connectivity initiative in GSMA, that includes governance (accreditation rules).
- ✓ **IPX model - Hubbing rules for Voice** is not happening. i3Forum has been analysing the implementation problems of IPX for voice in the implementation chain through voice Carriers as IPX Providers (technical, business, operational) in the VoIPX initiative.
- ✓ The IPX requirement of **combining three different "connectivity options": Transport Only, Service Transit and Hubbing in a single interconnection and contract** has not been further analysed in terms of implementation by any initiative/forum.



# i3Forum set-up in late 2008 an initiative related to Voice service over IPX from the Carriers perspective

## VoIPX Activities at i3Forum:

1. **in 2009 Joint Task Force** with MNO representatives from GSMA-IPIA in order to analyze and discuss the main modelling, technical, service, and commercial issues of the Voice over IPX -> **report issued in May 2009.**
2. **in 2010 co-operation with GSMA IWG and IREG Committee** in order to support the process of transforming the result of the Joint Task Force above into Change Requests **(CRs) to IPX.**

*However, we must take into account that IPX GSMA Definition is requirements-oriented and not implementation-oriented, so a certain level of mismatch between implementation and requirements is expected and that does not necessarily mean changing the original requirements.*

3. **in 2010 a specification activity** started in order to provide Carriers (IPX Providers) with a set of recommendations for a complete interface specification for the international voice over IPX.

# i3Forum VoIPX Initiative – Activity 1

## VoIPX status for IPX Requirements from GSMA (1/3)

Requirements	Notes
<b>Break-in Break-out rules</b>	<ul style="list-style-type: none"> <li>▪ private network, transparent and segregated from the Public Internet</li> <li>▪ Break-out and Break-in traffic with no-IPX networks (excluding Public Internet) are allowed but should be transparently announced and secure. TDM break-in/out was agreed by IPIA/i3 to be allowed.</li> </ul>
<b>Multi-service, Convergent Network</b>	<ul style="list-style-type: none"> <li>▪ Convergence of Voice, IP and Data services</li> <li>▪ Security and management Issues related to Data/IP services influence Voice traffic services and business model. Some impacts are neutral, others are blocking points to the voice service and business.</li> </ul>
<b>Signaling Protocols</b>	<ul style="list-style-type: none"> <li>▪ SIP-I but also SIP protocol have been agreed by IPIA and I3.</li> <li>▪ IPV4 SP-SP mandatory</li> </ul>
<b>IPX services and QoS</b>	<ul style="list-style-type: none"> <li>▪ IPIA/I3 agreed that SLAs for Voice in transport mode are not applicable and for voice hubbing and transit mode voice SLAs are optional (commercially negotiated).</li> <li>▪ KPIs have been identified               <ul style="list-style-type: none"> <li>▪ <b>Connectivity:</b> E2E Jitter, E2E Packet Loss, E2E RTD</li> <li>▪ <b>Signaling/ Media Processing:</b> E2E R-factor/MOS, ABR, ASR, PGRD, NER, ALOC. IPIA and i3 agreed to further investigate the possibility to measure and commit on MOS, for the moment MOS is not possible.</li> </ul> </li> </ul>



# i3Forum VoIPX Initiative – Activity 1

## VoIPX status for IPX Requirements from GSMA (2/3)

Requirements	Notes
<b>Migration</b>	<ul style="list-style-type: none"> <li>IPIA agreed to Provide a roadmap of SPs migration to IPX. IPIA and I3 agreed to work on a migration process and technical solutions/alternatives during the transition</li> </ul>
<b>High level of Security</b>	<ul style="list-style-type: none"> <li>Session Border Controller (SBC) &amp; Firewalls – IP. No use of Public Internet.</li> <li>Transparently transport the IP source of SP has not be agreed (SBCs owned by carriers do not support this function). IPIA had an action to explain the security issues that require IP transparency.</li> <li>Encryption possibilities (IPSec, TLS, etc)</li> </ul>
<b>IPX coverage</b>	<ul style="list-style-type: none"> <li>Same principle as GRX. Americas (Equinix Ashburn); Asia (Equinix Singapore); Europe (AMS-IX Amsterdam).</li> <li>When the IPX has 10 or more SPs within an IPX Zone, it shall interconnect with other IPX that have 10 or more SPs in that zone. The interconnection must be able to be in IPX point (or elsewhere within the zone if commercially agreed)</li> </ul>
<b>3 Connectivity options to SPs for IPX</b>	<ul style="list-style-type: none"> <li>The IPIA/I3 have agreed that an IPX Provider does not have to commercially offer all connectivity options (Transport only, Service Transit, Hubbing)..</li> <li>The IPIA/I3 have agreed that charges for the transport mode are based on destination</li> </ul>
<b>Charging transparency</b>	<ul style="list-style-type: none"> <li>IPIA/I3 have agreed that charging transparency is not required for Voice (unless commercially negotiated).</li> </ul>

# i3Forum VoIPX Initiative – Activity 1

## VoIPX status for IPX Requirements from GSMA (3/3)

Requirements	Notes
<p><b>Routing transparency:</b></p> <ul style="list-style-type: none"> <li>Information to be given to SPs</li> <li>Route to be used for same session</li> </ul>	<ul style="list-style-type: none"> <li>The WG agreed that following information will be given by IPXp:               <ul style="list-style-type: none"> <li>Direct route/ in-direct route/ break-out</li> </ul> </li> <li>Route should be the same for same session (symmetric routing) and it should be recognized by transparency of the originating SP - <i>but only if there is consistency between connectivity modes. No consensus on solution and therefore on the requirement to implement the rule. IPIA has agreed to come back to I3 with a detailed explanation on the security concerns and why only symmetric routing and a max of two IPX is required.</i></li> <li>The rule to have a maximum 2 IPXs in the chain, is pending the results of the routing transparency requirements.</li> </ul>
<p><b>Opt-in/Opt-out lists</b></p>	<ul style="list-style-type: none"> <li>Regulatory issues is believed by I3 to prohibit IPX to block incoming international calls.</li> <li>In order to avoid very complex validity check on origin and destination numbers/SPs list should be public with the possibility to block traffic at the origin IPXs</li> <li><i>In order to identify, and if needed to block a call from an SP, the calling number needs to be identified as belonging to the SP. This requires the management of number portability for all SPs (currently not available) and requires SPs to disclose their numbers, which was not agreed.</i></li> </ul>
<p><b>Number Portability / Enum addresses resolution</b></p>	<ul style="list-style-type: none"> <li><i>A function to solve NP solution should be adopted since SPs can not transit IPX calls (i.e. forward a call to another SP) but there is not yet a #portability solution at international level.</i></li> </ul>



# i3Forum VoIPX Initiative – Activity 2

## Status of CR to GSMA IPX – before IWG plenary for approval

Topic	I3 Forum Comments (March)	GSMA –CR actual Status	New Comments
<b>Opt in / Opt out</b>	<ul style="list-style-type: none"> <li>▶ The CR in line with Joint I3F / IPIA agreements and i3Forum position</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>To be approved by IWG:</b> IWG Doc 12_044</li> <li>▪ <b>Effects:</b> Opt in / Opt out method do not apply for PVI (Packed Voice Interconnection)</li> </ul>	<ul style="list-style-type: none"> <li>▶ OK: no change since last version – CR approved by SOLU 41</li> </ul>
<b>Charging Transpar.</b>	<ul style="list-style-type: none"> <li>▶ i3Forum suggested rewording: “... regulatory bodies, applicable law and contractual agreements between SP and IPX provider ...”</li> <li>▶ i3Forum would have preferred the charging transparency to be a commercial option, because the transparency can only be provided with global ported numbers resolution issue solved</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>To be approved by IWG :</b> IWG Doc 12_045</li> <li>▪ <b>Effects:</b> CR allows IPX Providers to omit separation of termination and transit fees only for those destinations where the IPX Provider is not allowed to disclose termination rates by regulatory bodies, applicable law, or commercial agreements. These limitations, if any, must be provided in written by the IPXP to the SP.</li> </ul>	<ul style="list-style-type: none"> <li>▶ OK: commercial agreements included as exception</li> <li>▶ Additionally the exceptions must be proven by IPXP in written to the SP</li> <li>▶ Approved by SOLU 41</li> </ul>
<b>QoS KPI</b>	<ul style="list-style-type: none"> <li>▶ OK with the CR, but in addition SLA for voice KPIs has to be considered a commercial option while:                             <ul style="list-style-type: none"> <li>▶ Voice KPI’s Measurements do include terminating SP network</li> <li>▶ Cascading responsibility can not be technical enforced but commercially upheld</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>To be approved by IWG:</b> IWG Doc 12_031</li> <li>▪ <b>Effects:</b> Demarcation points defined as in AA.80 in order to exclude terminating Service Providers network from the END to END Quality definition.</li> </ul>	<ul style="list-style-type: none"> <li>▶ GSMA/IMQ removed from Voice SLA “if commercially negotiated” suggested by I3Forum</li> <li>▶ No clear statement from IMQ for Voice KPI, which by definition include also SP networks</li> </ul>
<b>Break-in / Break-out</b>	<ul style="list-style-type: none"> <li>▶ OK with the CR for TDM break-out an 3 types (Direct, Indirect and Break-out) of connectivity to be declared in advance.</li> <li>▶ In case an indirect connectivity applies, i3forum suggest to delete the information on the number of IPX providers used in the Monthly Report.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>To be approved by IWG:</b> IWG Doc ??</li> <li>▪ <b>Effects:</b> 3 types connectivity are allowed : direct, indirect, break-out TDM. For each destination SP, the type of connectivity must be declared in a monthly report to the originating SP. In case of indirect connectivity also the number of IPX used must be declared</li> </ul>	<ul style="list-style-type: none"> <li>▶ Document not mentioned yet in IWG Plenary agenda.</li> <li>▶ Probably still under revision by IREG and approval postponed</li> <li>▶ Approved by last SOLU with small text revisions</li> </ul>
<b>Max of 2 hops</b>	<ul style="list-style-type: none"> <li>▶ Not Ok with the Change requests, while i3forum would prefer to guarantee the respect of End 2 End QoS thresholds, independently from the number of hops</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>To be approved by IWG:</b> IWG Doc 12_043 and IWG Doc 12_032</li> <li>▪ <b>Effects:</b> Use of more than 2 IPX Provider allowed only for Voice and as an exceptional case, always to be communicated to the SP</li> </ul>	<ul style="list-style-type: none"> <li>▶ OK: more than 2 IPX Provider allowed for Voice in “exceptional cases”.</li> <li>▶ the QoS requirements shall remain unaltered</li> </ul>
<b>NER definition</b>	<ul style="list-style-type: none"> <li>▶ NEW</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>To be approved by IWG:</b> IWG Doc 12_033</li> </ul>	<ul style="list-style-type: none"> <li>▶ NER definition aligned between GSMA and I3Forum</li> </ul>



# i3Forum VoIPX Initiative – Activity 3

## Technical Specification for Voice over IPX service (Rel., June '10)

### Key Features:

Private Interconnection as well as Public with VPN IP Sec Interconnection configurations allowing 2 signalling protocols (SIP-I, SIP), secured via Border Functions with QoS control and monitoring provided by Border Functions  
Confined routing within IPX Domain with break-in/break-out concepts  
No OPT-in / Opt-out

