



Technology WG Initiatives

June 26, 2019

Atlanta, GA

Technology WG objectives

IMS, IPX, CLI, SEC, BC, 5G, IoT...

- + IMS interconnections WG delivered most guidelines in the last few years
- + Transition to IP/IPX WG merged with IMS interconnections WG
- + New areas to be explored: Network security, Blockchain, 5G, IoT

Objective of Technology WG is to provide i3forum's perspective on interoperability issues related to the interconnection between two international carriers as well as between an international carrier and a domestic operator (service provider).

Technology WG does not intend to duplicate other existing specifications or documents on the same issue, but to complement these documents with the perspective of the International Carrier members of i3 forum.



Update on delivered items

VoIP/VoIPX survey (1/2)



Traffic survey to identify levels and trends of VoIP and VoIPX traffic within the international wholesale market

- + Migration to IP and IPX remains core to i3forum mission
- + Understand carrier position in IMS service space
- + Bolster carrier readiness
- + Champion acceleration
- + Gain valuable insight into aggregate traffic levels and trends

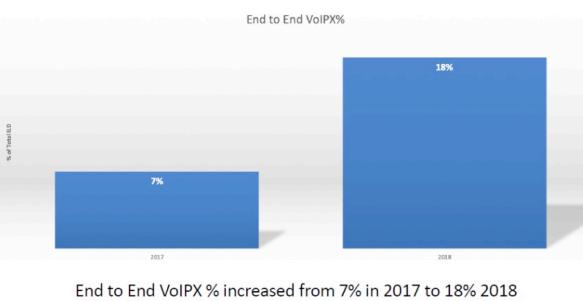
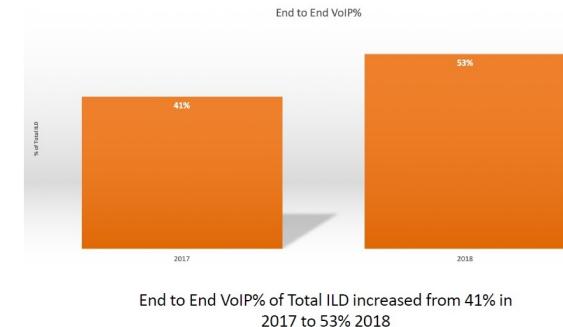
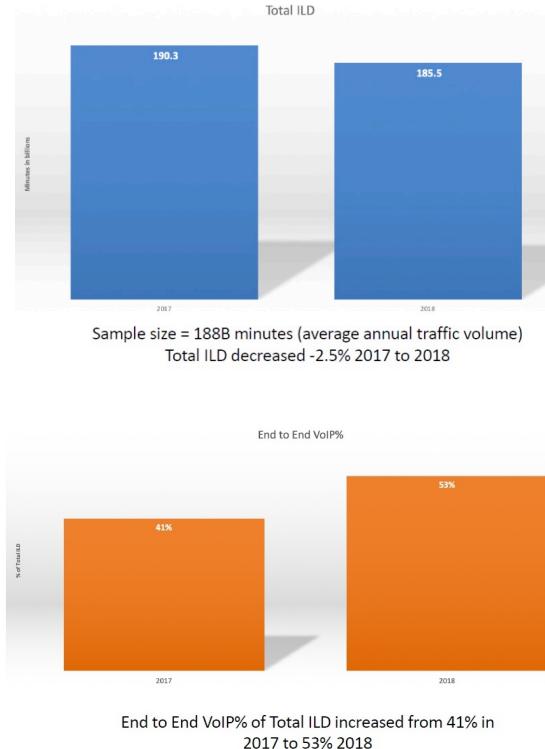
Market insight based on actual carrier traffic data

- + All i3forum carrier members invited to participate
- + 10 carrier members provided traffic data including; AT&T, BTS, Deutsche Telekom, Orange, PCCWG, Tata, Telefonica, TI Sparkle, TNZI, Vodafone Carrier Services

VoIP/VoIPX survey (2/2)

Traffic survey highlights

- + End to End VoIP and VoIPX reporting strong growth rates year over year
 - + 53% of total international traffic in 2018 transported End-to-End VoIP
 - + 142% growth in End to End VoIPX traffic
 - + 148% growth rate in End to End VoIPX traffic
- + Many carriers contributing to high end to end VoIP %
 - + 53% in 2018 based on several carriers.... not just a few carriers impacting aggregate results
- + Low carrier contribution to end to end VoIPX %
 - + 18% in 2018 driven by two carriers



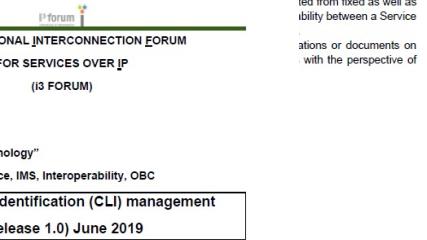
CLI management (1/2)

Comprehensive set of guidelines for CLI management released

- + Calling Line Identification (CLI) management (Release 1.0) document contains the full set of recommendation for CLI management among operators
- + CLI management recommendations also included in IMS Service interoperability (Release 1.2) document
- + CLI management guidelines deal with both Presentation (including Privacy options) as well as Origin Based Charging aspects
- + Additional guidelines defined in 2019 in order to cover
 - + SIP to TDM interworking scenario
 - + Multiple SIP P-Asserted-Identity headers
 - + CLI management in case of diverted calls



This document provides the i3 forum's perspective on the interoperability multyservice IMS-based from fixed as well as ability between a Service applications or documents on with the perspective of



This document provides the i3 forum's perspective on the interoperability issues related to the international interconnection of multiservice IMS-based platforms focusing on voice and video services originated from fixed as well as mobile networks. The scope covers both the interoperability between a Service Provider and Int. Carrier and between two Int. Carriers. It does not intend to duplicate other existing specifications or documents on the same issue, but to complement these documents with the perspective of the International Carrier members of i3 forum.

CLI management (2/2)

SIP to TDM interworking

- + SIP call that has to be delivered through TDM interconnections
- + Mapping defined in ITU-T Q.1912.5 Recommendation
- + Possible options:
 - + The call has a well formed P-Asserted-Identity (PAI) header -> PAI information mapped to Address Signals of ISUP Calling Party Number
 - + The call has no well formed PAI -> guideline is not to fill Address Signals of ISUP Calling Party Number

Multiple SIP PAI headers

- + P-asserted-Identity (PAI) uses either Tel URI or SIP URI for the content:
- + PAI containing Tel URI, since it should contain the telephone number (RFC 3966)
- + PAI containing SIP URI and user=phone (RFC 2396)
- + Both type of URIs should not be present at the same time unless containing the same phone number
- + If none of the above exist and contain a valid E.164 number, PAI will not be considered valid

Diverted calls

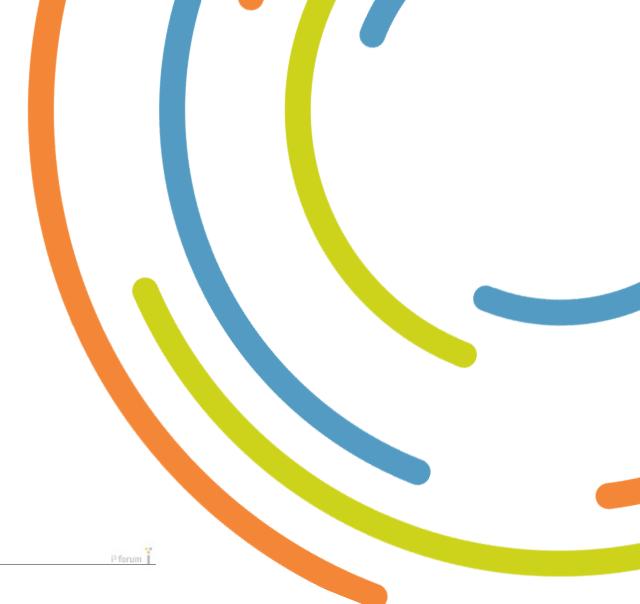
- + In a diverted call A ->B -> C, looking into the path B to B, these are the headers/fields that identify each origin related number:
 - + A: P-Asserted-Identity header (SIP), Calling Party Number (ISUP)
 - + B: top most Diversion or History-Info header (SIP), Redirecting Number (ISUP)
- + Recommendation for presentation is to use A, according to privacy settings
- + Recommendation for Origin Based Charging is use B

Liaison with GSMA on IPX requirements

GSMA WSOLU drafting a new PRD on IPX requirements

- + Draft “WA.14 IPX Requirements” circulated within GSMA WSOLU
- + LS sent from GSMA SOLU to i3forum in March 2019 in order to collect feedbacks from IPX providers
- + LS reply sent to GSMA SOLU in May 2019, further interaction between GSMA WSOLU and i3forum expected to happen in the next months

i3forum believes there is room for improvement on current WA.14 draft document as circulated by GSMA. In particular several aspects of the proposal can be seen as a limitation to the business models IPX Provider can develop between them and even towards their customers. Furthermore other aspects covered in WA.14 draft document have been included in the IPX definitions (IR.34) since the beginning of IPX and have so far had little or no traction on customers side (see Cascading of responsibilities, Transparency and Traceability concepts)



International IP Interconnection i3forum

Title LS reply to GSMA WSOLU on "WA.14 IPX Requirements"
Date May 10th 2019

Status Please mark with X one of the following actions relating to this document: <input type="checkbox"/> For Approval <input type="checkbox"/> For Discussion <input type="checkbox"/> For Information												
Document History												
<table border="1"><thead><tr><th>Revision</th><th>Date</th><th>Brief Description</th></tr></thead><tbody><tr><td>1</td><td>Apr 16th 2019</td><td>Comments from I3FORUM</td></tr><tr><td>2</td><td>Apr 26th 2019</td><td>Comments from CT included</td></tr><tr><td>3</td><td>May 10th 2019</td><td>Comments from Board included</td></tr></tbody></table>	Revision	Date	Brief Description	1	Apr 16 th 2019	Comments from I3FORUM	2	Apr 26 th 2019	Comments from CT included	3	May 10 th 2019	Comments from Board included
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LS reply to GSMA WSOLU on "WA.14 IPX Requirements"

i3forum appreciates the request for comments put forward by the GSMA with regards to the WA.14 and we provide the following comments.

The role played by IPX Providers is not substantially different to the position held by Carriers during the TDM-era and we do not want to diminish our relevance in the IP World. We believe that international wholesale operators are still responsible for interworking and they are relevant and useful in the international roaming context. International wholesale operators provide a significant service, leading to reduction of complexity in the interconnection and interworking, but they have no specific position in the definition of the interfaces between operators.

As providers of interconnection and interworking the IPX Providers are already subject to binding requirements, those established on the technical level for the services we provide. New binding requirements included in WA.14 provide no understanding certainty and lack of clarity in certain aspects. WA.14 statements could be endorsed provided that these statements are further discussed in details.

Several aspects of the proposal can be seen as a limitation to the business models IPX Provider can develop between them and even towards their customers. This limitation can be seen as a reduction of the freedom of action of IPX Providers. In particular, paragraphs 4.1 (Cascading Billing), 4.3 (Charging Principle) and 4.6 (Inter-IPX Provider Interconnection obligation) of the interconnection model of the draft WA.14 document, where we believe content should be updated.

Other aspects covered in WA.14 have been included in the IPX definitions (IR.34) since the beginning of IPX and have so far had little or no traction on customer side. Concepts such as Cascading of responsibilities, Transparency and Traceability have not been considered by the IPX operators and are therefore irrelevant, even though BA.51 PRD provides guidelines on Roaming SLA among SPs as well as between SP and IPX provider (roaming connectivity is a subset of services offered by IPX providers). Additionally, the IPX operators have not been considered in the IPX definitions, which is why they are not included through technical framework. We think this framework should be described in details and reviewed by IPX providers.

We are keen to understand the worries operators may have regarding IPX and we are interested to address these needs. However it has to be considered that binding requirements would also need to be established for operators as part of the two-way relationship between them and IPX Providers. It follows that AA.80 PRD should be enhanced accordingly.



Update on new items

A-Number (CLI) validation

Calling Line Identification (CLI) becoming more and more important

- + CLI management guidelines aim to avoid interoperability issues among operators
- + Since it is transferred in the call signalling as binary or plain text (not encrypted) CLI can be easily manipulated for fraudulent purposes:
 - + CLI is relevant for wholesale inter-operator billing due to Origin Based Charging (OBC) principle
 - + Fake and/or spoofed CLI used to generate spam calls affecting end subscribers (robocalling, Wangiri, call bombing, scam calls)

Transferring reliable CLI is therefore a need for our industry, and interest is growing around technologies that may help achieving this result

- + STIR/SHAKEN
- + SOLID
- + Blockchain

Network security



Network security is a must for mobile operators

- + Roaming interfaces to be secured
 - + Mobility management for 2G/3G roaming: SS7 connectivity
 - + Mobility management for 4G roaming: Diameter connectivity
 - + Data roaming: GTP connectivity
- + Security guidelines from GSMA on these interfaces already published: FS.11, FS.19, FS.21, FS.20, FS.07
- + RESIST initiative from GSMA for 4G roaming

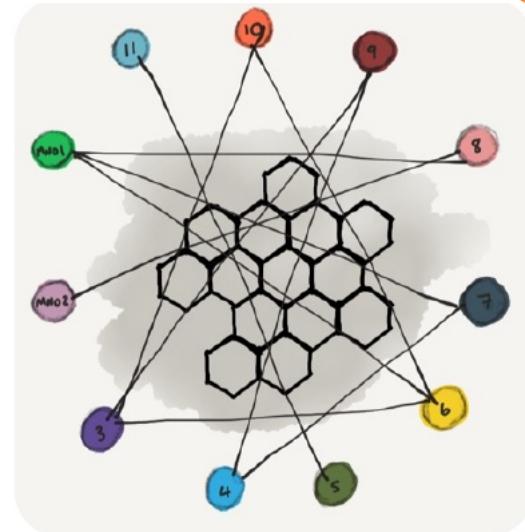
International carriers provide connectivity to support international roaming for 2G/3G, 4G and 5G, even though they act as transit networks not involved in the “application layer”. They represent the entry point for traffic sent to and received by a mobile operator, so they act as “connectivity backbone” in the international roaming ecosystem. Trust domain concept could be applied to international connectivity, should international carriers agree on and implement security checks to be performed at the edge of this domain

The screenshot shows a news article from ZDNet. The title is "Invasive phone tracking: New SS7 research blows the lid off mobile security". The article discusses a vulnerability in the SS7 protocol that allows for eavesdropping on mobile communications. The page includes a sidebar with social sharing options (Facebook, Twitter, LinkedIn, Email) and a "SHARE" button. Below the main article, there are sections for "THE CRITICAL HOLE AT THE HEART OF OUR CELL PHONE NETWORKS" and "MOST POPULAR" stories.

Blockchain

Blockchain and its applicability to telco wholesale ecosystem

- + Blockchain may be applied to any context where there is a need for a distributed, trusted, public database
- + Telco ecosystem:
 - + Billing, rate exchange, financial settlements
 - + User authentication
 - + Number resolution
 - + CLI validation
- + Analysis of short and medium term opportunities offered by blockchain is ongoing



5G and IoT

5G

- + Topics to be addressed for 5G roaming:
 - + 5G roaming (including Option 3)
 - + Voice over 5G
 - + Network slicing
 - + 5G inter-PLMN security
 - + IoT on 5G
- + 5G roaming technical guidelines provided by GSMA

IoT traffic management

- + IPX requirements for IoT traffic (need for traffic differentiation?)
- + IoT roaming traffic off-load; direct traffic delivery towards public Internet provided by wholesale carriers (PGW-GGSN within carriers)
- + Permanent roaming SIM detection





Thank you

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