



6th Annual i3Forum Conference

The Future is All IP

May 14, 2015
Chicago

*IMS challenges and opportunities:
the carrier perspective*

presented by

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TELECOM ITALIA SPARKLE



Agenda

- ❑ What is and why IMS?
- ❑ The i3 forum view on IMS
 - ❑ Business models
 - ❑ Protocols, codecs
 - ❑ QoS Control
- ❑ Challenges and Opportunities

Scope

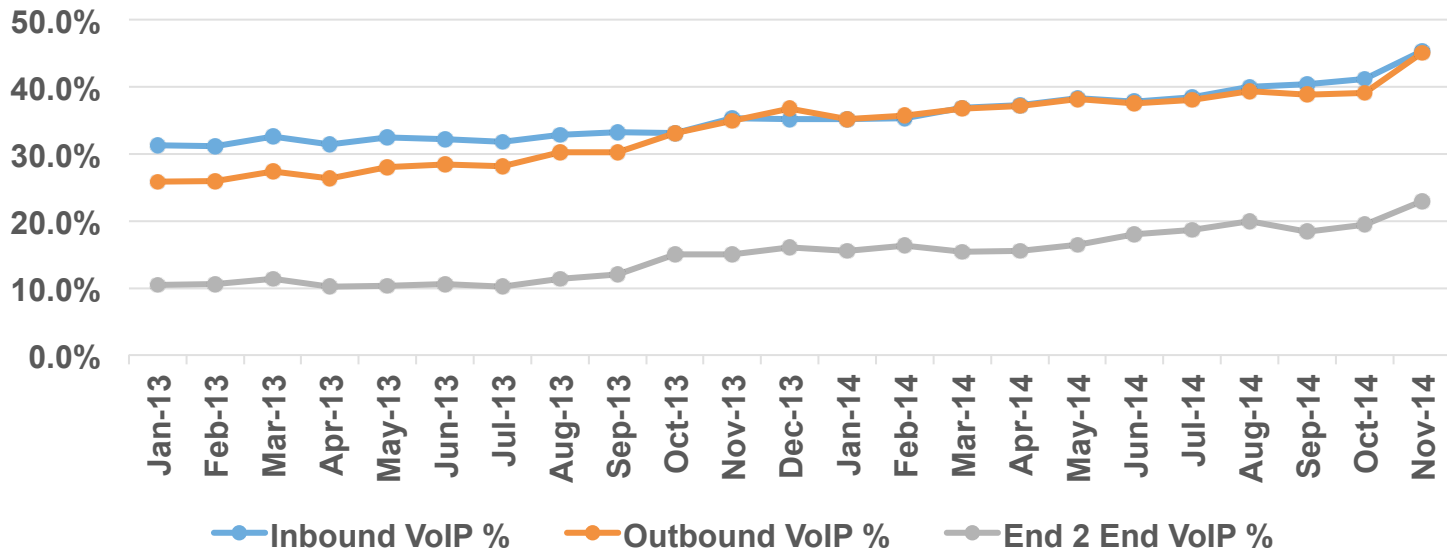
- ❑ All session based services, such as voice and video
- ❑ Related signalling services
- ❑ Messaging services including RCS

Where is the Wholesale industry in '15?

...progressing in the IP transition

- **SLOWLY but constantly**
- **FTTx and VoLTE are bringing IP to FNOs/ MNOs**

VoIP Migration from 10 i3f Carriers as of Dec. 2014

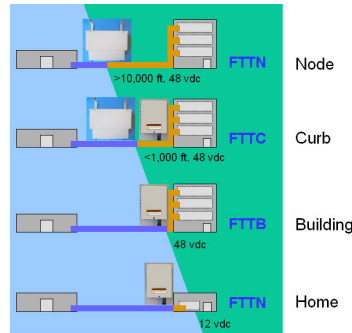


**Industry
takeaway**

IP traffic around 50% of total managed traffic

FTTx and VoLTE -> IMS (IP Multimedia Subsystem)

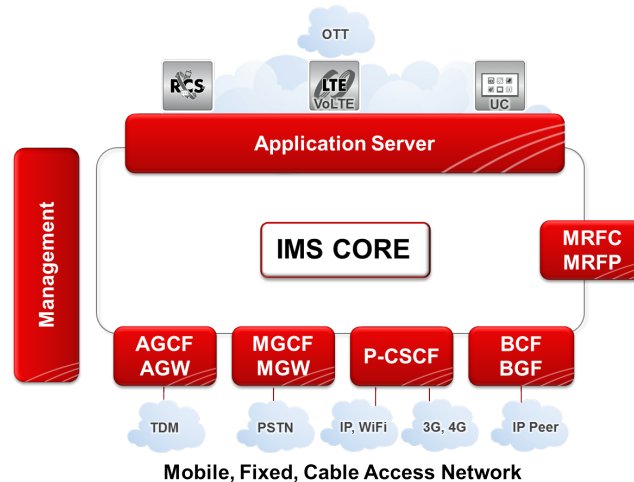
Fixed Access



Mobile Access



Based on ETSI TISPAN Model



3GPP selected IMS for Session-based services over LTE (p.es. VoLTE)

Industry
takeaway

IMS: first converged model for SPs' networks for all session-based services (e.g. VoLTE, ViLTE, RCS)

i3 forum deliverable on IMS

- Increasing FTTx deployment in fixed networks
- Rise of LTE technology in mobile networks
- Spreading of LTE data services
- First deployments in Asia and in the USA of Voice over LTE (VoLTE) services with HD voice capabilities and first VoLTE roaming trials

For i3 forum it is a priority to deliver a document describing:

- ✓ *Strategic environment*
- ✓ *Reference architectures adopting IPX at the transport level*
- ✓ *The interfaces, protocols and codecs to be adopted at inter-IMS border and between IMS and non IMS networks,*
- ✓ *The related business models together with QoS control discussion*
- ✓ **For interconnecting calls and roaming calls**

**i3 forum
deliverable**

“IMS Based Services: Technical and Commercial Analysis of International Interconnection and Roaming Services” (Rel. 1) June 2015

Services and related Business Models

<i>IMS Service (over IPX)</i>	<i>Business Model between SP and IPX P</i>	<i>Charging metrics</i>
(HD) Voice	Sending Party Pays (cascading)	Minutes per destination
Videocall	?????	?????
Signalling (Diameter)	Flat Fee or Per Transaction Fee	Number of Transactions
Signalling (*) (SIP IMS)	Flat Fee or Per Message Fee	Number of MSU
Enhanced Messaging	?????	?????
SMS/MMS	Sending Party Pays (cascading)	Message for destination
<u>IPX Transport</u>	<u>Flat Fee</u>	<u>Port capacity (Mbit/s)</u>

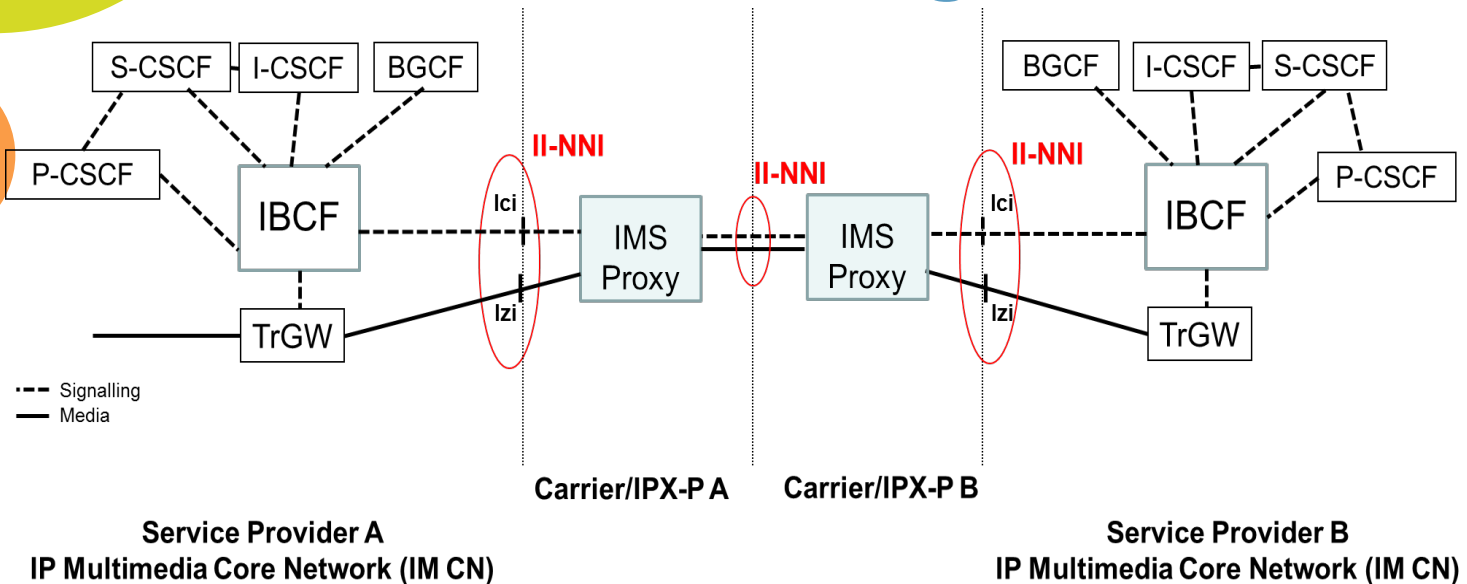
(*) For the 3 types of SIP IMS signalling

**Industry
takeaway**

***Variety of business models together with a variety
of charging schemes => efficient OSS/BSS chain***



Reference Configuration



IPX Transport Model

- **Service aware configuration** endorsing 3GPP TS23.228 “IP Multimedia Subsystem (IMS)”, to be applied between SP and IPX Providers and between 2 IPX Providers

The Ici interface provides signalling connectivity for the Control Plane based on SIP signaling. The Izi provides connectivity for session-based media (e.g. User Plane for the voice service)

- **Service Unaware configuration** also specified; e.g. agnostic data transport with QoS control and monitoring

Signalling and codecs

- **Inter IMS Signalling protocol endorsing 3GPP TS29.165** “*Inter-IMS Network to Network Interface*” to be applied between SP and IPX Providers and between 2 IPX Providers
- i3 forum deliverable “*Interconnection & Roaming IMS Signaling Profile Release 2 (May 2013)*” provides an operational specification of the 3GPP document
- GSMA PRD IR.95 “*SIP-SDP Inter-IMS NNI Profile*” reviewed and commented in the document
- **Rec. Narrowband Codecs**
- **Rec. Wideband Codecs**



Mandatory Narrow band codecs	Optional Narrow band codecs
G.711 A-law, μ-law 64 kbit/s: Mandatory for IMS interworking	AMR-NB: Mandatory in terminals using 3GPP access to the IMS
G.729, G.729a, G.729b, G.729ab. For interworking with existing VoIP networks	

Mandatory Wideband codecs
G.722: Mandatory for IMS interworking
G.722.2 (AMR-WB): Mandatory for VoLTE in GSMA IR.92

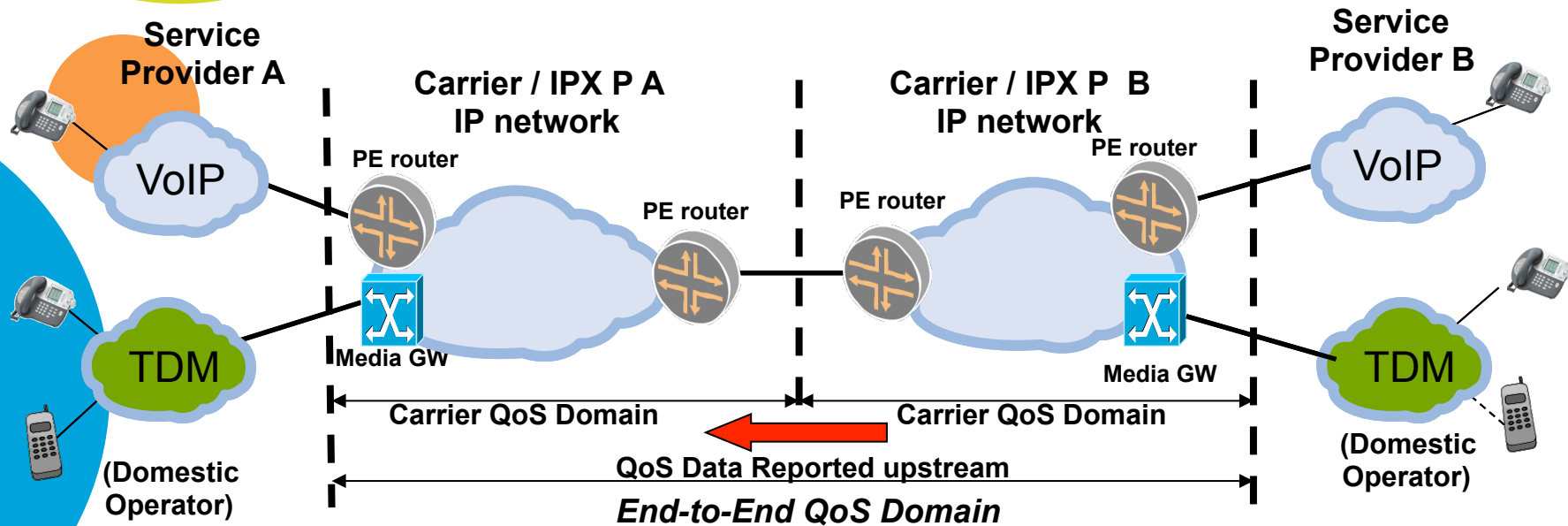
- **Codecs supported by OTTs (e.g. Opus) are also discussed**

Transcoding guidelines

Transcoding adversely affects the quality of the communication

1. Transcoding should be avoided when it impairs speech quality.
2. Wideband codec continuity with no transcoding => the optimal quality scenario.
3. Transcoding to NB codecs to be avoided unless is the only way for call completion
4. **A call, where transcoding between two different wideband codecs takes place, has better quality than the same call using a unique NB codec end-to-end**
5. No significant quality improvements are expected if a call, in some segments, is converted to wideband versus an end-to-end narrowband quality.
6. If both narrowband and wideband codecs are offered in a voice IMS session, the wideband ones should be placed in the top priority positions in the SDP offer.
7. The order of codec/packetization period preference is determined by the originating terminal and should be honored wherever possible;
8. **In the first instance it is the responsibility of Service Providers to support transcoding in order to ensure successful voice interoperability for their services.**

QoS Control and Monitoring

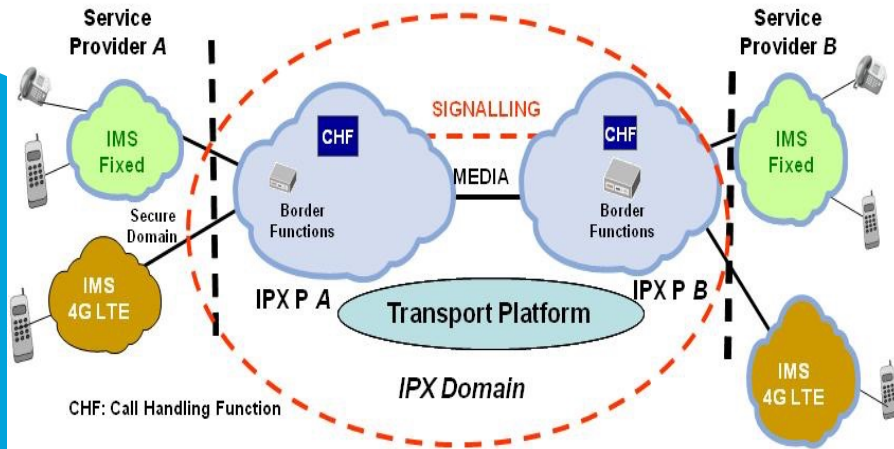


- **No reliable, accurate solution available** (RTCP, Media loopback, ICMP)
- **“Aggregation” method** as a possible workaround (also in GSMA AA.81 “*Packet Voice Interconnection Service Schedule to AA.80*”) => **no implementation from IPX Providers**

IPX Providers, with a pragmatic approach, meet Service Providers requirements of predefined QoS levels in SLA by assuming historical data of the downstream network performance

Interconnecting IMS networks

A) No-fixed/mobile interworking



Services: all IMS-based services

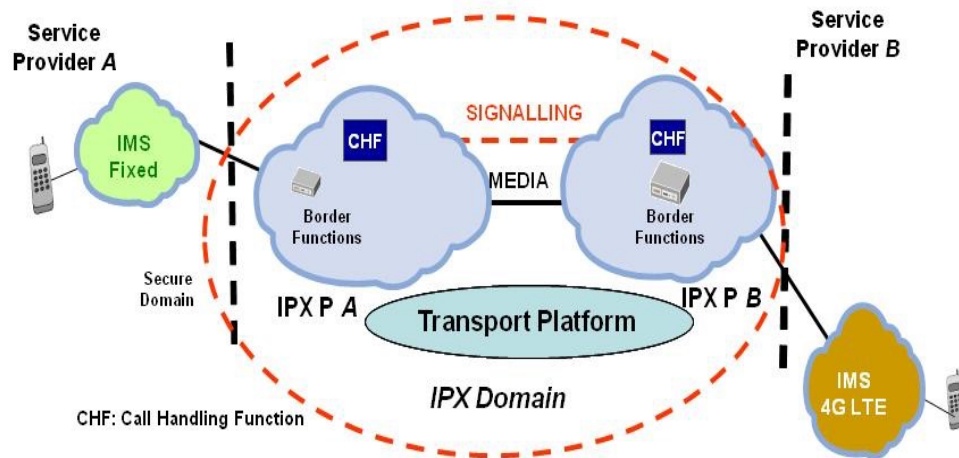
Physical Interconnection: standard IP interconnection; variety transmission systems

Signalling: 3GPP TS 29.165 => No interworking / interoperability is required.

Transcoding:

A) codec transparency guaranteed.

B) With fixed/mobile interworking



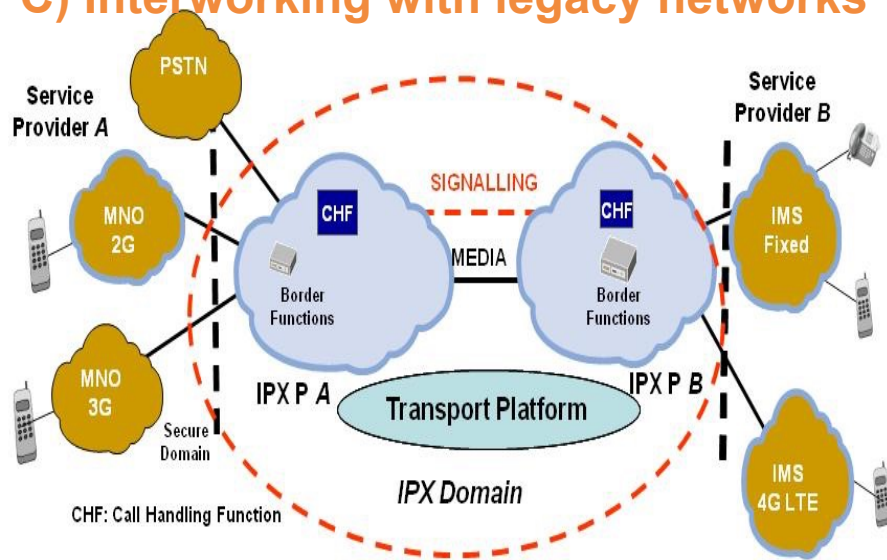
B) In case no successful negotiation of a common wideband codec on each side => transcoding. In any case there is the certainty to set-up the call using the G.711 codec

Addressing and Routing:

- Tel-URI, SIP-URI user=Phone OK
- SIP-URI Alphanumeric ❌
- IPX requirement: max 2 hops

Interconnecting IMS with legacy nets

C) Interworking with legacy networks



Services:

- Voice; support of supplementary services needs evaluation
- Mobile HD voice with TrFO only
- *In VoIP SD and HD voice supported*

Physical Interconnection: standard IP interconnection; variety transmission systems

Signalling (from ISUP, SIP to SIP IMS): interworking performed by the 1st IPX Provider

Transcoding: when transcoding needed, as common practice the originating Service Provider takes care of it

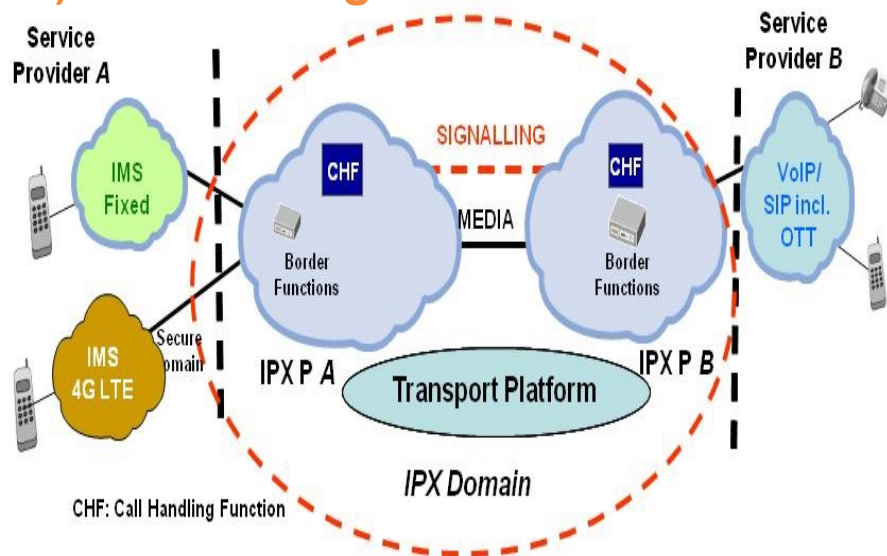
In any case, fall back to the G.711 codec.


OTT codecs to be considered

Addressing and Routing:

- Tel-URI, SIP-URI user=Phone
- *mapping from the OTT to telco addressing scheme in the OTT Providers domain.*
- IPX requirement: max 2 hops

D) Interworking with VoIP networks

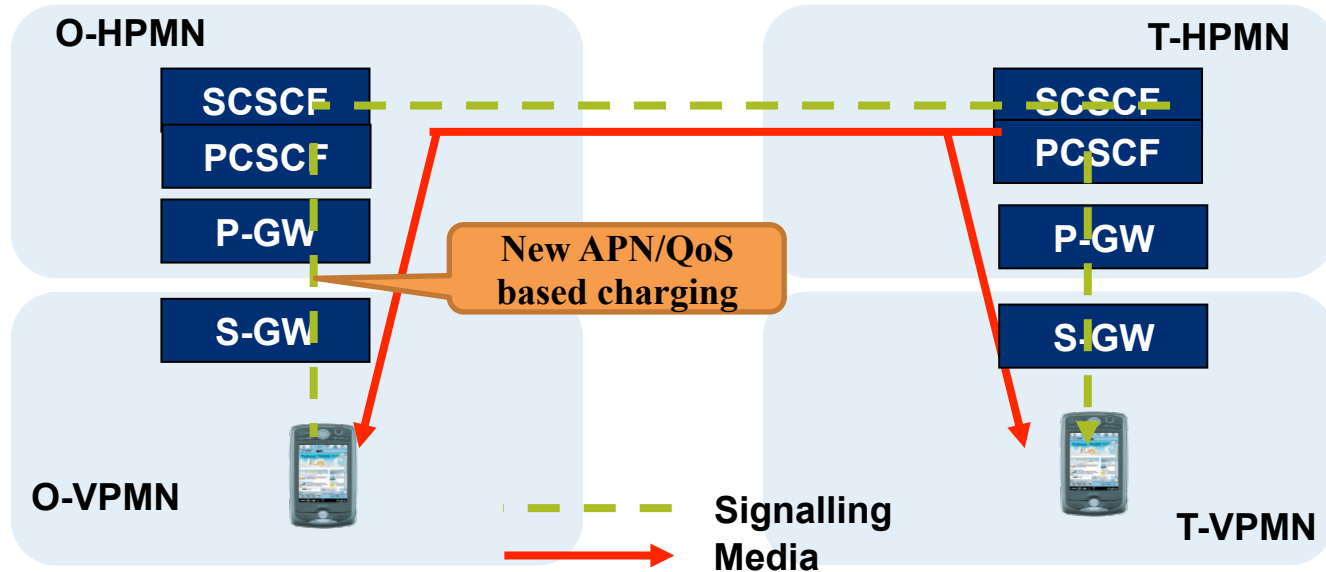




- **Voice oriented solution => same business model as in 2G/3G**
- Signalling goes back to Home network, which, call by call, decides the call routing via visited network (LBO) or via home network (HR) => **impact on Signalling services**
- Emulate 2G/3G voice services with VoLTE
- Full IMS interwork needed between roaming partners
- Specified in GSMA IR.65 “*IMS Roaming and Interworking Guidelines*” from Apr. 2014

VoLTE Roaming scenarios

Service Unaware (based on S8HR interface)



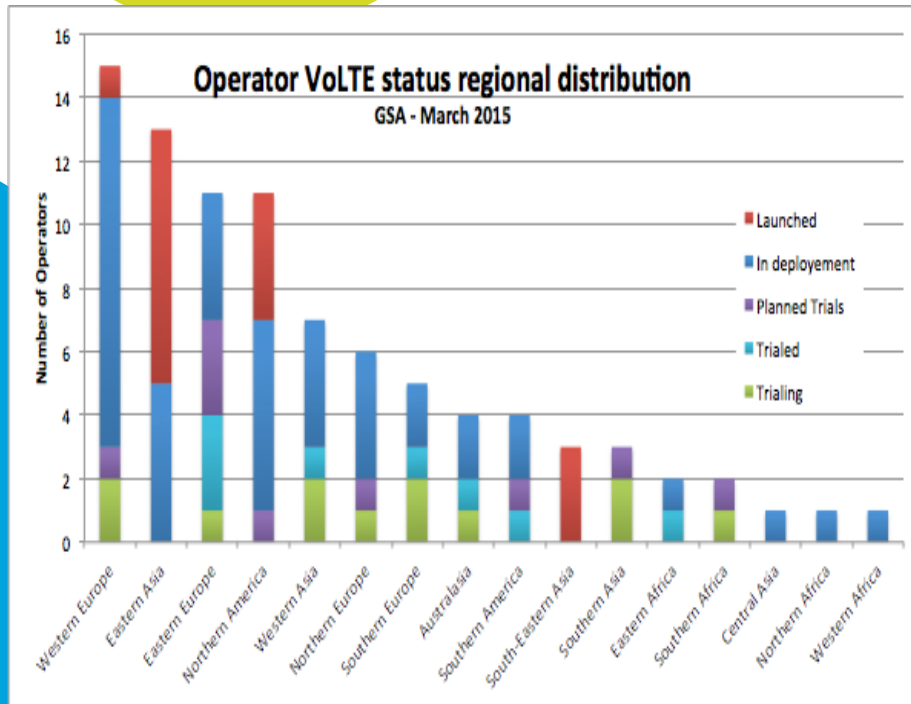
- Data oriented solution => new business model
- Push from some MNOs for technical/commercial reasons => GSMA Revolver TF
- VoLTE on LTE Data Roaming framework with QoS differentiation based on QCI/APN
- No IMS-level interwork b/w roaming partners
- Open issues (among others): lawful intercept

i3 forum
position

i3 forum is ready to support the two described alternatives giving its preference to the service aware scheme

Source: GSA (March 2015)

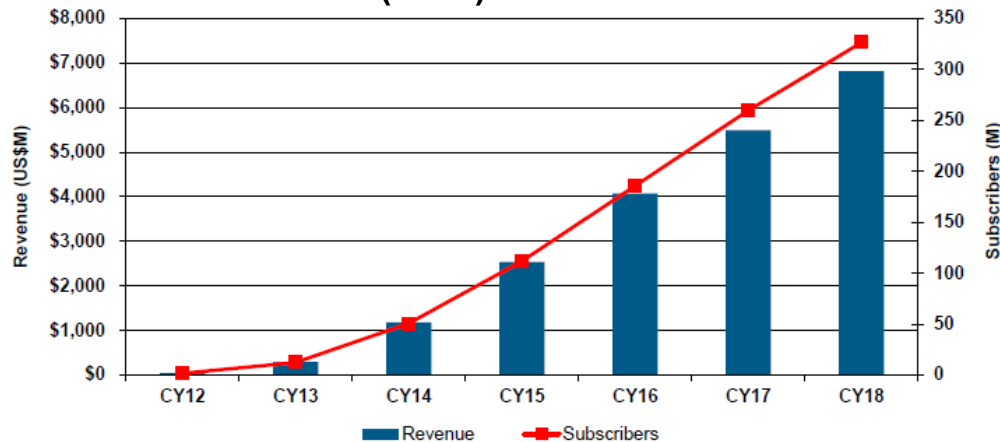
IMS Opportunities to Carriers



The support of IMS services generates opportunities for IPX Providers

- New services (e.g. voice + video + enhance messaging)
- New capabilities (e.g. SD and HD quality)
- Higher level of flexibility (e.g. in session routing)
- New hubbing possibilities towards Tier 2, 3 TelCos

Source: Infonetics (2014)



.....but

IMS Challenges to MNOs

Technical challenges

*IMS aims at supporting full interoperability between TDM and IP networks => the support of **SRVCC** (Single Radio Voice Call Continuity) is highly challenging and it is a key milestone of this technical integration*

Commercial challenges

in terms of definition of a proper IMS VoLTE profile: e.g. which 2G/3G supplementary to be retained and what has to be added in the new IMS VoLTE profile;

Financial Challenges

in terms of definition of sustainable financial plan: the deployment of mobile IP access network de facto implies the beginning of the 2G/3G decommissioning

Devices Availability

In terms of availability of compliant mobile devices guaranteeing expected end-to-end user experience. (GSA, in April 2015: 196 VoLTE-capable devices are announced)

**Industry
implication**

The above issues could slow down VoLTE take-off



For the TelCo's originated traffic



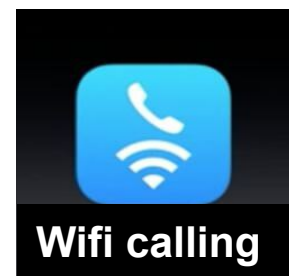
- *Voice over IMS/LTE (Rel.2)*
- *Video over IMS / LTE*
- *Rich Comm. Suite*
- *Signalling services (Rel.2)*



For the OTT/Web originated traffic



Audio and Video Communication in the browser





Thank You

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