

ITU Workshop on “protocol enhancements for IMS to be used in LTE/IMT-2020 networks and beyond ” (5 July 2021)

IMS interconnection and ENUM deployment experience

*Xiaojie Zhu, China Telecom
(zhuxiaojie@chinatelecom.cn)*



Outline

- Back ground of IMS-based interconnection project
- Solution of IMS-based interconnection for VoBB/VoLTE/ViLTE/VoNR
- Project plan
- Main issues and solution alternatives
- Ways forward

Back ground of IMS-based interconnection project

Back ground of IMS-based interconnection project

- China Telecom launched IMS-based VoBB in 2010 and VoLTE/ViLTE in 2018. By the end of 2020, the number of VoLTE/EPS FB users was 351M, and the number of VoBB users is 160M.
- The interconnection of IMS based VoBB/VoLTE/ViLTE networks between operators are implemented by CS-based gateways
 - ✓ CS-based gateways have been running for years with high risks due to lack of spare parts and maintenance supports from manufacturers
 - ✓ HD voice/video and multimedia services are not supported
- China launched an IMS-based interconnection project in 2018, The goal is to achieve IMS interconnection between operators' networks in 2021

Users	China Mobile	China Telecom	China Unicom
Mobile(VoLTE/EPS FB)	942M	351M	306M
VoBB		160M	86.1M

Back ground of IMS-based interconnection project

CS-based Gateways for interconnection



IP-based Gateways for interconnection

Transport

E1

IP

Protocols

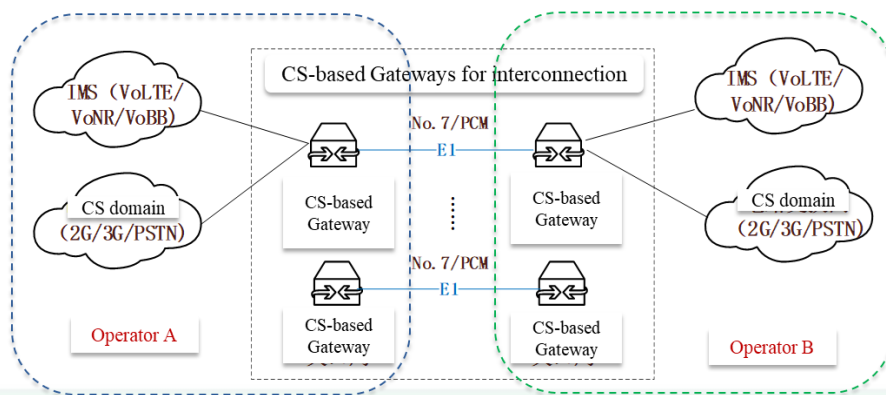
No.7/PCM

SIP/RTP

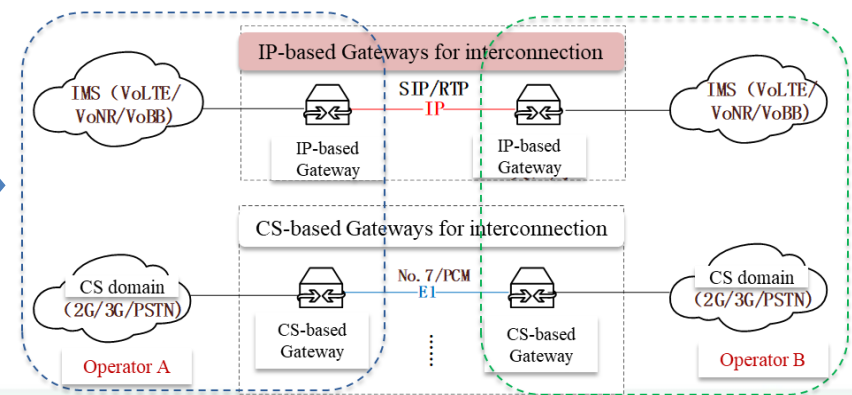
Services

Voice, Colorful Ringback Tone

Multimedia Services, including HD voice/video, Multimedia RBT



Current situation of interconnection between operators' networks



IMS-based interconnection project target

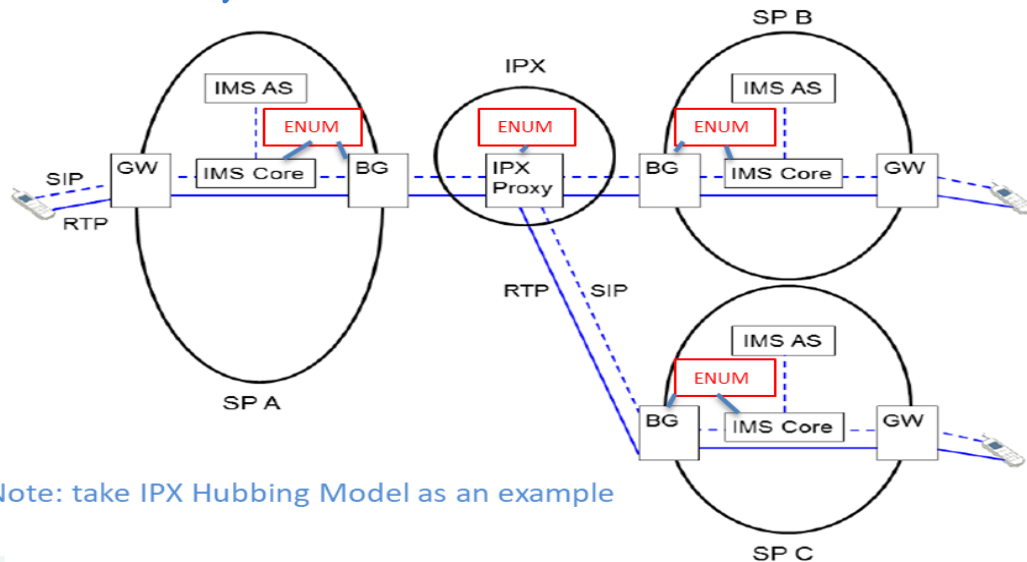


Solution of IMS-based interconnection for VoBB/VoLTE/ViLTE/VoNR

Requirements of E.164 number translation in IMS

- The requirements of ENUM (E.164 Number Mapping) in IMS

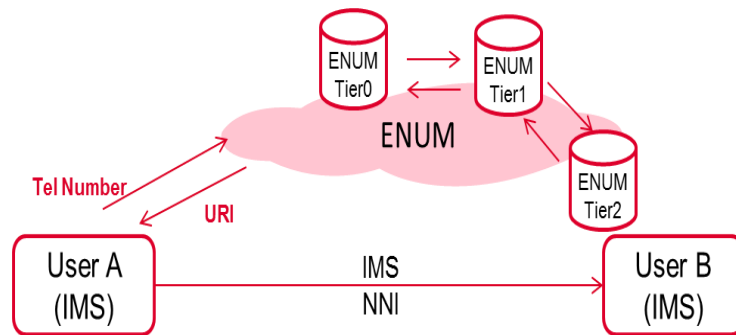
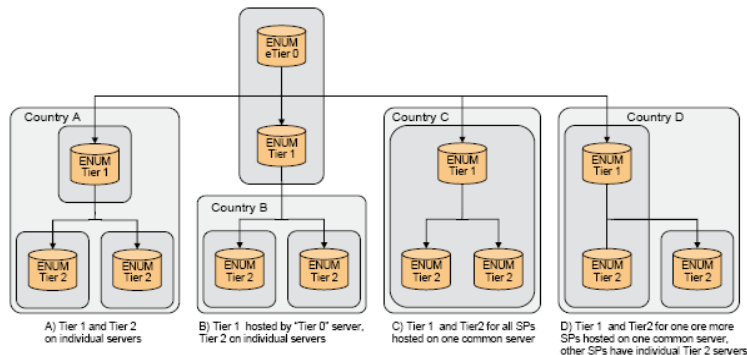
- ✓ mapping the telephone number of the destination into an URI (Uniform Resource Identifier), which is a SIP phone number that clearly identifies the destination network .



Note: take IPX Hubbing Model as an example

Infrastructure ENUM models for IMS interconnection

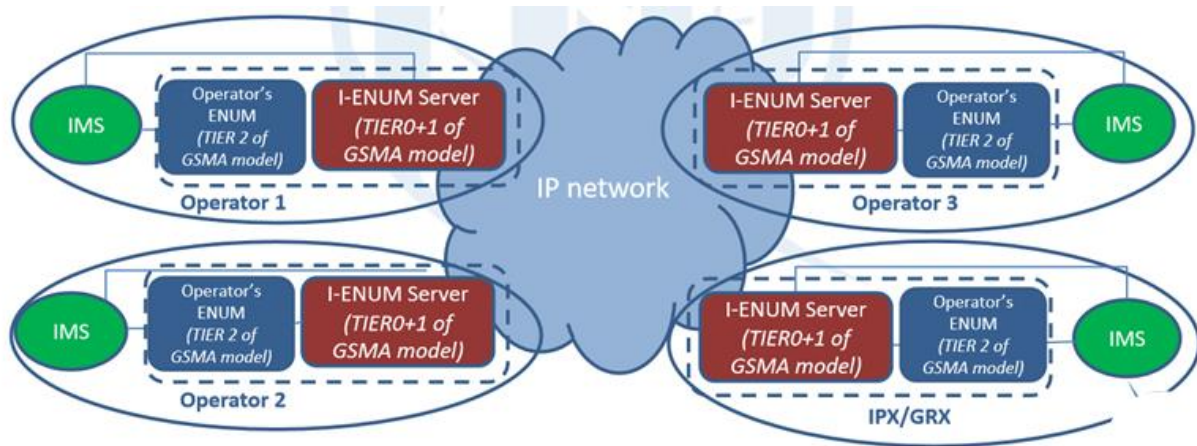
- ✓ **Tier 0: Global level**, authoritative for the ENUM top level domain. Under this domain are pointers to the Tier 1 authoritative servers.
- ✓ **Tier 1: Country Code level**, authoritative for ITU-T assigned E.164 country codes. Under this domain are pointers to the Tier 2 authoritative servers.
- ✓ **Tier 2: Service Provider level**, authoritative for National Destination Codes and individual Subscriber Numbers. Under this domain are the individual Subscriber Numbers each with one or more (Naming Authority Pointer) NAPTR records associated with them.



1. ENUM Hierarchical Model (GSMA IR.67)

Infrastructure ENUM models for IMS interconnection

- Introduces an Interconnection ENUM Server (IES), which will be deployed by operators, to establish a self-management distributed ENUM model in support of IMS interconnection.



2. Distributed ENUM Model (ITU-T Q.3643 and ITU-T Q.3645)

Key issues of the candidate ENUM models

ENUM Hierarchical Model

Distributed ENUM Model

Advantages

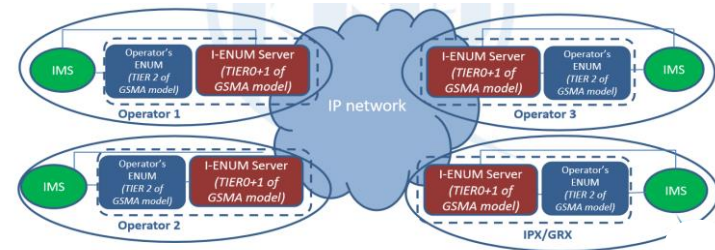
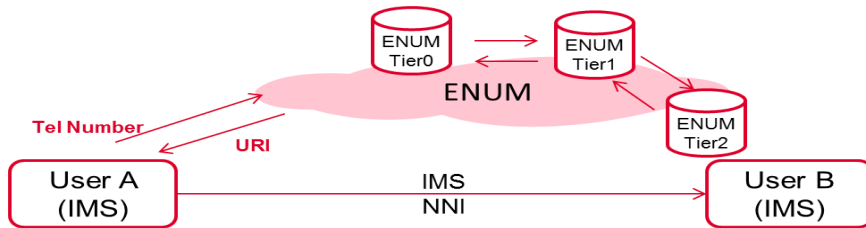
Ready for production deployment

No need to involve third parties in setting up Tier 0 and Tier 1 ENUM servers

Disadvantages

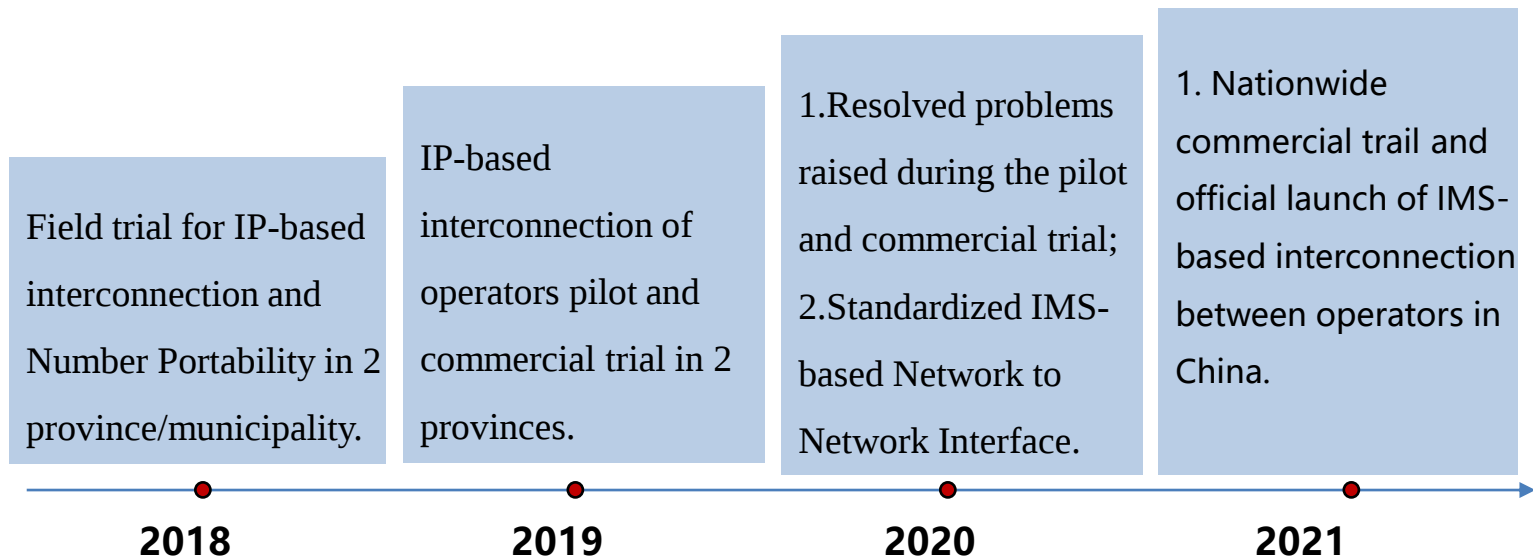
No timeline for deploying Tier 0 and Tier 1 ENUM servers

Lack of Interconnection ENUM Server for production deployment



Project plan

Project plan



Main issues and solution alternatives

Main issues and solution alternatives

- CRBT Service interoperability issue: CRBT service doesn't work when the session involves in IP-based gateways
 - ✓ solution alternatives: to unify the CRBT service procedures of relevant operators
- Location information transmission and identification issue: the formats of location information contained in the header field of SIP protocol such as P-Access-Network-Identity are different between operators.
 - ✓ Solution alternatives: 1) to unify the format of specific head field. 2) to identify the location information by calling/called party number transformation.

Ways forward

Ways forward

- **Service interoperability enhancements**
 - ✓ VoNR with enhanced CODECs
 - ✓ Interactive and immersive services using IMS data channel
- **Protocol enhancements in support of the service interoperability enhancements**

Thank you!

Questions / Comments ?

*Xiaojie Zhu, China Telecom
(zhuxiaojie@chinatelecom.cn)*

