Roaming in LTE and Voice Over LTE
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How to make an ecosystem

840 Networks in 192 countries

Economies of scale
4 billion connections
Interoperability - 2G & 3G

5,800,000,000,000
call minutes annually

Tomi Ahonen Consulting

25 years of GSM

Diverse handsets

Roaming

Common Network interface
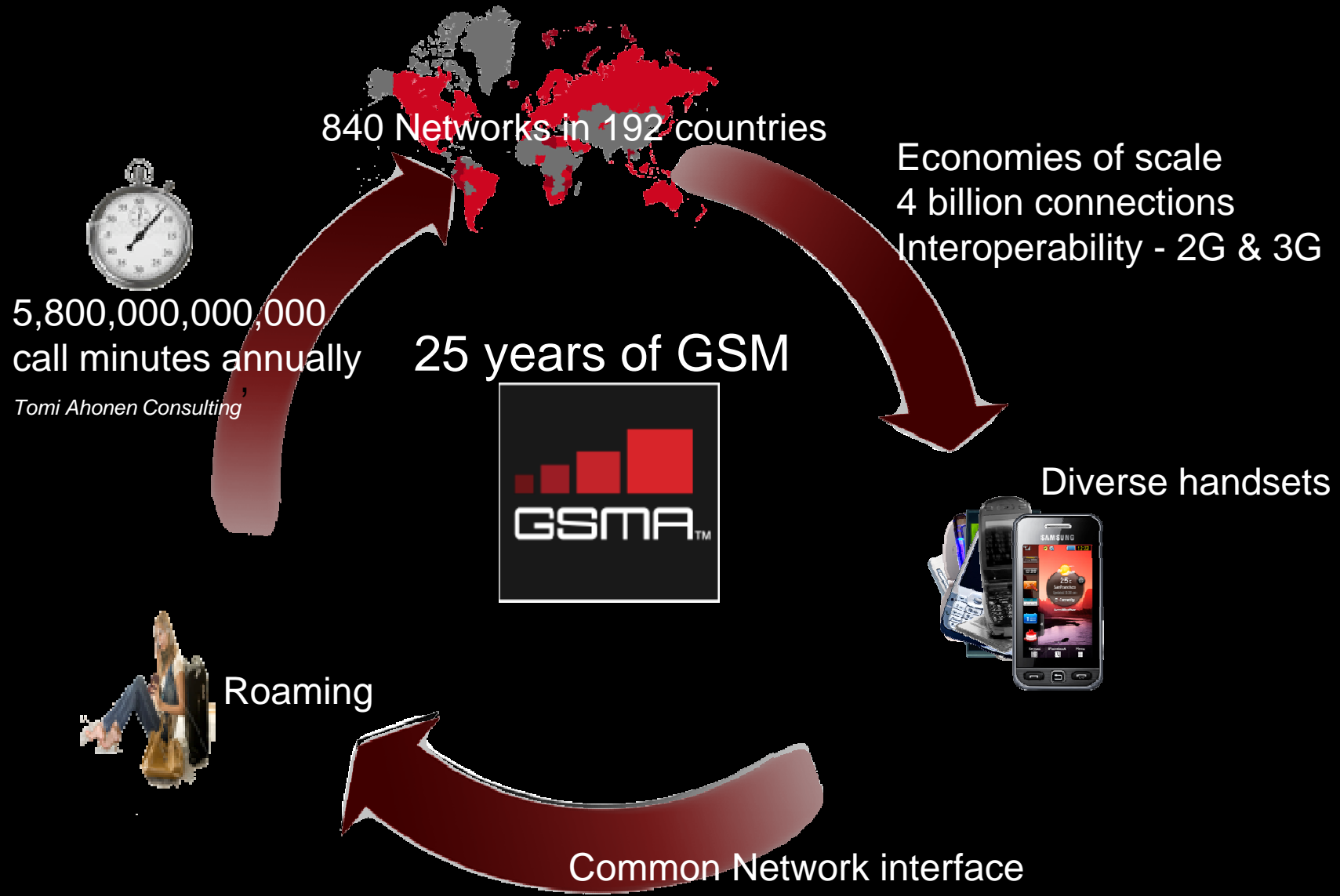
Next Gen Roaming and Interoperability (NGRAI)

- Roaming is, and will remain, a fundamental part of the Mobile Telecoms customer experience.

- NGRAI was GSMA project to take existing Roaming Eco-System for data and evolve it to meet the requirements of LTE/EPC devices and networks
  - Take into account existing network technologies
- Project is now complete - closed March 2010
  - IREG PRD IR.88 created to define interfaces between HPLMN and VPLMN
  - All affected GSMA PRDs updated to include LTE data roaming aspects

- BUT, challenge of what to do about Voice remains.

The Voice challenge for LTE

- LTE is an all-IP mobile network
  - No support for 'traditional' CS domain voice
  - New Voice and SMS solutions required
    - CSFB, VoLGA, 'One Voice'

- The risk – industry fragmentation
  - Poor customer experience
  - No common implementation
  - Economies of scale are lost

- The Reality – the industry knows where it is going
  - 'OneVoice' adoption as GSMA Voice over LTE (VoLTE)
  - Massive backing from operator and vendor community.
  - 'Migratory solutions' filling the gap between LTE launch and IMS deployment for some operators.

'Migratory' Solutions

- Migratory solutions fill the gap between existing CS voice and the Target Solution.
    - Short window of opportunity for deployment
    - Not required by all operators (some will move directly to the Target Solution).

- Once in a network, Migratory solutions may prove difficult to remove
    - Handset impact => need to support handsets with network functionality even once Target Solution is deployed.

- More than one Migratory solution defined
    - CS Fallback (CSFB) in 3GPP, VoLGA defined by VoLGA Forum
    - Industry fragmentation leads to non-optimal economies of scale and breakage of roaming

Target solution - GSMA VoLTE

- GSMA VoLTE Task Force
  - Single 'target' solution – IMS-based
  - Shorten the 'window' for Migratory solutions
    - For as many operators as possible, try and avoid the need for any migratory solution at all
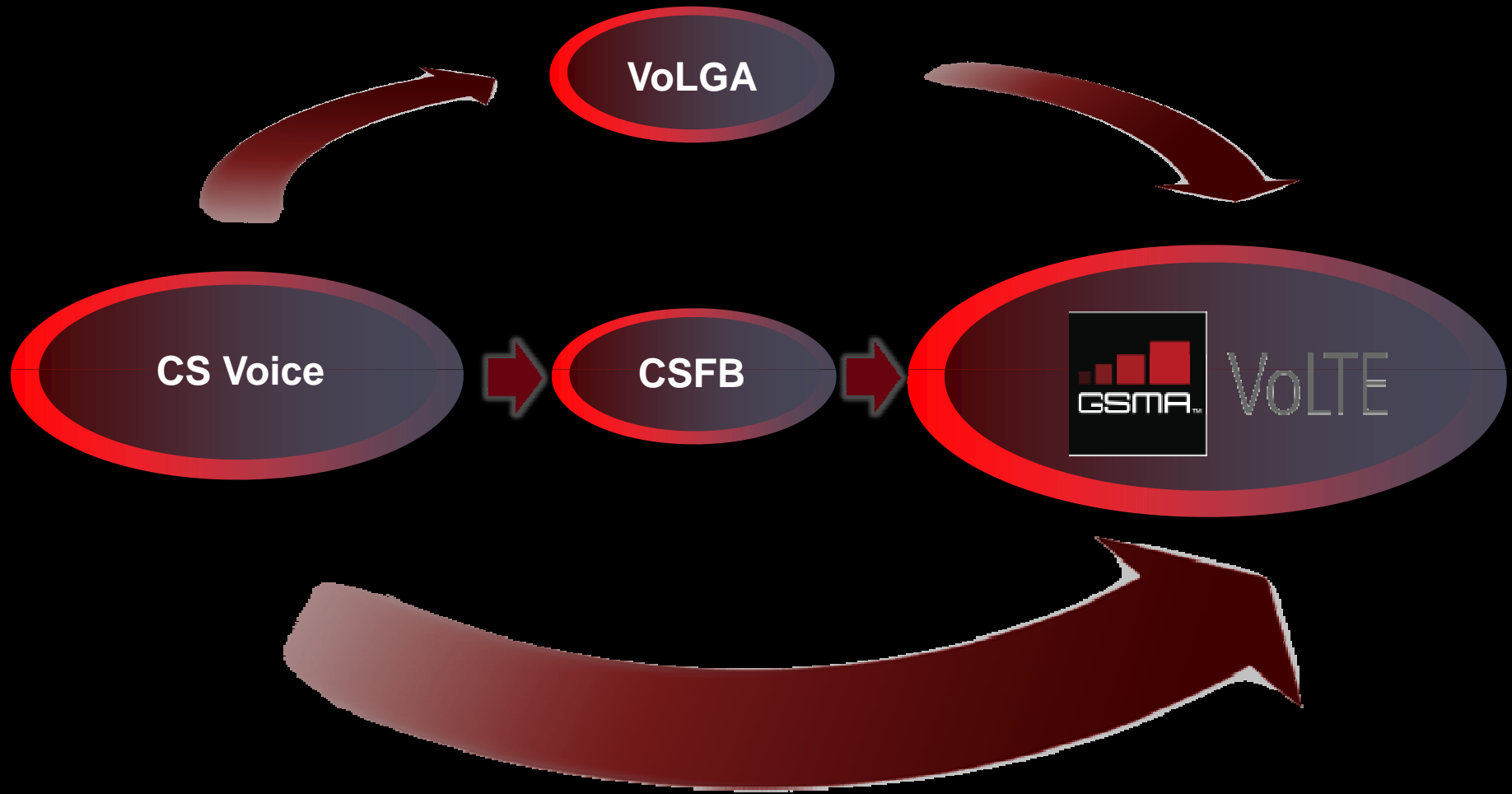
- VoLTE Task Force and One Voice collaboration
  - VoLTE adopted One Voice Profile of IMS SIP, 8th January 2010
  - GSMA VoLTE initiative announced 15th February 2010

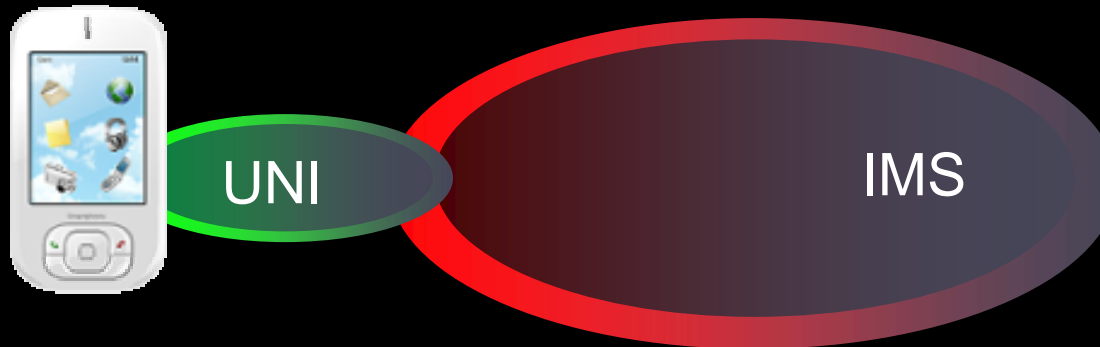- One Voice closed, all future work through VoLTE initiative.

From today to the Target

What GSMA VoLTE will deliver

Customer Interface

UNI

IMS

- Common UNI (User Network Interface) needed
  - Common implementation results in
    - Roaming capability maintained
    - Global scale and global ecosystem
    - Lower per unit cost for vendors as a result greater amortisation of R&D

**VoLTE protocol profile enables these benefits**

Interconnection

Interconnect
NNI

UNI

IMS

IMS

UNI
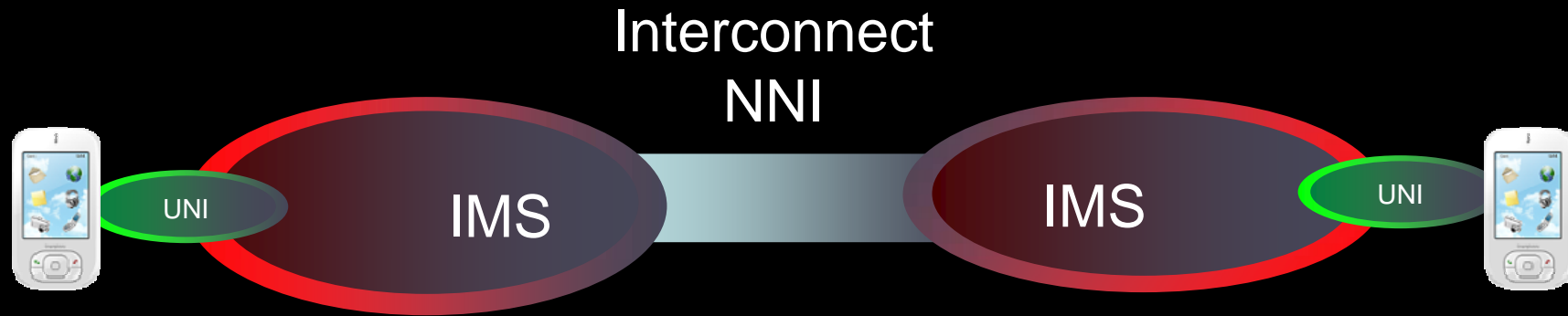
- Interconnect Network-Network Interface (i/c NNI) creates end-to-end call connectivity
- Common functionality required
- Common implementation required
- Need for expensive interworking functionality is removed

Work initiated in GSMA IREG Packet Working Group

Roaming – how it will work

HPLMN

?

Roaming
NNI

?

VPLMN
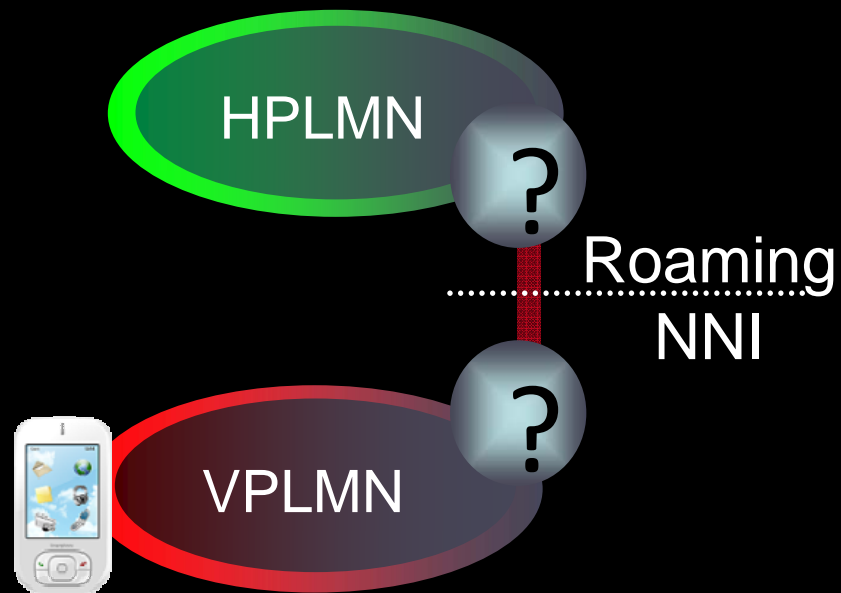
- VoLTE will define functional split between Home and Visited networks
  - 3GPP has different options for split
  - GSMA VoLTE will select one option

- VoLTE will define a common Roaming NNI

- VoLTE will define how emergency call for roaming is supported

- All work to be executed in GSMA IREG RiLTE group

Where we are today
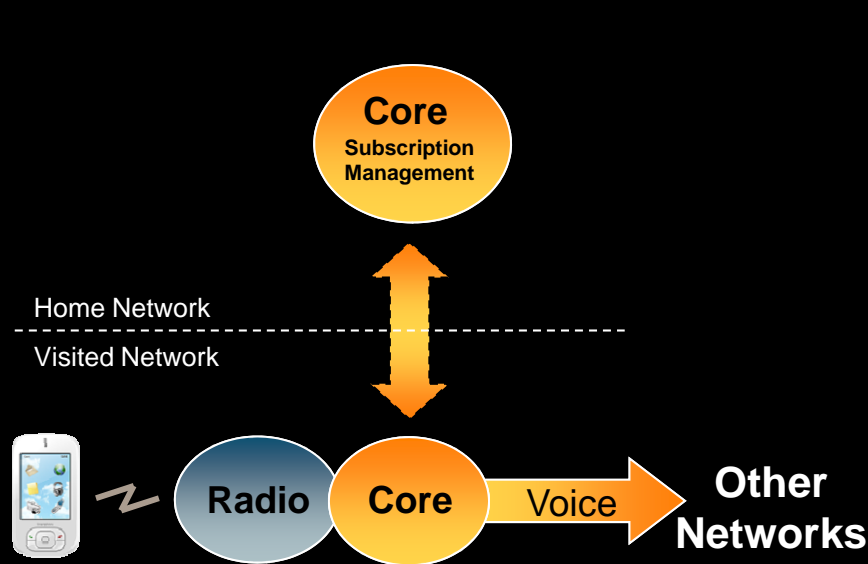
Voice Roaming

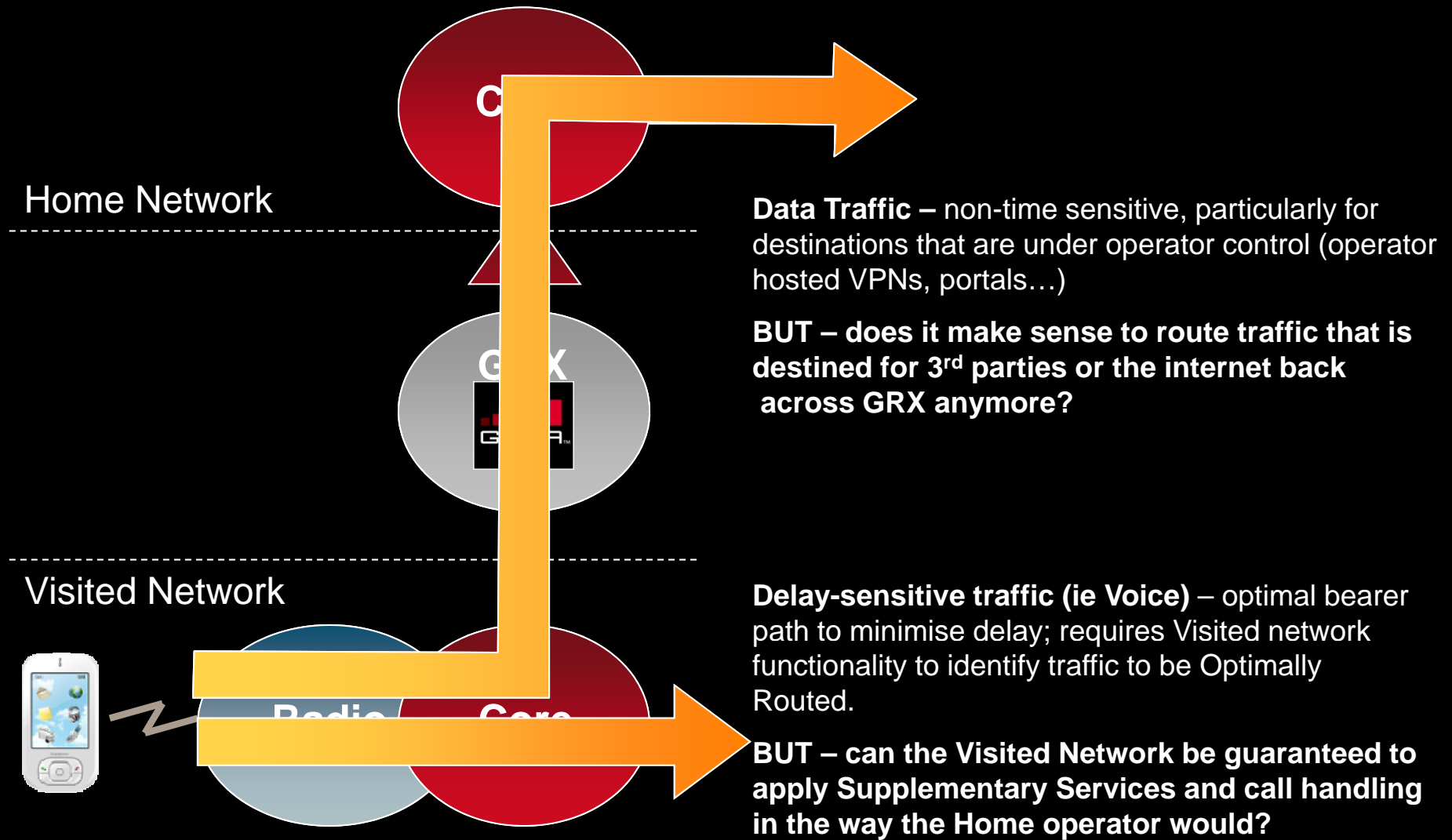- Voice traffic routed directly from the Visited Network
    - Optimised path for traffic to reduce delay – improved QoS
- Interaction with Home Network for Subscription Management only
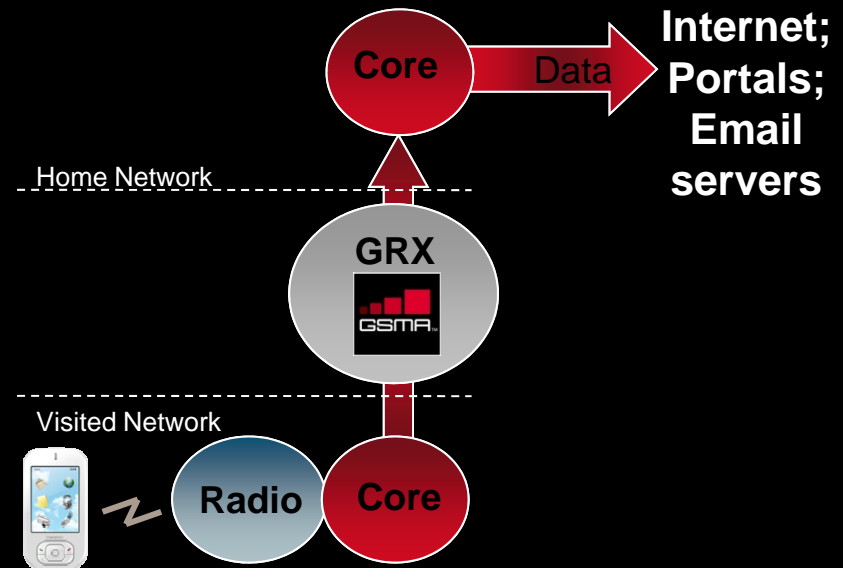
Data Roaming

- Data traffic routed to Home Network
    - Allows Home network to 'see' traffic destination, serve e-mail, apps etc directly
- No QoS issues as data traffic is not as delay sensitive as real-time apps

Roaming in an all-IP network

C

Home Network

GRX

Visited Network

Radio **Core**

Data Traffic – non-time sensitive, particularly for destinations that are under operator control (operator hosted VPNs, portals…)

BUT – does it make sense to route traffic that is destined for 3rd parties or the internet back across GRX anymore?

Delay-sensitive traffic (ie Voice) – optimal bearer path to minimise delay; requires Visited network functionality to identify traffic to be Optimally Routed.

BUT – can the Visited Network be guaranteed to apply Supplementary Services and call handling in the way the Home operator would?
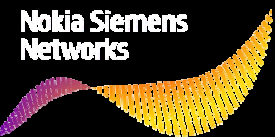
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Completing the work

- GSMA Working Groups with expertise in
  - inter-network charging
  - interoperability with existing systems
  - handover from IMS to CS domain
  - Interconnectivity models

- GSMA VoLTE will work with industry bodies for overall solution –
  - 3GPP
  - NGMN Alliance
  - IMTC
  - GCF
  - PTCRB

Industry Support

Conclusions

- Continuing high quality, fully interoperable and globally available voice services is fundamental to operators

- Require a single technology, common interfaces and open standards

VoLTE will develop the necessary specifications

to put this in place

Get Involved

If you are interested to learn more about GSMA VoLTE or would like to support the work…

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www.gsmworld.com/volte