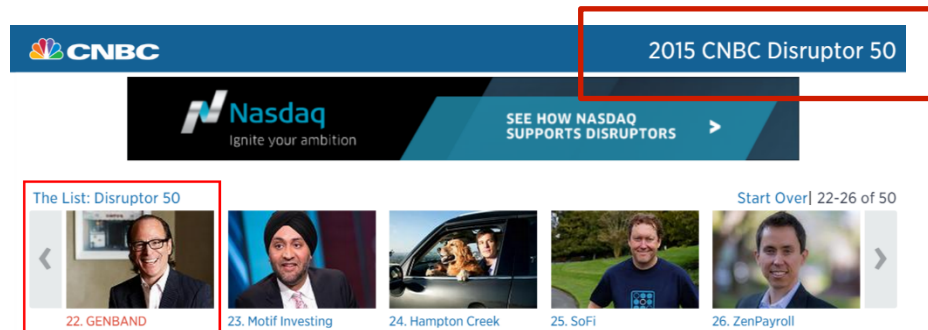# Role of IPX Carrier in VoLTE and WiFi Roaming

Ashish Jain

Director Solutions Marketing, GENBAND

i3 Forum Conference 2015

GENBAND

GENBAND

- Serving over 700 of the world's largest service providers, IPX Carriers and hundreds of large enterprises
- Operating in nearly 80 Countries
- Approximately 1,600 Employees
- 5 R&D Centers of Excellence

CNBC

2015 CNBC Disruptor 50

Nasdaq Ignite your ambition — SEE HOW NASDAQ SUPPORTS DISRUPTORS

The List: Disruptor 50

Start Over| 22-26 of 50

22. GENBAND 23. Motif Investing 24. Hampton Creek 25. SoFi 26. ZenPayroll

Network Modernization

SBC WAG DSC SPiDR
AS CIM C3 G9

Mobility & OTTaaS

GENBAND fring

UC As a Service

NUVIA Cloud UC

Embedded Communications

KANDY

Over 41 Million	298 Million	18 Million	50 Million
Lines Migrated to IP	**IP Sessions Shipped**	**UC Ports Shipped**	**Cloud Users**

HD VOICE — **VoIP** **Messaging** **Conferencing** **Mobility** **Video** **Collaboration**

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Discussion Today

5 Major Mobile Trends Impacting IPX

Opportunities For IPX Carriers

Role of IPX in VoLTE Roaming

Role of IPX in Carrier Wi-Fi Roaming

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5 Major Mobile Trends Relevant For IPX

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393 LTE networks commercially launched in 138 countries

- 607 operator commitments in 176 countries (of which 393 networks are launched)
- 107 LTE networks commercially launched in the previous 12 months
- Latest territories where LTE service launched: Aland Islands, Botswana, Chad, Cyprus, Ethiopia, Gambia, Georgia, Jersey, Jordan, Kosovo, New Caledonia, Panama, Serbia, Turks & Caicos
- 497 million LTE subscriptions worldwide: Q4 2014

(Source of data: GSA's Evolution to LTE report: 9 April 2015)

GSA
www.gsacom.com

45% of LTE networks use 1800 MHz (band 3) 176 LTE1800 networks launched in 86 countries

54 operators, > 1 in 8, launched LTE TDD (TD-LTE) in 34 countries

64 LTE-Advanced networks launched in 39 countries

90 operators investing in VoLTE deployments, trials or studies. 16 operators launched VoLTE-based HD Voice
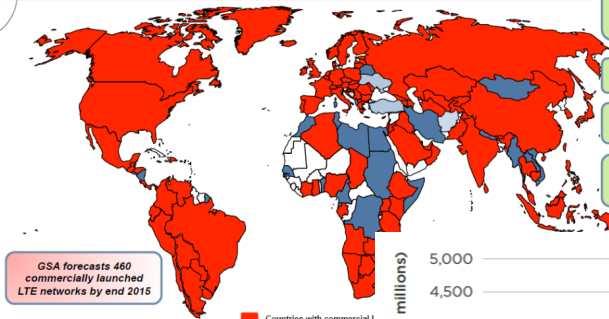
GSA forecasts 460 commercially launched LTE networks by end 2015

- Countries with commercial L
- Countries with LTE in progr
- Countries with LTE trial syst
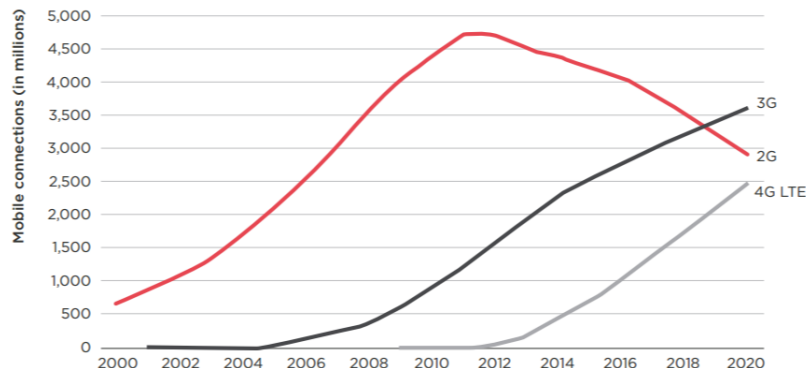
A Lot of Growth Potential In LTE Roaming

Figure 6: Total cellular connections, global, by technology generation
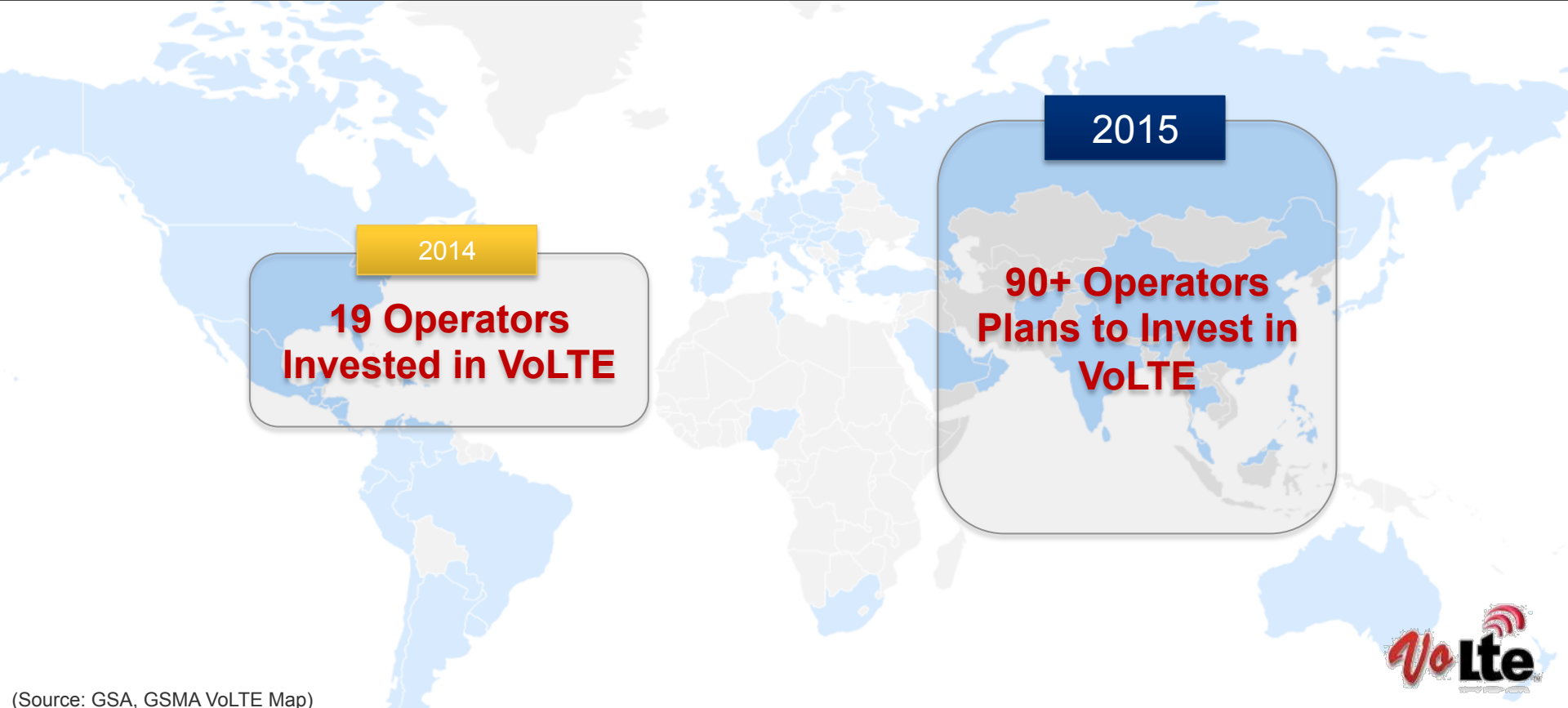
Source: GSMA Intelligence

Key 5G Principals

NFV & SDN
HetNet
Low Power Low
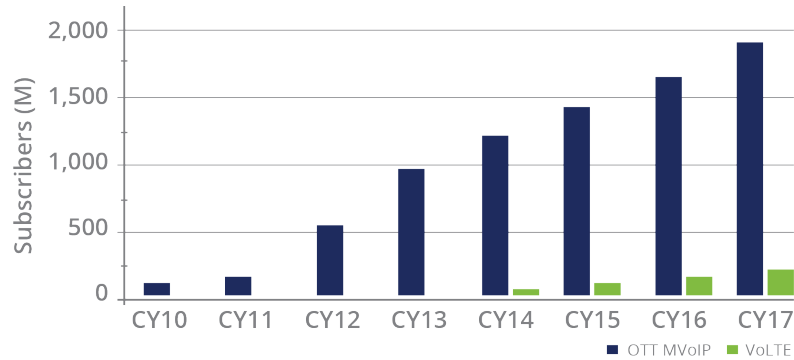Through Networks
> 1Gbps Downlink
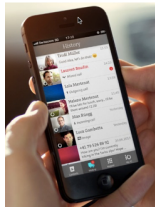
More Mobile Data Exchange

VoLTE – Gaining Momentum

2014

19 Operators Invested in VoLTE

2015

90+ Operators Plans to Invest in VoLTE

(Source: GSA, GSMA VoLTE Map)

Worldwide Mobile VoIP Subscribers

Subscribers (M): 2,000 / 1,500 / 1,000 / 500 / 0

CY10 CY11 CY12 CY13 CY14 CY15 CY16 CY17

■ OTT MVoIP ■ VoLTE

"Those not embarking on carrier OTT plays may find themselves challenged by the new communications industry paradigm."

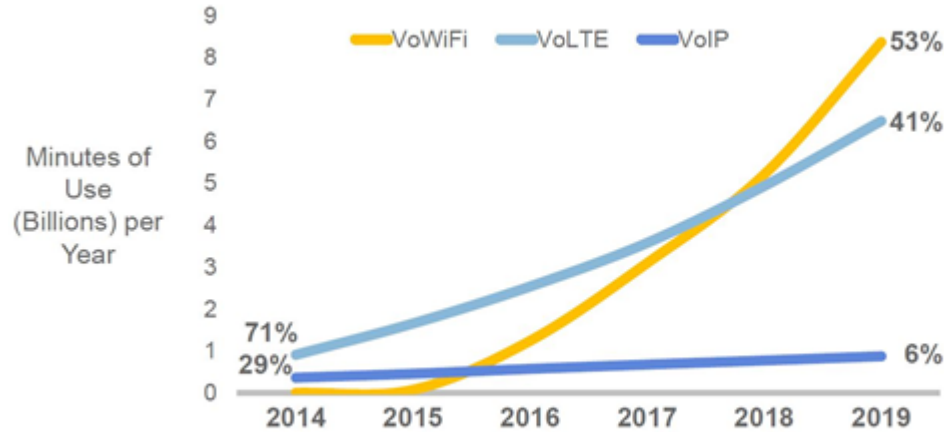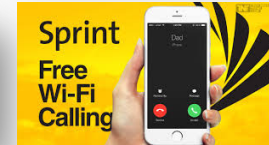*Juniper Research – Future Voice Strategies, Jan 2014*

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Minutes of Use (Billions) per Year

VoWiFi — VoLTE — VoIP

53%
41%
71%
29%
6%

2014 2015 2016 2017 2018 2019

Source: ACG, Cisco VNI Global Mobile Data Traffic Forecast, 2014–2019

# of Cellular Capable Devices
542 Million

# of Wi-Fi Capable Devices
1.9 Billion

Tablets
PCs

Wi-Fi calling

WI-FI CALLING & TEXTING — EVERY SINGLE SMARTPHONE

Sprint Free Wi-Fi Calling

FREEWHEEL

CABLEVISION

FREEWHEEL

SCRATCH WIRELESS — Wi-Fi First℠

republic WIRELESS

Wi Fi CALLING

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Sources: (1) Infonetics (2) iPass/MaravedisRethink (3) Real Wireless
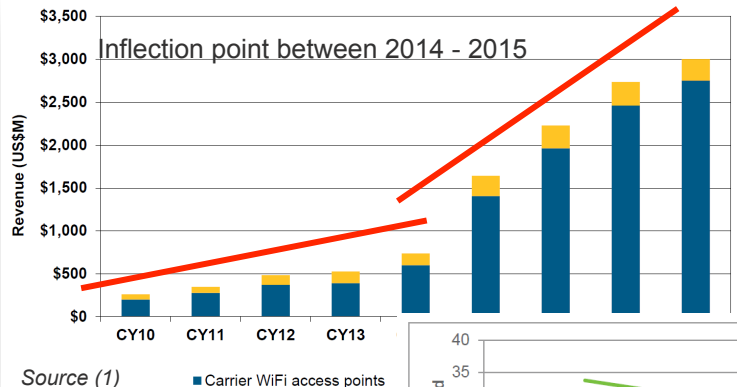
50m Wi-Fi hotspots today, 340m by 2018

Inflection point between 2014 - 2015

Source (1) — Carrier WiFi access points

85% of MNO's to invest in carrier Wi-Fi by 2016

HOTSPOT 2.0 DATA OFFLOAD
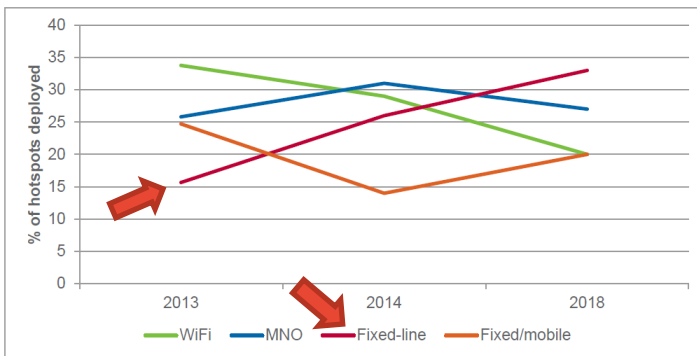
Figure 3-1   Ownership of hotspots

Source: WBA/MaRe online survey and MaRe assumptions

WiFi   MNO   Fixed-line   Fixed/mobile

Carrier-grade Wi-Fi hotspots 14% today, 72% by 2018

WiFi CERTIFIED®

Opportunity: Enabling New Peering, Roaming & Federation

Solve New Challenges

- Network Security
- Service Interworking
- Service Scalability
- **Peering & Roaming**
- Cost Efficiencies

Flow into **IPX**:

1. LTE (600+ Networks)
2. VoLTE (6B+ Minutes)
3. OTT (2B+ Subscribers)
4. VoWi-Fi (8B + Minutes)
5. Carrier Wi-Fi (340M Hotspots)
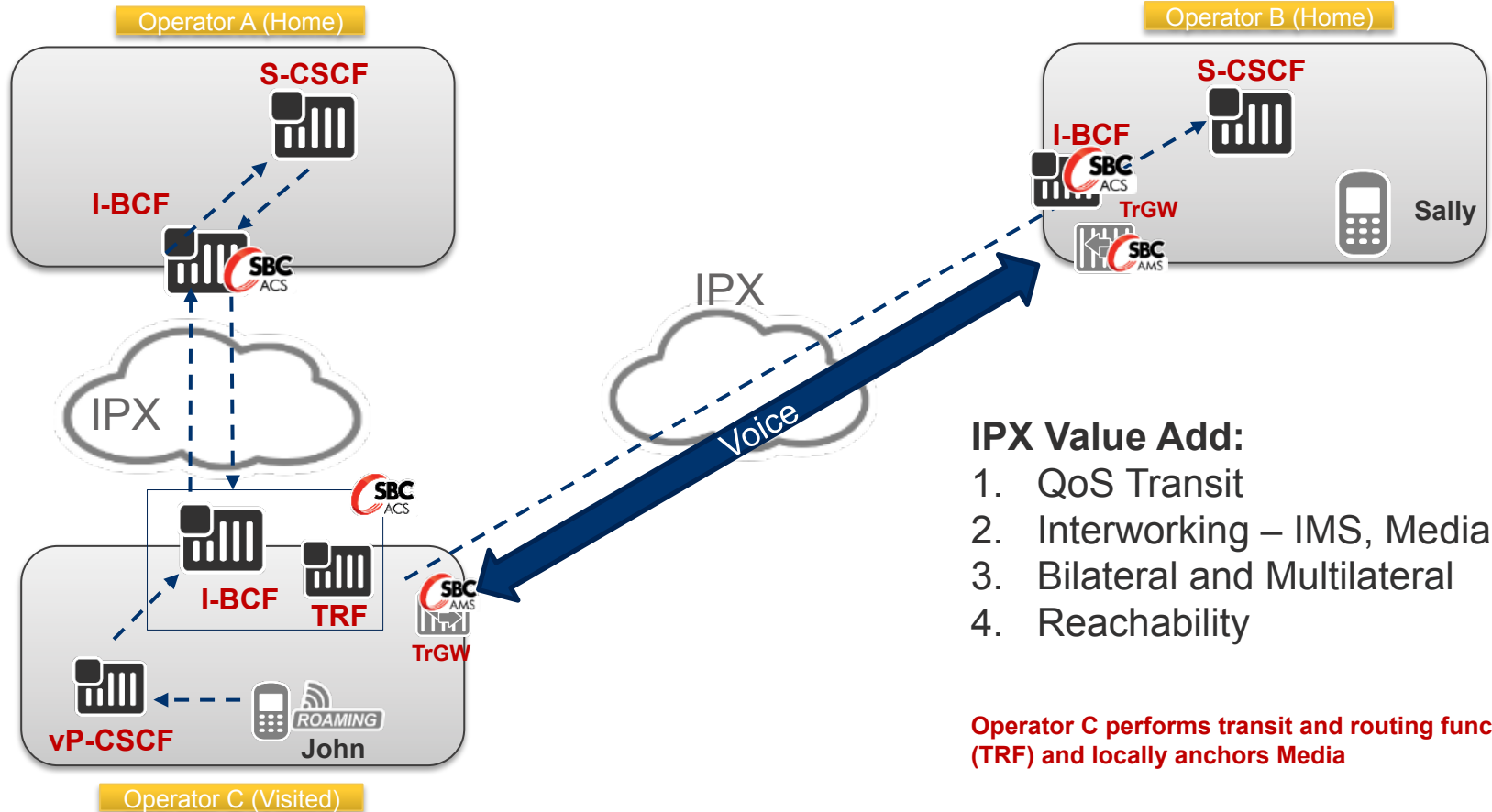
GENBAND
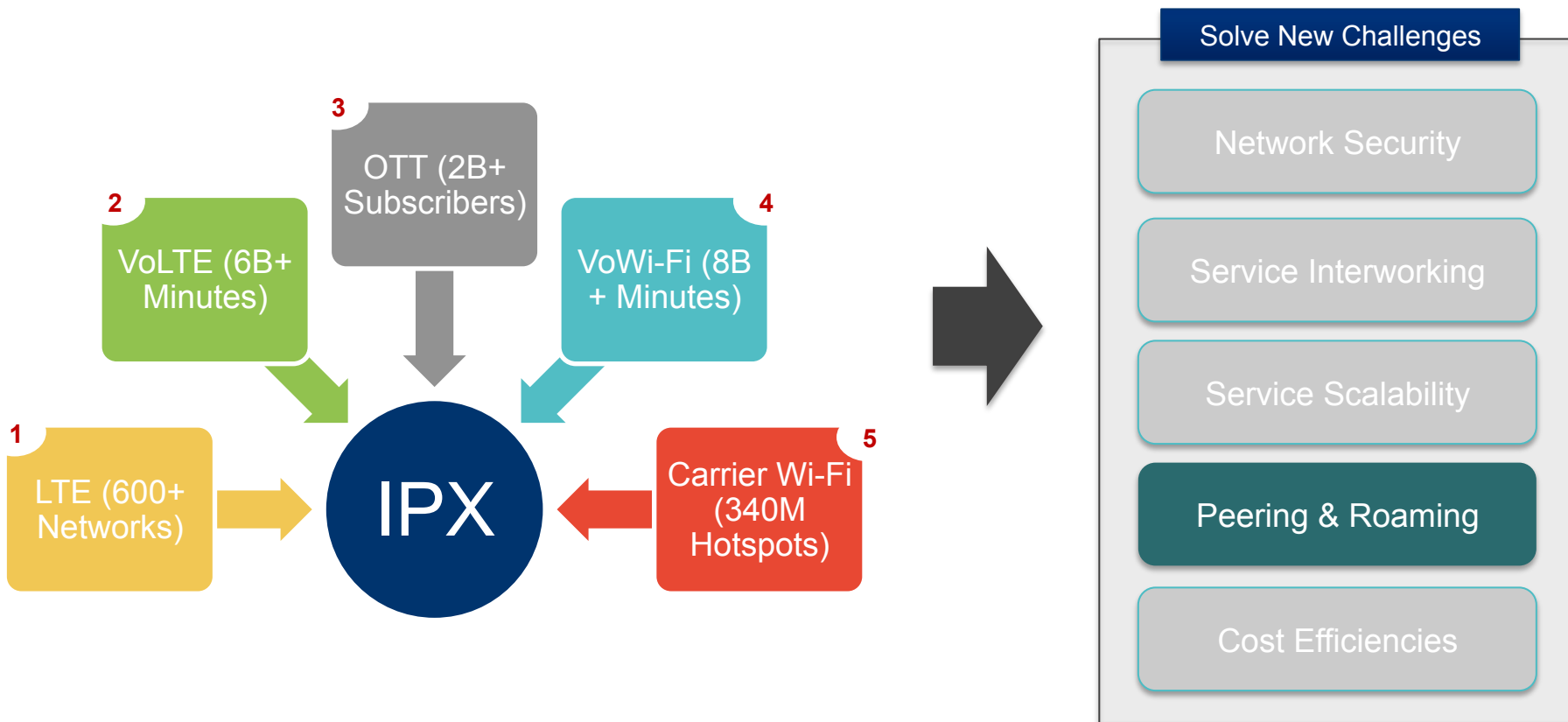
VoLTE Roaming Use Cases

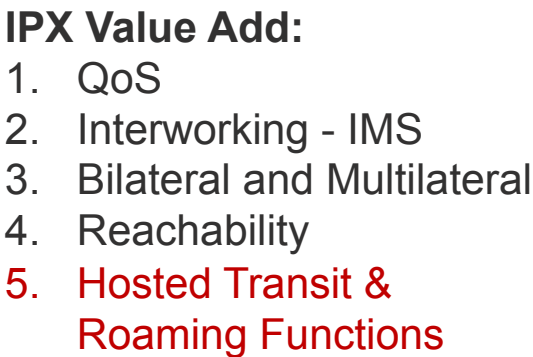# VoLTE Interconnect & Roaming With Home Routed Media
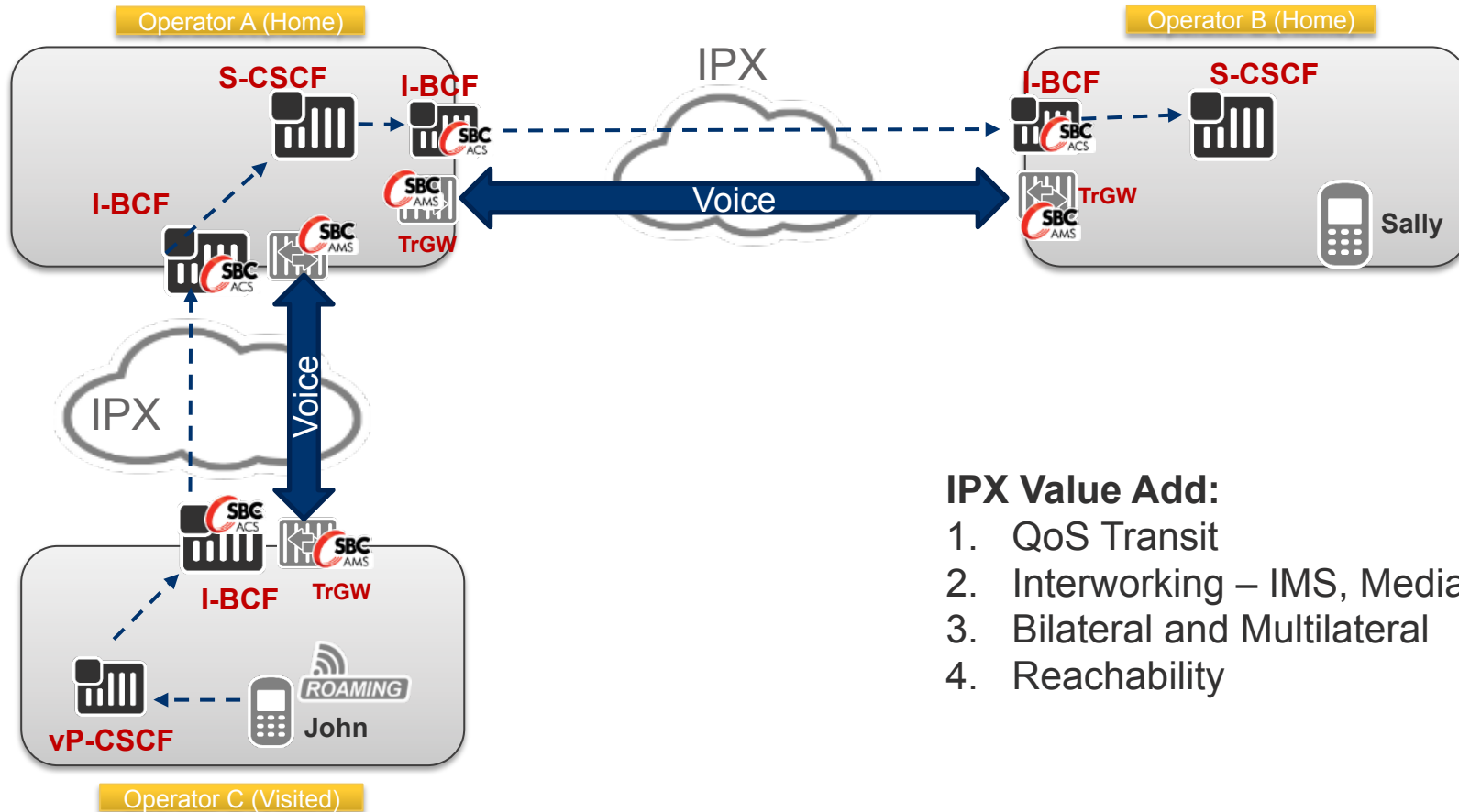
IPX Value Add:
1. QoS Transit
2. Interworking – IMS, Media
3. Bilateral and Multilateral
4. Reachability

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VoLTE Interconnect & Roaming With RAVEL Local Breakout

Operator A (Home)

S-CSCF

I-BCF

Operator B (Home)

S-CSCF

I-BCF

TrGW

Sally

IPX

IPX

Voice

SBC ACS

I-BCF

TRF

TrGW

vP-CSCF

ROAMING

John

Operator C (Visited)

IPX Value Add:
1. QoS Transit
2. Interworking – IMS, Media
3. Bilateral and Multilateral
4. Reachability

Operator C performs transit and routing function (TRF) and locally anchors Media

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IPX Hosted RAVEL Loopback For Visited Network

IPX Value Add:
1. QoS
2. Interworking - IMS
3. Bilateral and Multilateral
4. Reachability
5. Hosted Transit & Roaming Functions

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Carrier Wi-Fi Roaming

Use Cases

1   Mobile Subscriber Roaming In Wi-Fi Network Provided by MNO

2   Mobile Subscriber Roaming In Partner Wi-Fi Network
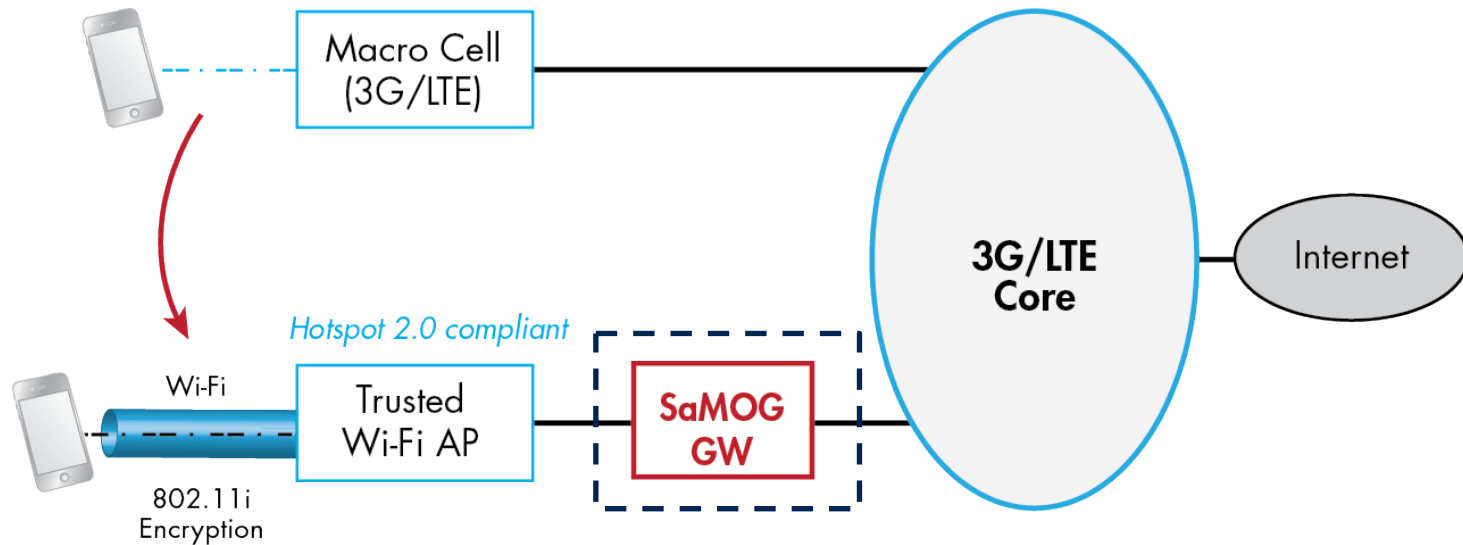
3   Wi-Fi Subscriber Roaming In Another Wi-Fi Network

Using SIM Based Device or Non-SIM based

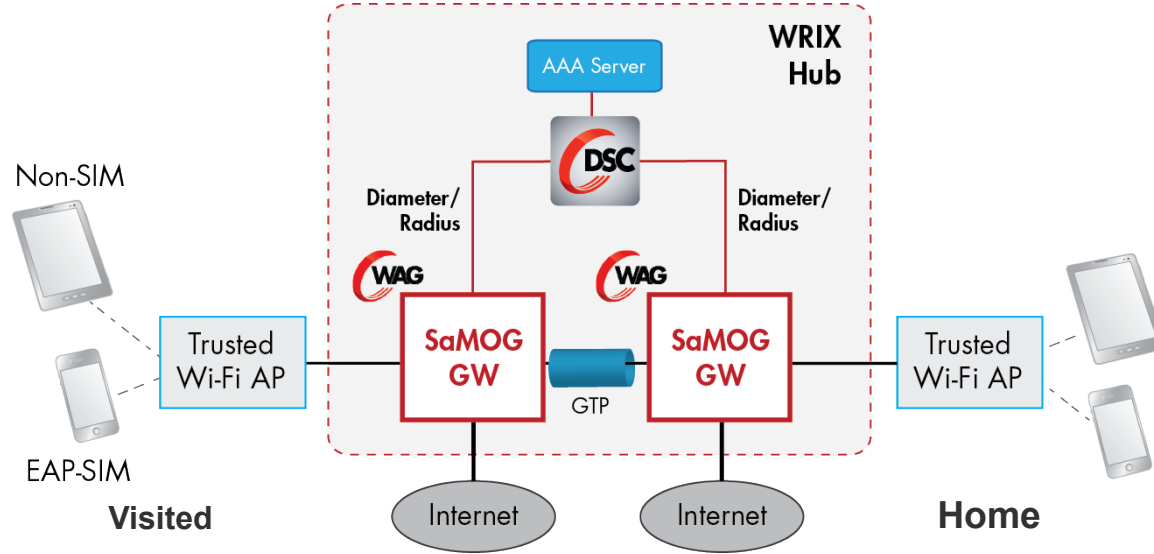Legacy Wi-Fi Hotspot or NG Hotspot 2.0

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Mobile Subscriber Roaming In Wi-Fi Hotspot Provided By MNO

- Enables roaming onto Wi-Fi network – the same way a cell phone roams between cellular networks,
- Handset detects a Hotspot 2.0 enabled Access Point and authenticates to this using credentials stored in the subscriber's home MNO,
- Wi-Fi connection is made automatically, no interaction needed with the subscriber,
- Data is then offloaded from the Wi-Fi network, or tunnelled to the MNO to their managed interconnection.

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Mobile Subscriber Roam In Partner Wi-Fi

- MNO customer attaches to trusted Wi-Fi Access Point
  - Manually, for APs not compliant to Hotspot 2.0 (IPSec tunnel required to SAMOG GW)
  - Automatically, for APs compliant to hotspot 2.0 (No IPSec tunnel required)
- Customer sends SIM authentication credentials and GRX/IPX proxies them to the appropriate MNO
- Upon successful authentication, customer data traffic is sent via GTP to the home MNO network

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Wi-Fi Roaming Intermediary Exchange For Wi-Fi To Wi-Fi Roaming

Wi-Fi Roaming and Interconnect provided by MNO or MSO using WRIX Hub

- Direct routing between Wi-Fi operators network with Roaming support
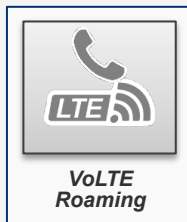- Local Internet Breakout
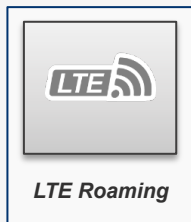- EAP-SIM authentication if WRIX hub provided by MNO

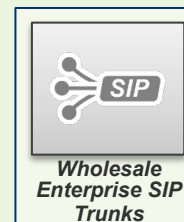GENBAND

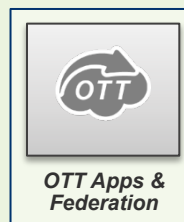# Lots of New Opportunities For IPX Carriers

Quality VoIP Interconnect

GENBAND Can Enable

Multi-Service IP Interconnect

Enhance
- HD Voice Interconnect
- Video Interconnect
- Interworking as a Service
- RCS Interconnect

Extend
- LTE Roaming
- VoLTE Roaming
- Wi-Fi Roaming
- VoWi-Fi Roaming

Overlay
- Hosted Applications
- Hosted SBC
- OTT Apps & Federation
- Wholesale Enterprise SIP Trunks

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