ITU Arab Regional Workshop on Mobile Roaming: National & International Practices

Data Roaming / Protecting & Empowering Subscribers

By

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Roamingwise

Agenda

- Data Roaming (GPRS/UMTS/LTE)
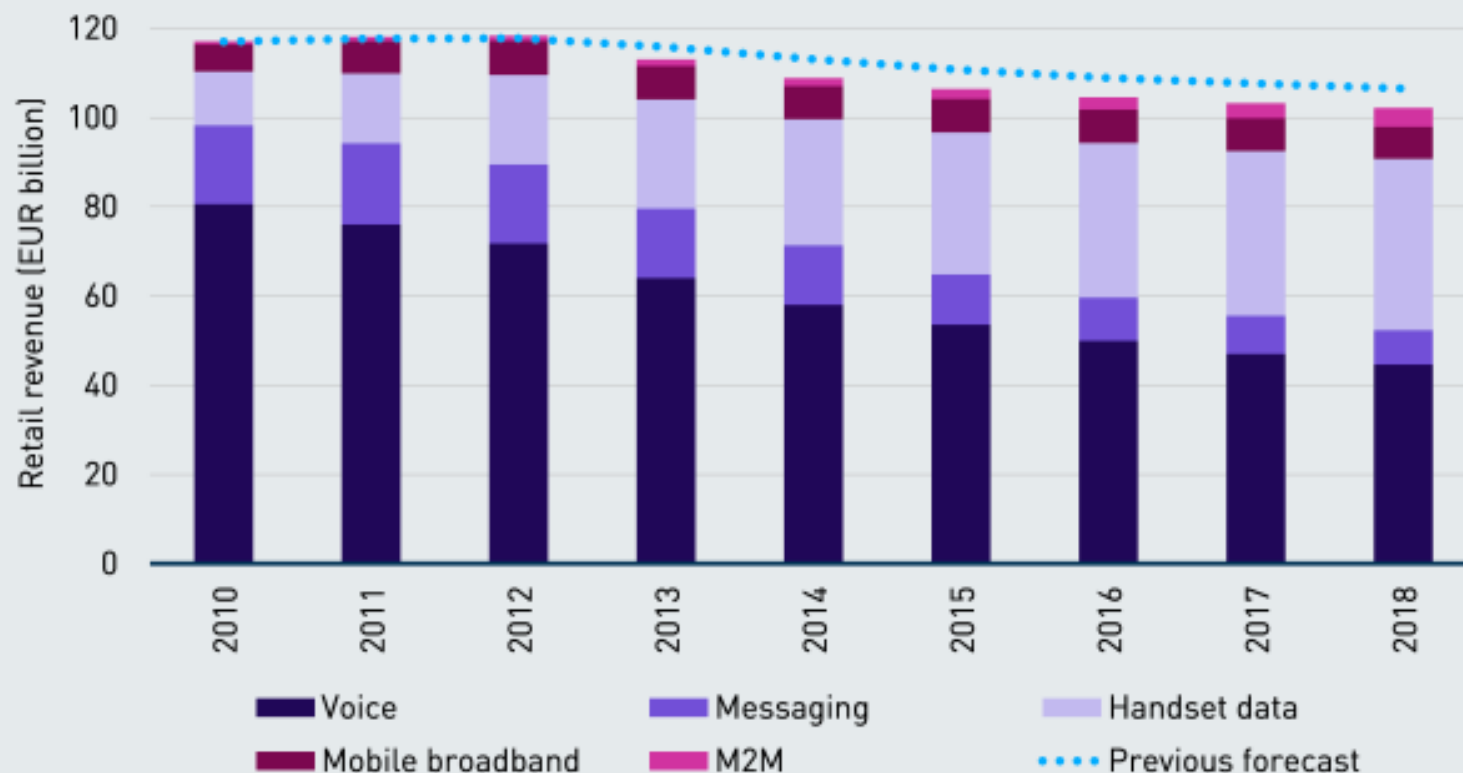- Protecting and Empowering Subscribers
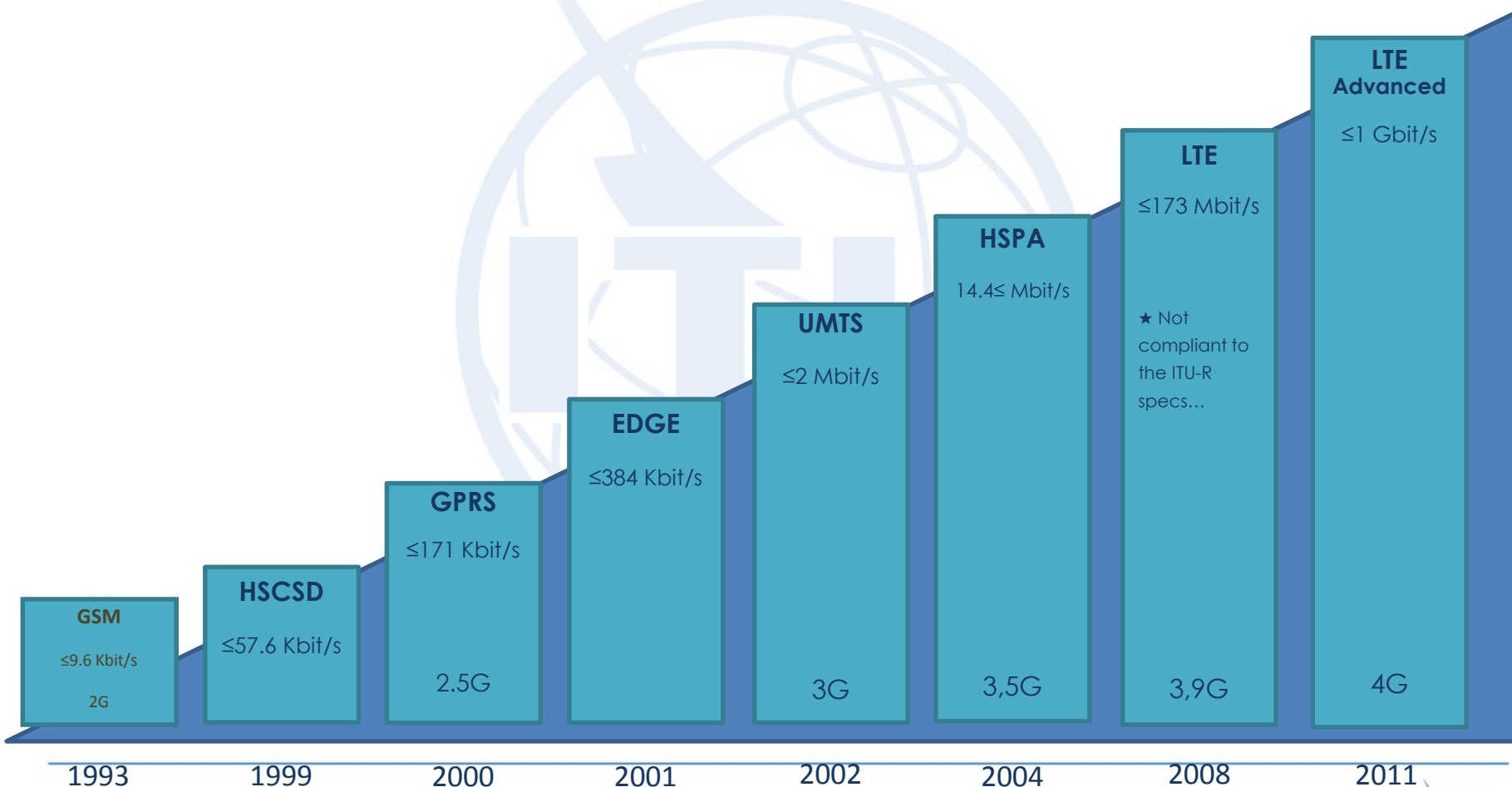
• Data Roaming (GPRS/UMTS/LTE)

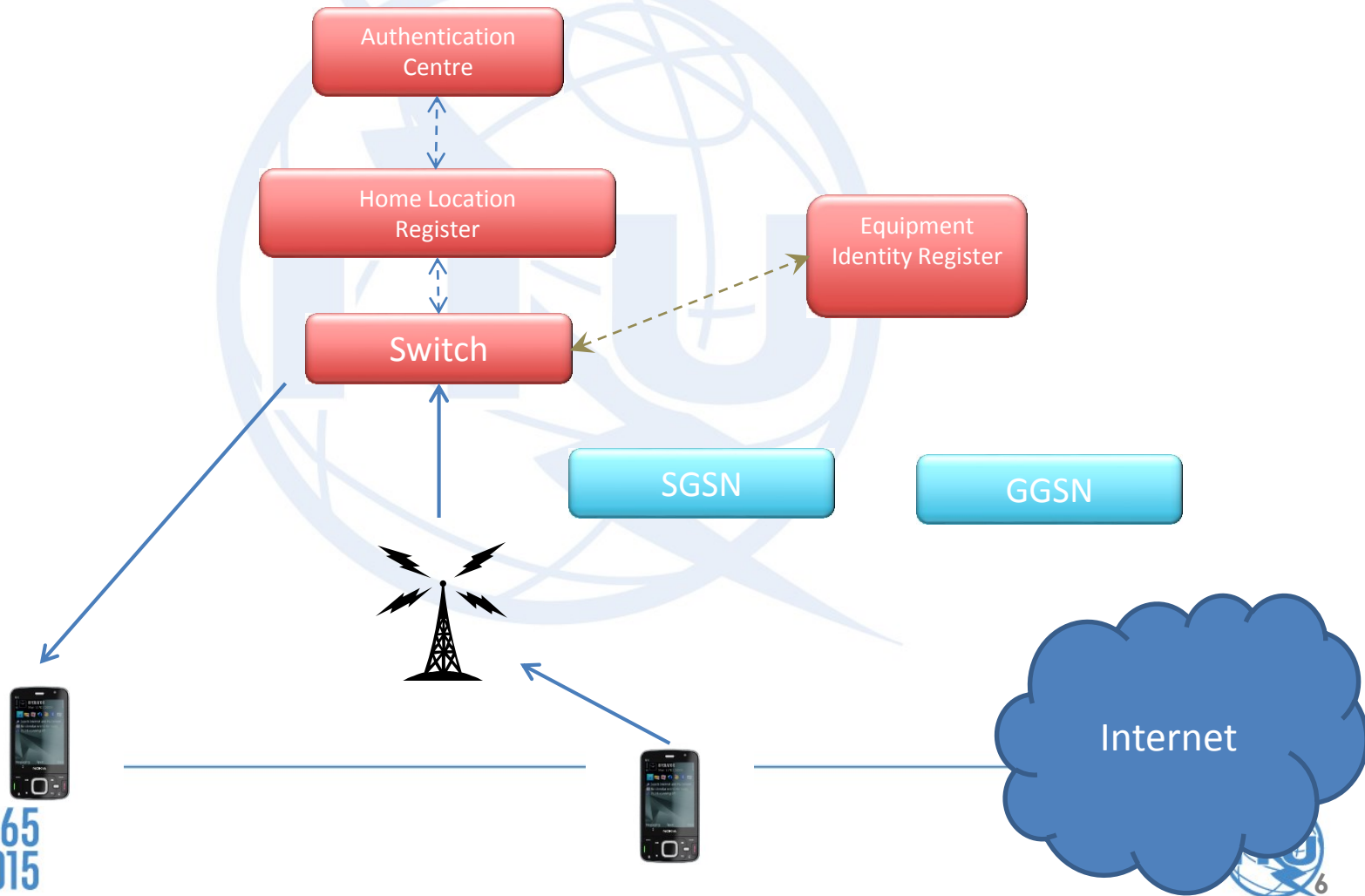# Mobile phone usage is changing (Western Europe)

Figure 2: Mobile retail revenue by service type and previous forecast for mobile retail revenue, Western Europe, 2010–2018 [Source: Analysys Mason, 2014]

Legend: Voice, Messaging, Handset data, Mobile broadband, M2M, Previous forecast

Evolution of Mobile Data Services

| 1993 | 1999 | 2000 | 2001 | 2002 | 2004 | 2008 | 2011 |

GSM ≤9.6 Kbit/s 2G

HSCSD ≤57.6 Kbit/s

GPRS ≤171 Kbit/s 2.5G

EDGE ≤384 Kbit/s

UMTS ≤2 Mbit/s 3G

HSPA 14.4≤ Mbit/s 3,5G

LTE ≤173 Mbit/s ★ Not compliant to the ITU-R specs… 3,9G

LTE Advanced ≤1 Gbit/s 4G

GPRS Network Architecture – new elements

GPRS Session – Data Flow

Authentication Centre

Home Location Register

Equipment Identity Register

Switch

SGSN

GGSN

Internet
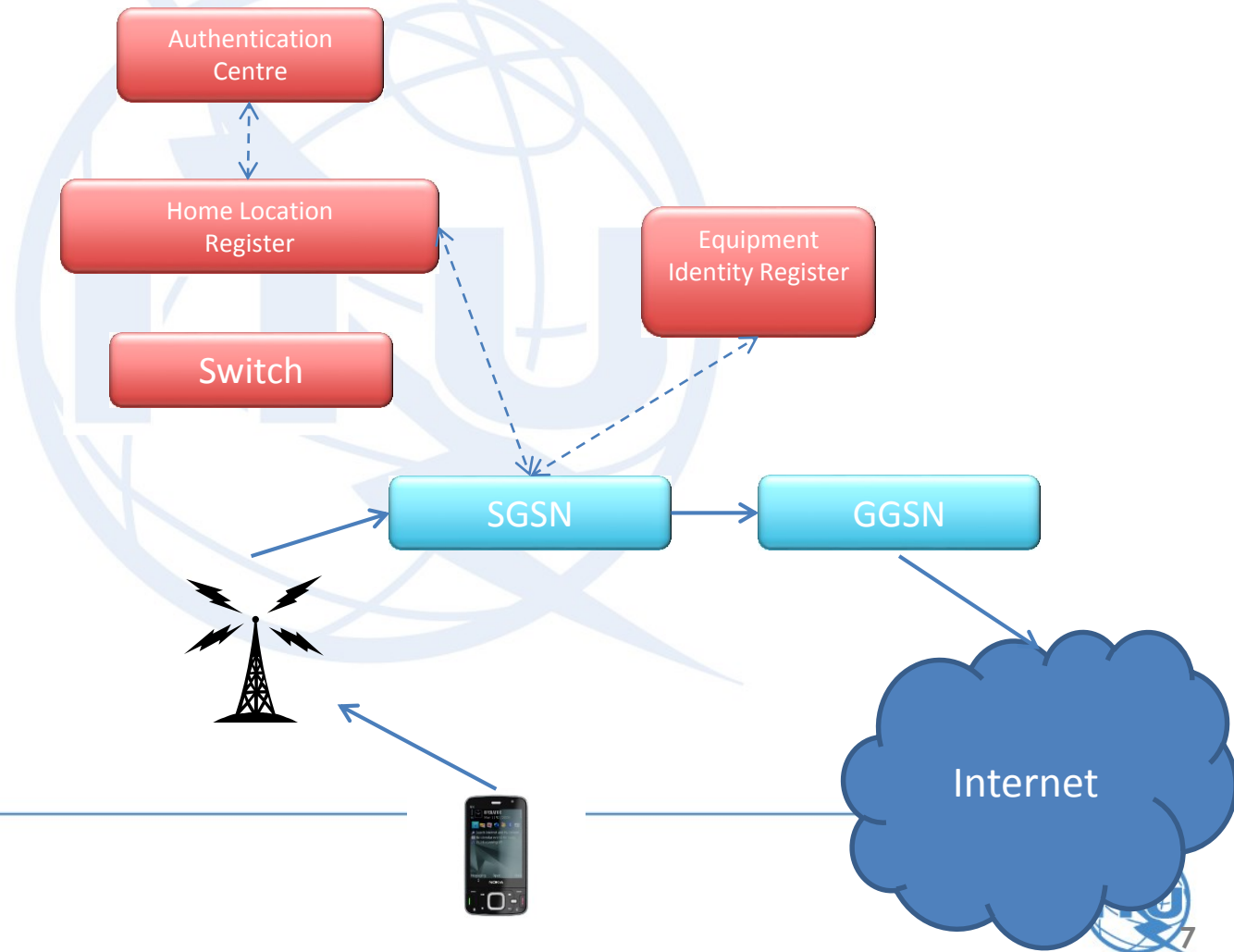
GPRS Roaming eXchange

GPRS Roaming - Dataflow

VPMN

HPMN

Internet

IP-Backbone

APN Operator ID = MNC001.MCC228.GPRS

BG

BG

SGSN

GGSN

(123.456.789.012)
PDP Context IP address assigned to the handset

APN NI + OP ID

IP Address HGGSN

DNS

DNS

APN NI + OP ID

ROOT DNS

APN Network Identifier = INTERNET.SWISSCOM.CH
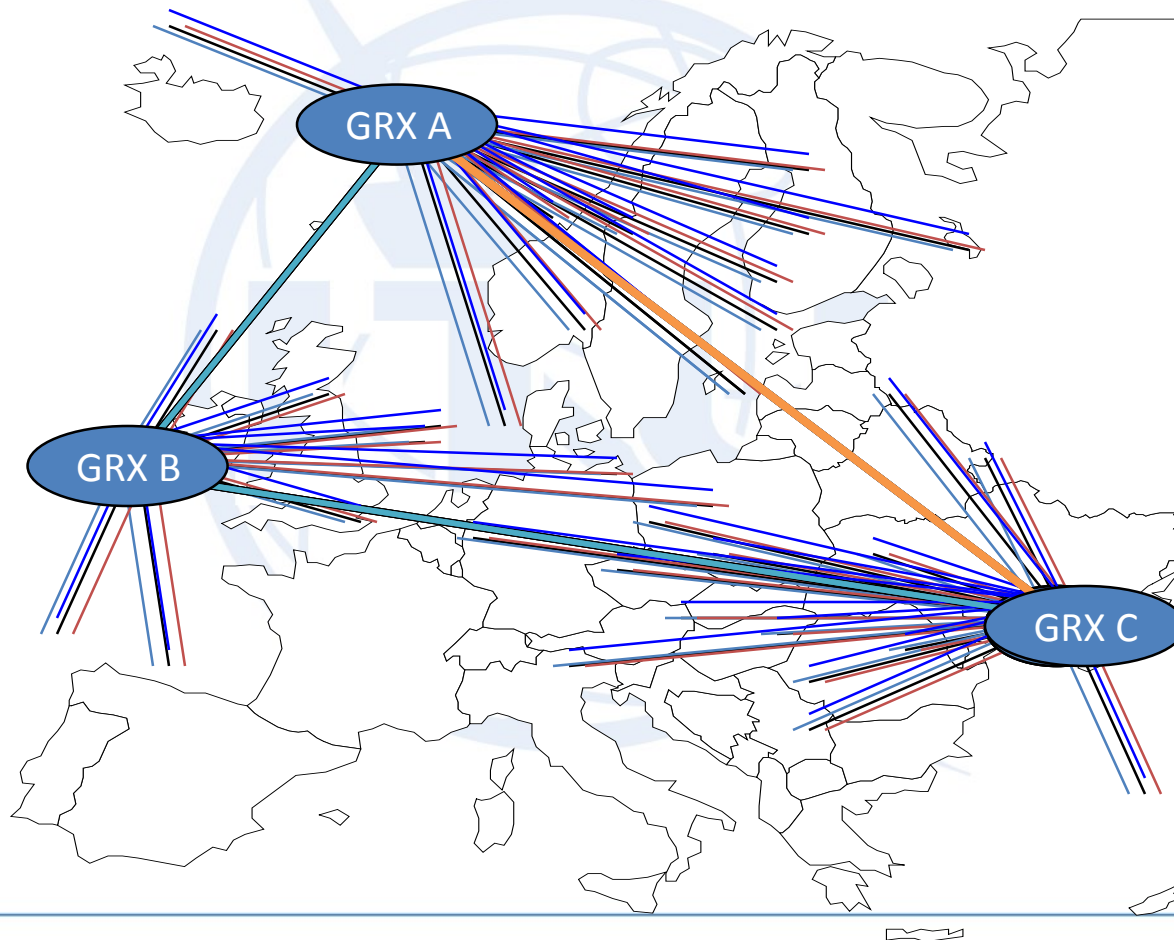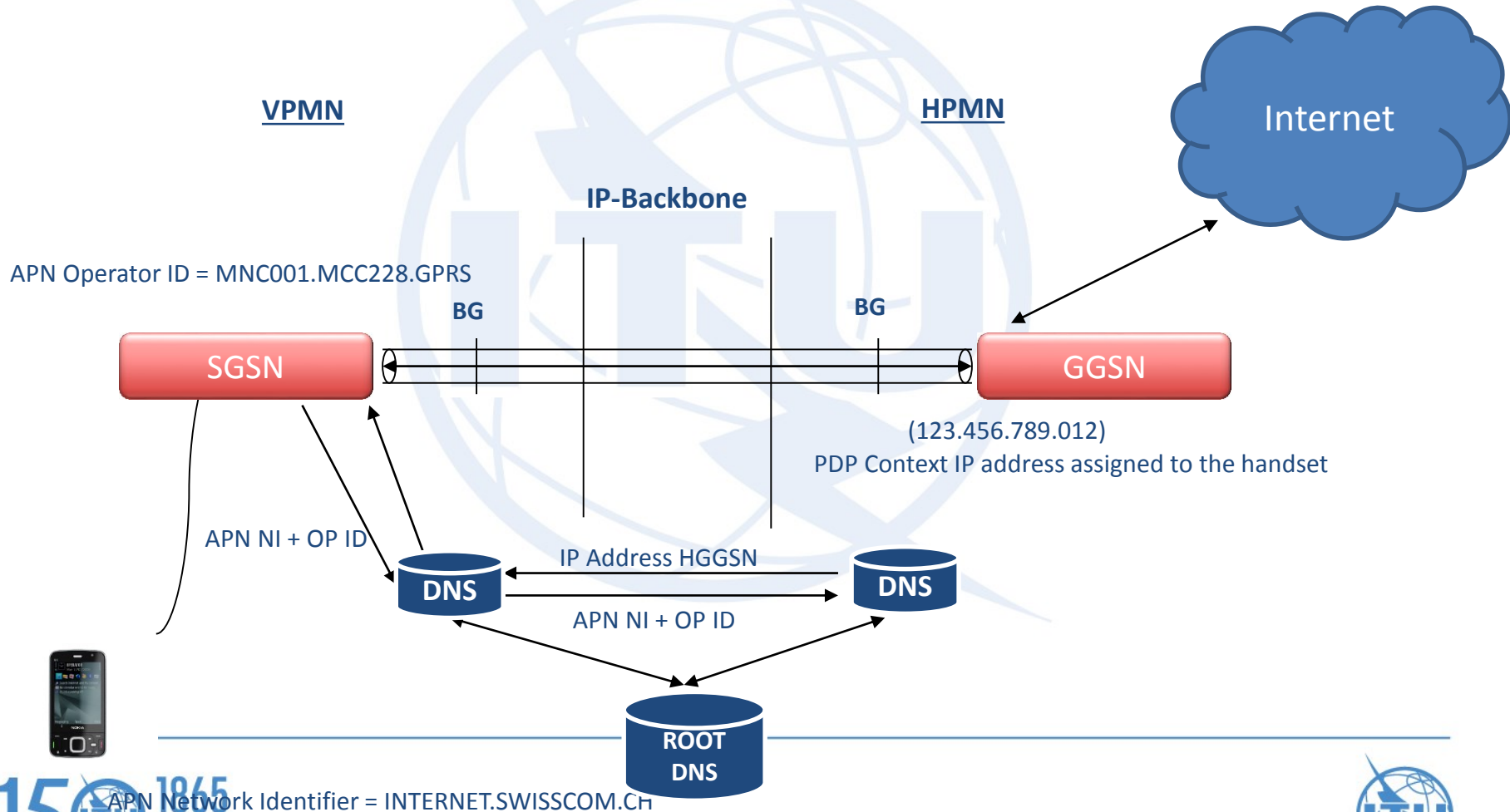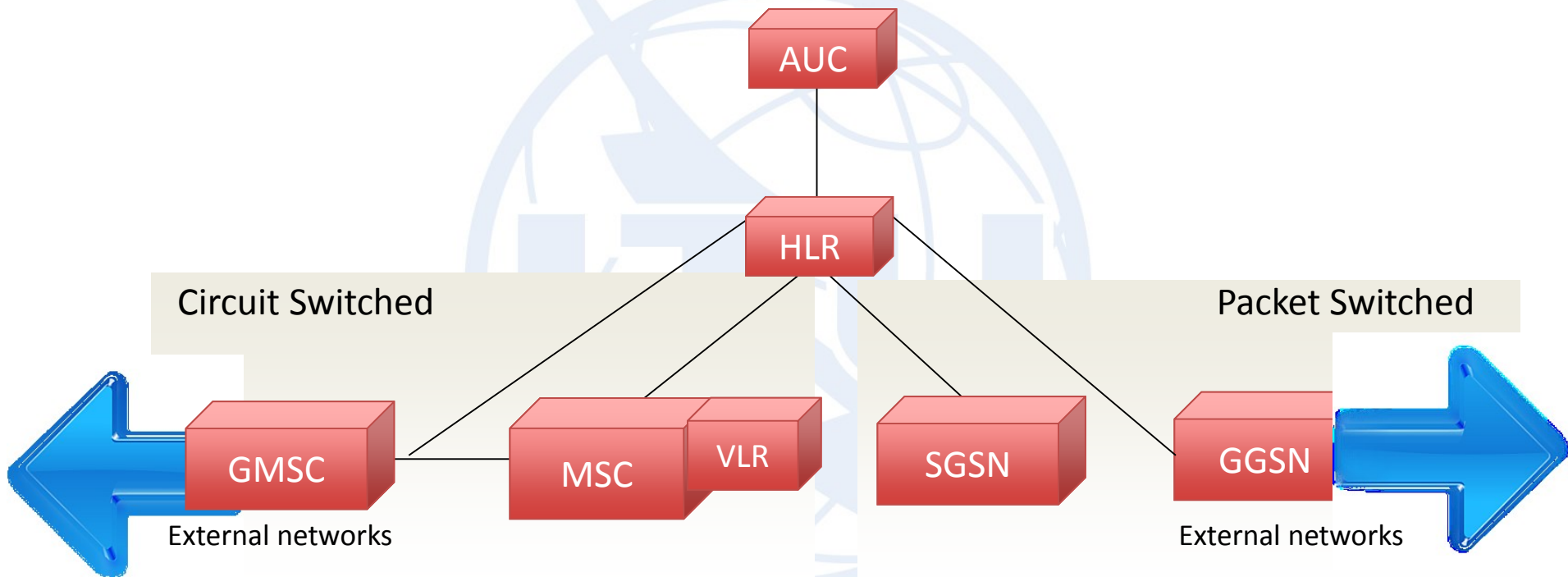
UMTS

- UMTS: Universal Mobile Telecommunication System

- 3rd Generation GSM network

- Higher download & upload speed

- Core network structure nearly identical with 2G GSM networks

Network Architecture: Core

AUC

HLR

Circuit Switched

Packet Switched

GMSC

MSC VLR

SGSN

GGSN

External networks

External networks
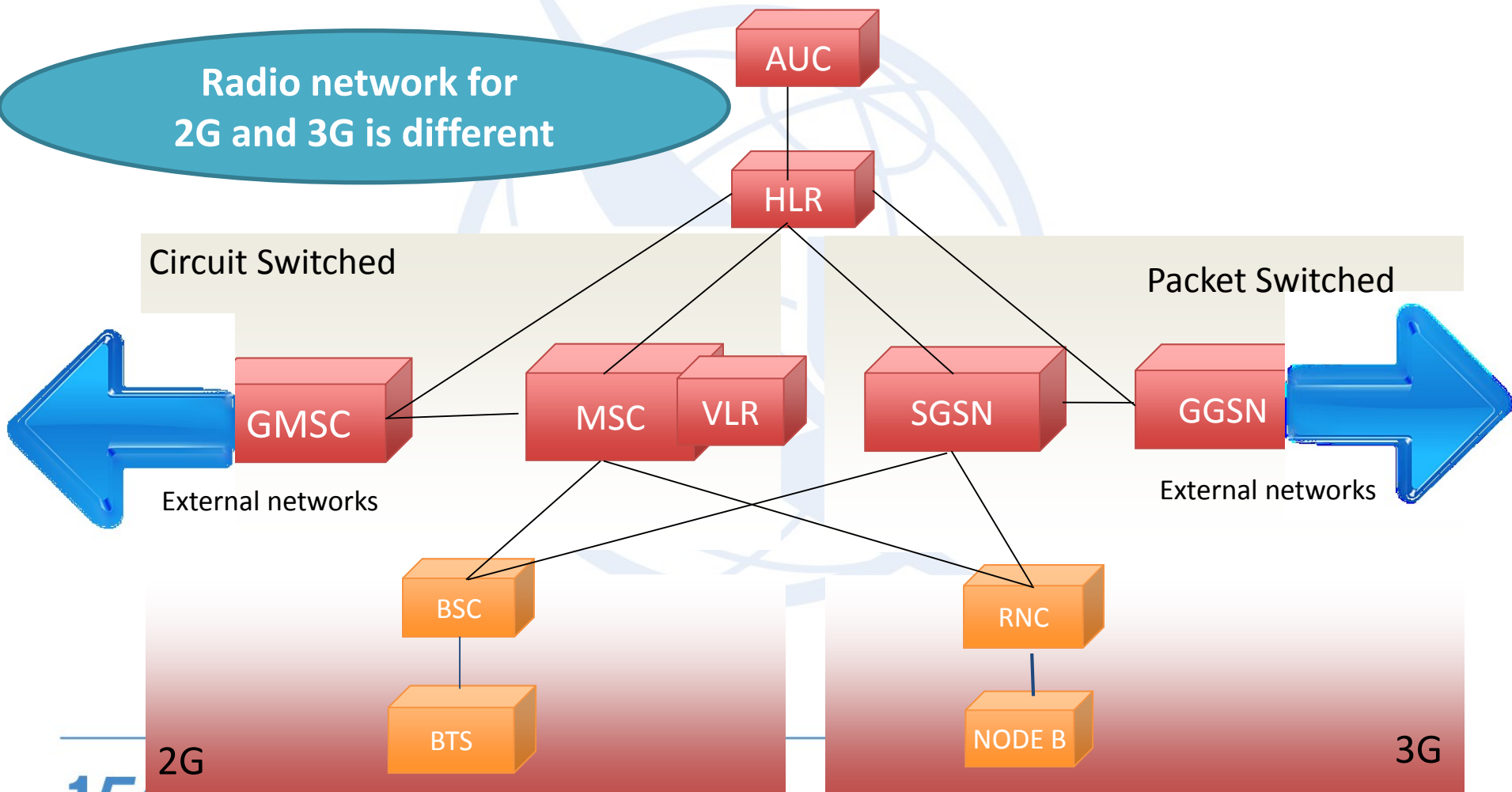
Basic core network elements
identical to 2G

Network Architecture: Core + Radio

Radio network for 2G and 3G is different

AUC

HLR

Circuit Switched

Packet Switched

GMSC

MSC VLR

SGSN

GGSN

External networks

External networks

BSC

RNC

BTS

NODE B

2G

3G

What is LTE?

- A standard for wireless communication of high-speed data for mobile phones and data terminals

- Pure packet based networks without traditional voice circuit capabilities

- Voice services are provided via VoIP

- Support for inter-operation and co-existence with legacy standards (e.g. GSM/EDGE and UMTS)

Mobile data roaming is expected to be the next big opportunity and generate approximately $50 bn in revenues by 2019*

*Ovum

13

What speed are we talking about?

422 LTE Networks in 143 Countries

422 LTE networks commercially launched in 143 countries

- **638 operator commitments in 181 countries** *(of which 422 networks are launched)*
- *106 LTE networks commercially launched in the past year*
- *Latest territories where LTE service is launched: Bonaire, Guernsey, Laos, Malawi, Morocco*
- **635 million LTE subscriptions worldwide: Q1 2015**

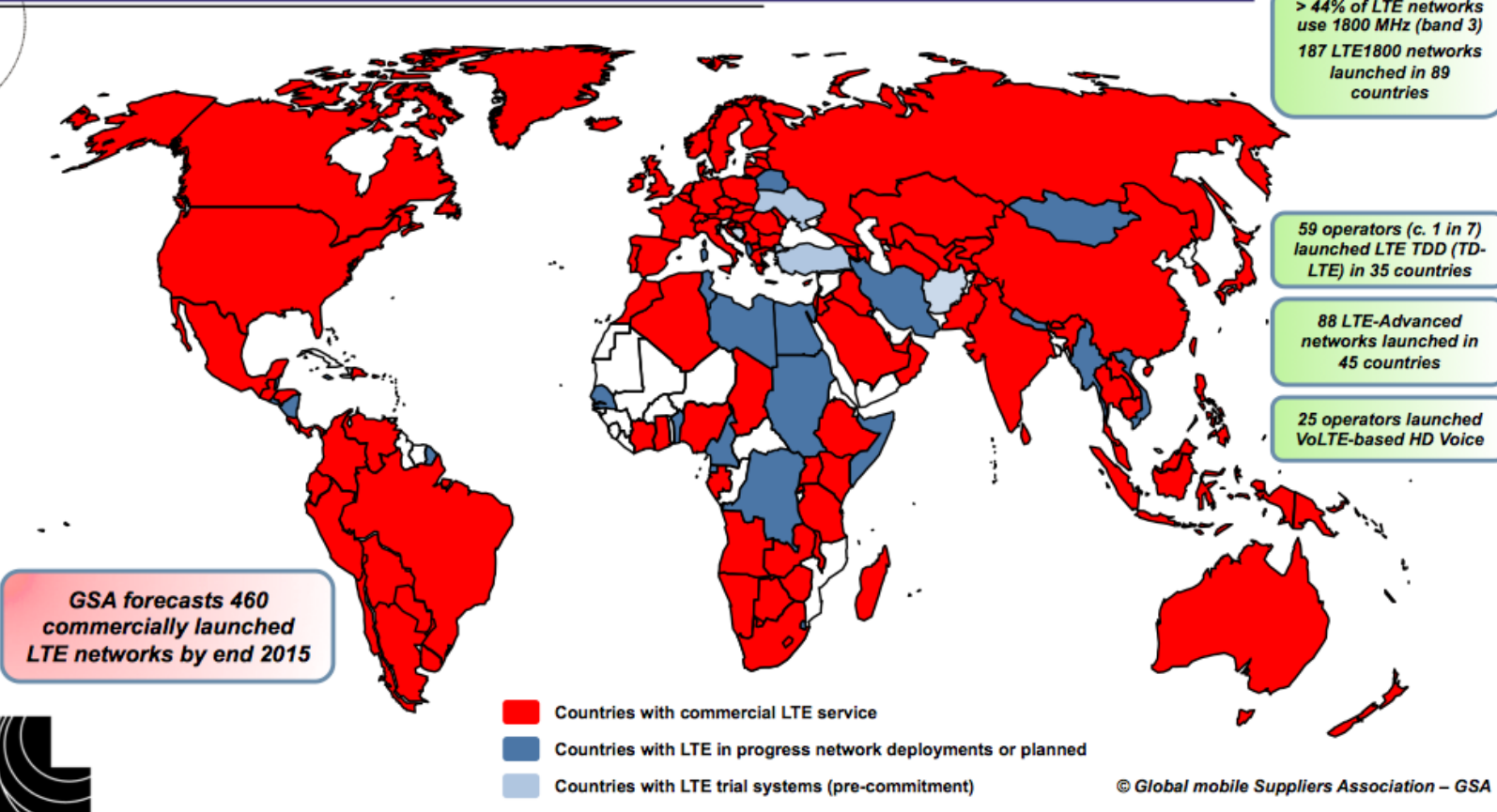*(Source of data: GSA's Evolution to LTE report: 21 July 2015)*

GSA
www.gsacom.com

> 44% of LTE networks use 1800 MHz (band 3)
187 LTE1800 networks launched in 89 countries

59 operators (c. 1 in 7) launched LTE TDD (TD-LTE) in 35 countries

88 LTE-Advanced networks launched in 45 countries

25 operators launched VoLTE-based HD Voice

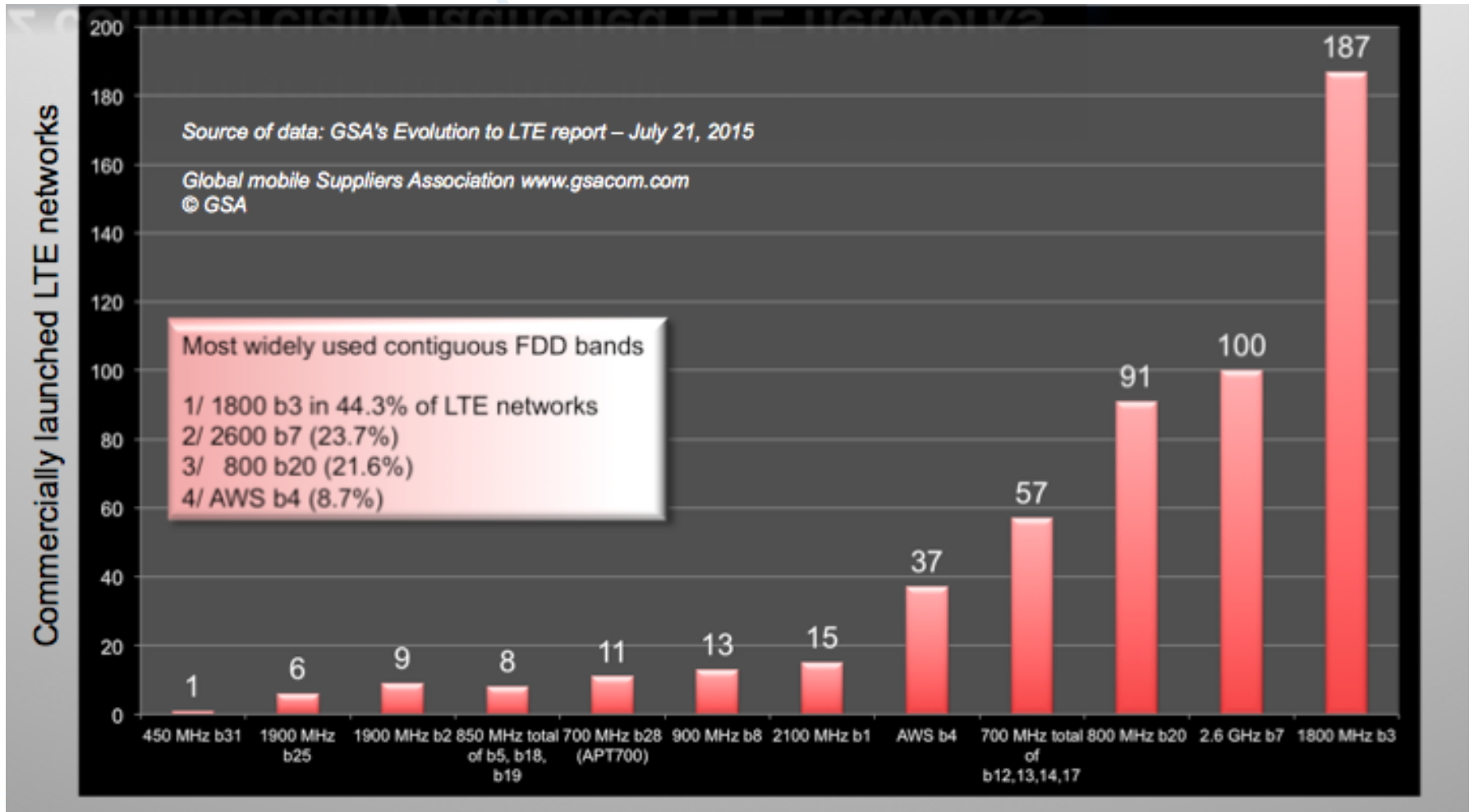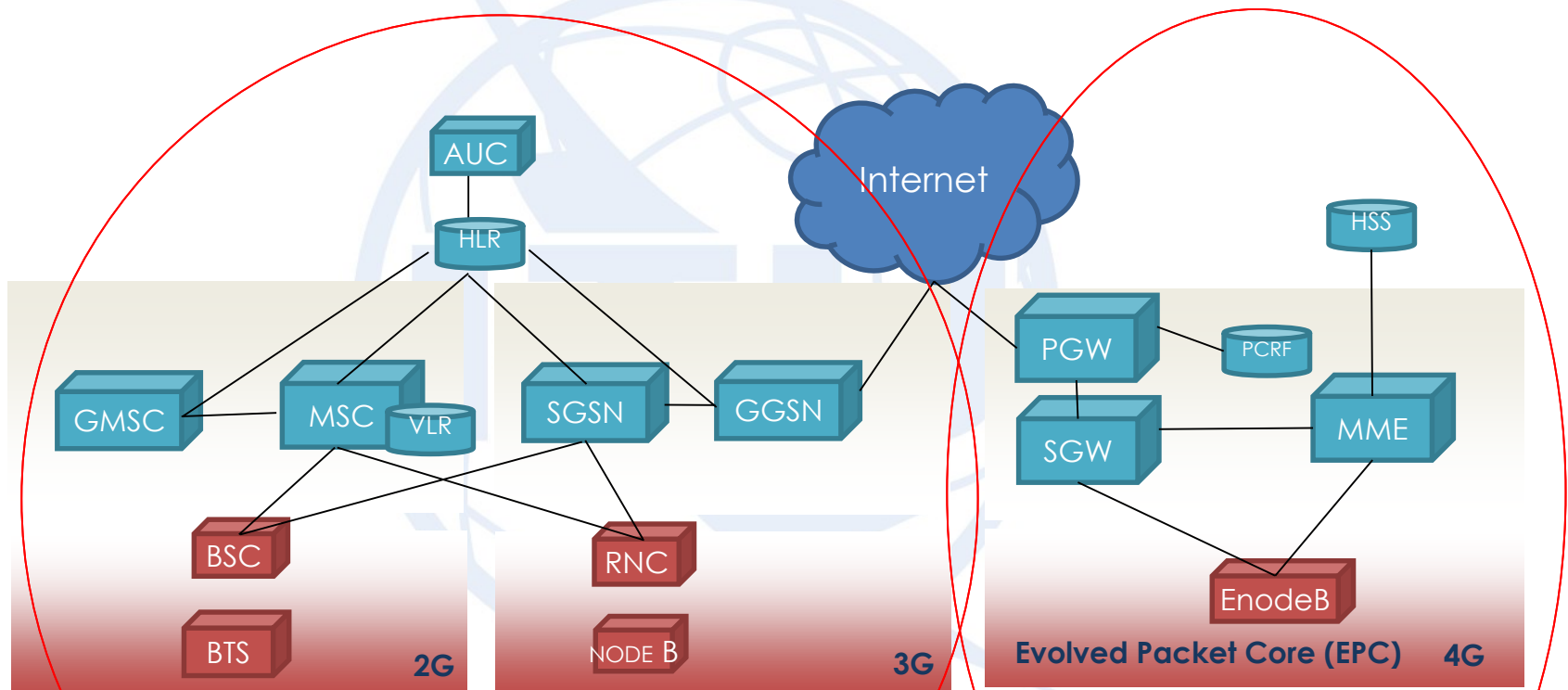*GSA forecasts 460 commercially launched LTE networks by end 2015*

Countries with commercial LTE service
Countries with LTE in progress network deployments or planned
Countries with LTE trial systems (pre-commitment)

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Spectum Used in LTE Deployments

Commercially launched LTE networks

Source of data: GSA's Evolution to LTE report – July 21, 2015

Global mobile Suppliers Association www.gsacom.com
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Most widely used contiguous FDD bands

1/ 1800 b3 in 44.3% of LTE networks
2/ 2600 b7 (23.7%)
3/   800 b20 (21.6%)
4/ AWS b4 (8.7%)

Band	Value
450 MHz b31	1
1900 MHz b25	6
1900 MHz b2	9
850 MHz total of b5, b18, b19	8
700 MHz b28 (APT700)	11
900 MHz b8	13
2100 MHz b1	15
AWS b4	37
700 MHz total of b12,13,14,17	57
800 MHz b20	91
2.6 GHz b7	100
1800 MHz b3	187

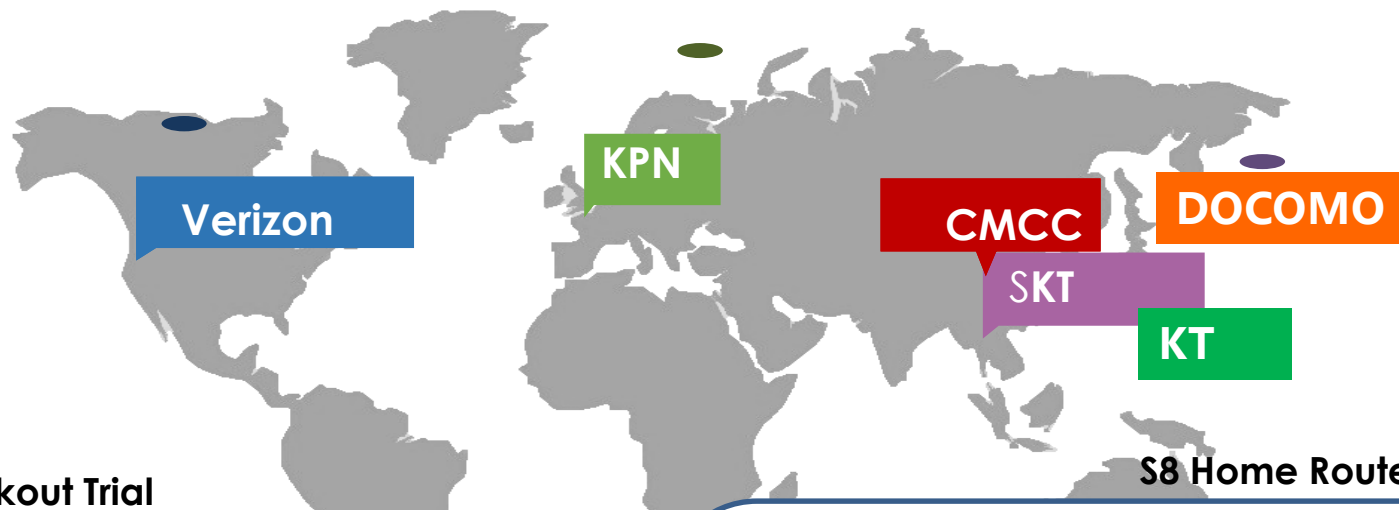# Comparison 2G/3G/4G - Radio Access + Core Network

LTE Roaming

- LTE Roaming today is mainly for mobile data services only (voice is mostly delivered over 2G/3G networks through Circuit Switched Fall-back mechanisms)

- However...first tests of VoLTE Roaming have been successfully performed

VoLTE Roaming Trial Results

Verizon **KPN** **CMCC** **SKT** **DOCOMO** **KT**

Local Breakout Trial

- Trial Results(only voice call tested) – China Mobile and KPN
- Call success rate: 100%; Call setup time: 4.1-5.4s (4.7s for average).
- Video call test and mouth-to-earn delay measurement will be carried out later.

Key Parameters	China Mobile - KPN	China Moible - SKT
Call Setup Time	On Going	On Going
POLQA	On Going	On Going
Mouth-to-Ear Delay		

S8 Home Routed (S8HR) Trial

- Great voice/video quality (call set up time, media delay, POLQA), better than legacy 3G (CS domain) voice roaming
- Fast "time-to-market" that the technology (network and device) can be ready within 2 months – on top of existing LTE data roaming framework.

Key Parameters	KT – DOCOMO	DOCOMO -KT	Verizon – DOCOMO	DOCOMO - Verizon	DOCOMO - China Mobile
Call Setup Time	2.1sec	3.3sec	5 sec (3G call is 8 sec)	4.0 sec (3G is 7 sec)	3
POLQA	3.6	3.5		3.5	3.4
Mouth-to-Ear Delay			598ms (3G call is 813ms)	522ms (3G is 893ms)	

Protecting & Empowering Subscribers

Purchasing a mobile subscription

- Subscribers choose a mobile subscription on the basis of the national package (prices, bundle)

- Service providers do not use roaming prices to attract new customers

- Some operators ask subscribers to request the roaming option before travelling

Options available to Regulators to lower roaming pricing, given by the ITU:

- To take regulatory action in the national market to reduce wholesale and retail prices, impose obligations on national mobile operators toward subscribers and to develop competition;

- Protect and empower subscribers to help them manage their usage of mobile services when abroad and to ensure that they have full information;

- To ensure that there are no obstacles in the market so that any opportunities to create competition are maximised;

- To initiate and engage in bilateral/ multilateral actions in order to develop an open and competitive international mobile roaming service market.

Simple steps to regulators to provide information to users to manage use of communication services while roaming:

- Transparency of retail roaming charges

- Information requirements to diminish chance of "bill shock'

Transparency of retail roaming charges

- A link on the mail page of the service provider

- Transparent information on roaming retail rates and structure

- Receive a welcoming SMS with price information

- Clear dispute resolution procedure

Information requirements to diminish chance of "bill shock"

- Information about data consumption of various activities

Device type	Email without attachment	Email with attachment	App or game	4 minute song	Web page
BlackBerry	2 KB	200 KB	440 KB	4 MB	70 KB
Smartphone	20 KB	300 KB	4 MB	4 MB	180 KB
Mobile Internet	35 KB	600 KB	20 MB	4 MB	250 KB

Source: Derived from www.sasktel.com/datacalculator/

- Provide information on risk of automatic data downloads and how to switch off mobile broadband while roaming

- A predetermined could be set and should be informed when reaching this level

- Protection measures for roaming in border areas

In conclusion – Protecting & Empowering Subscribers

Since the transformation of telecommunication markets beginning in the mid-1990s telecommunication users have benefited significantly from competition through lower prices, more choice, better quality of services and a significant increase in service innovation. At the same time the pace of change in communication technologies and services can make it difficult for users to master all the products and the complexity of pricing plans. Regulators and service providers need to provide the support to help users, in particular consumers, in meeting the challenges of new technologies and services.

Conclusion

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THANK YOU

Open Discussion