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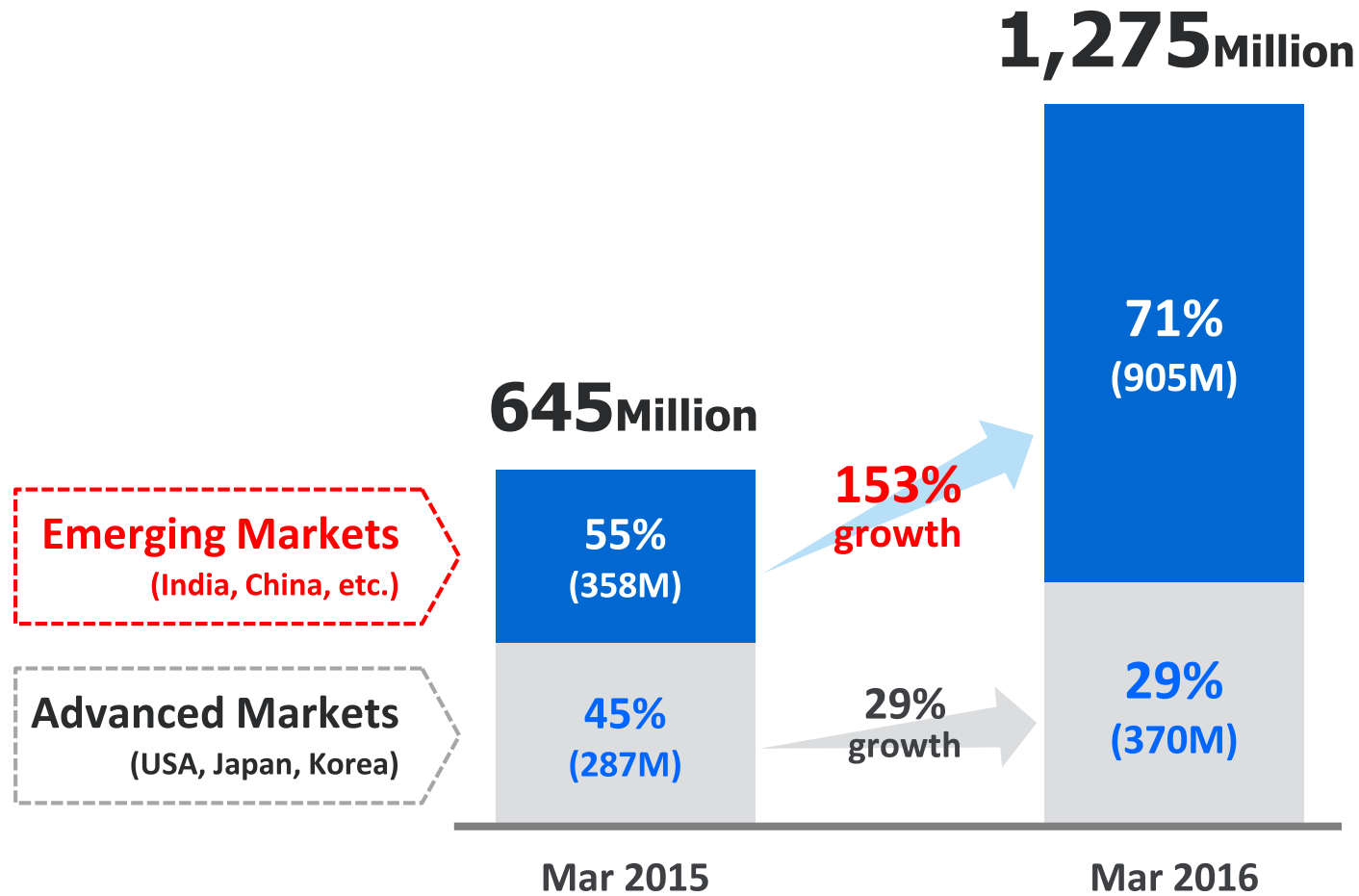
Global LTE trend & its evolution

8 June, 2016

EK Hong (hongek@samsung.com)

01_ **LTE Market Status**

✓ Number of LTE Subscribers

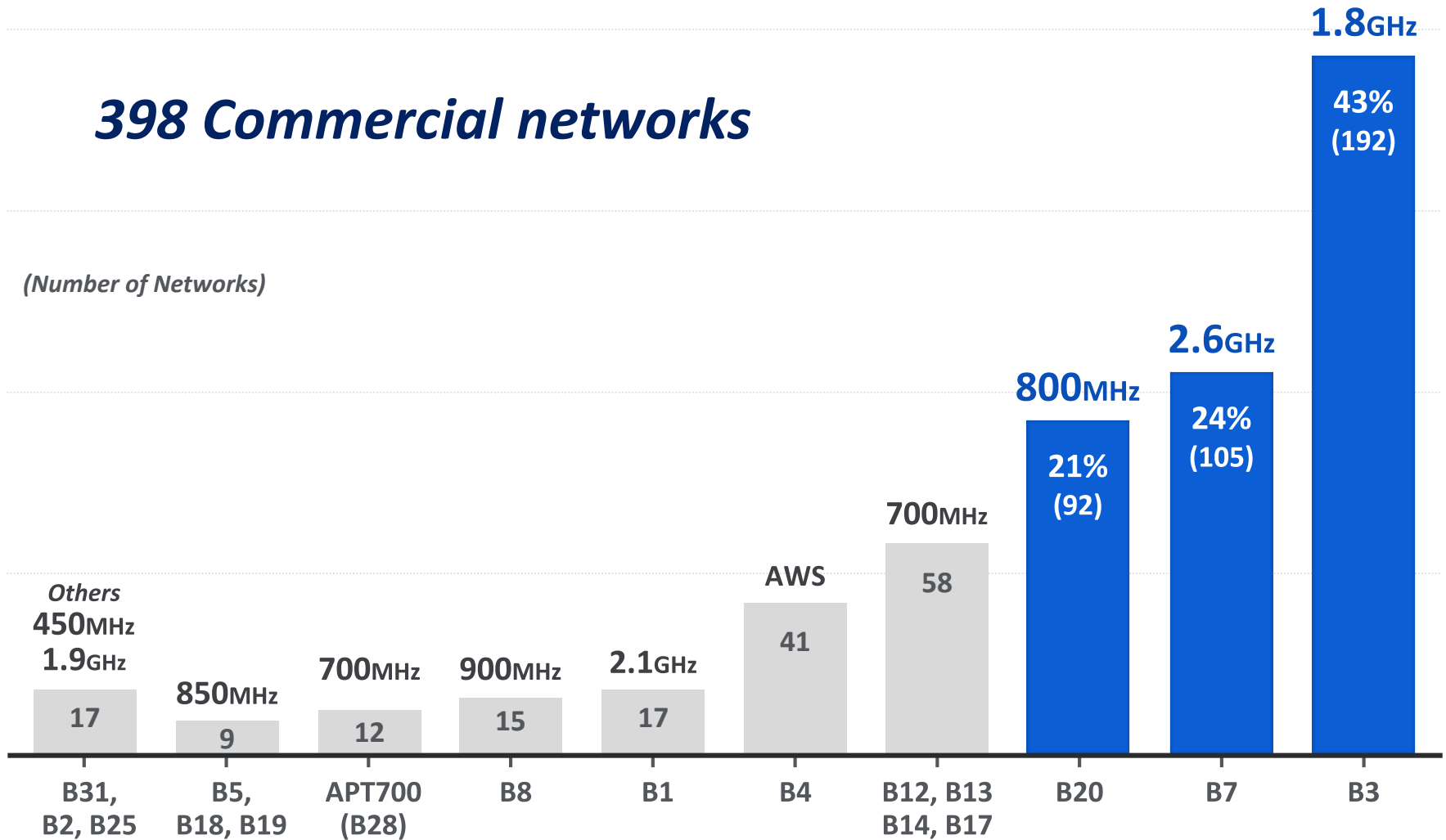


Global LTE Frequency bands

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398 Commercial networks

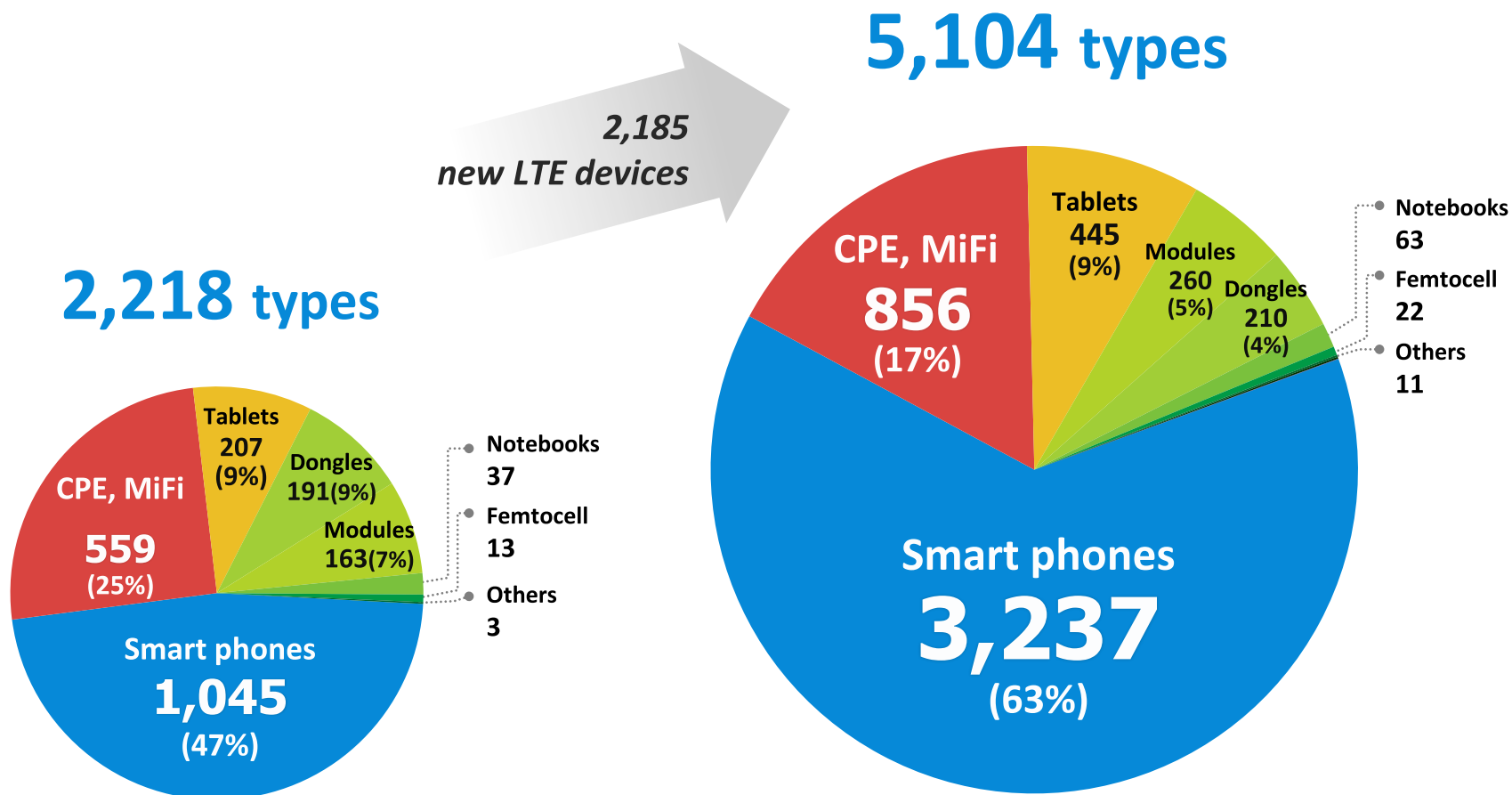
(Number of Networks)



(Source : GSA, October 2015)

LTE Device Ecosystem

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(Source : GSA, April 2016)

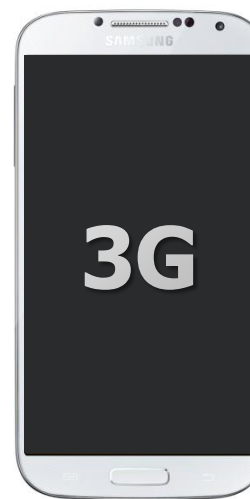
2015 Global Smartphone Sales

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57%

849M unit



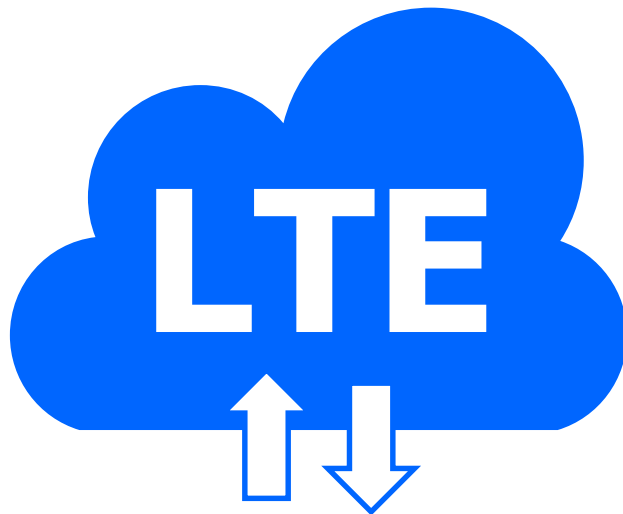
40%

583M unit

(Source : Strategy Analytics, Jul 2015)

2015 Global Mobile Data Traffic

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58%

37,906 Petabytes



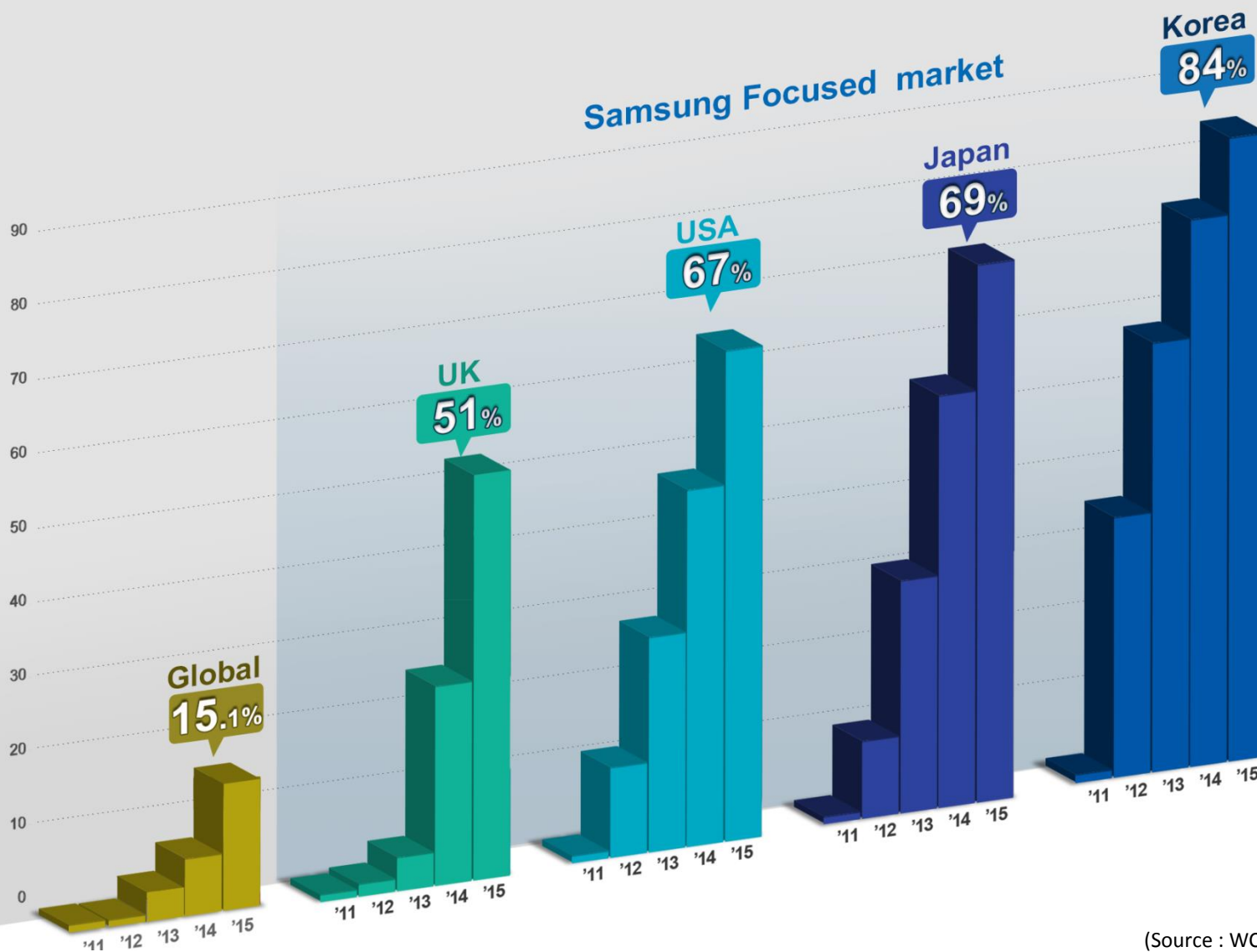
38%

25,094 Petabytes

(Source : ABI Research, Q2 2015)

Global LTE Penetration

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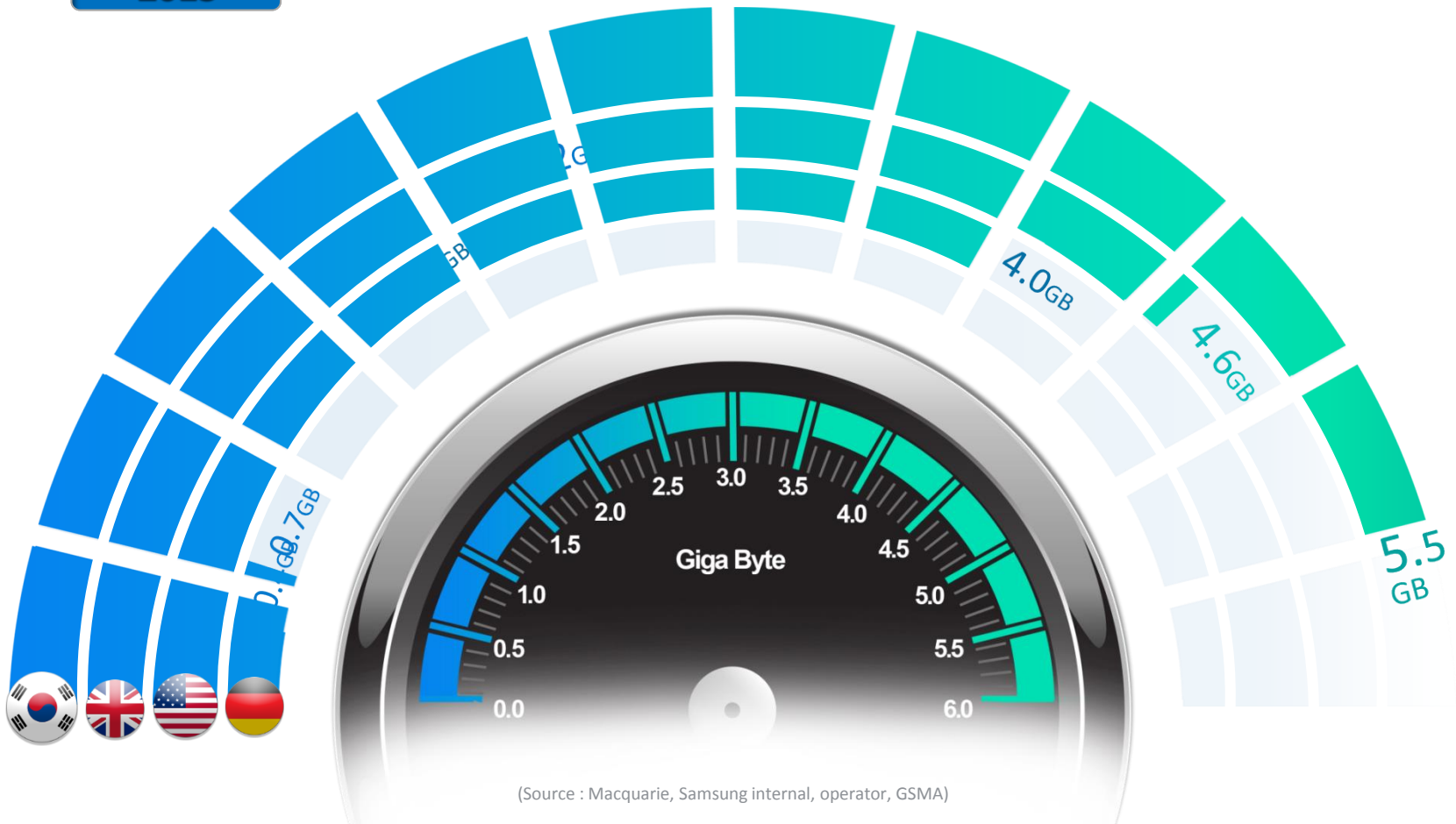
(Source : WCIS, Mar 2016)

LTE Data Traffic Growth

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Monthly LTE data traffic per user

▶ 2015

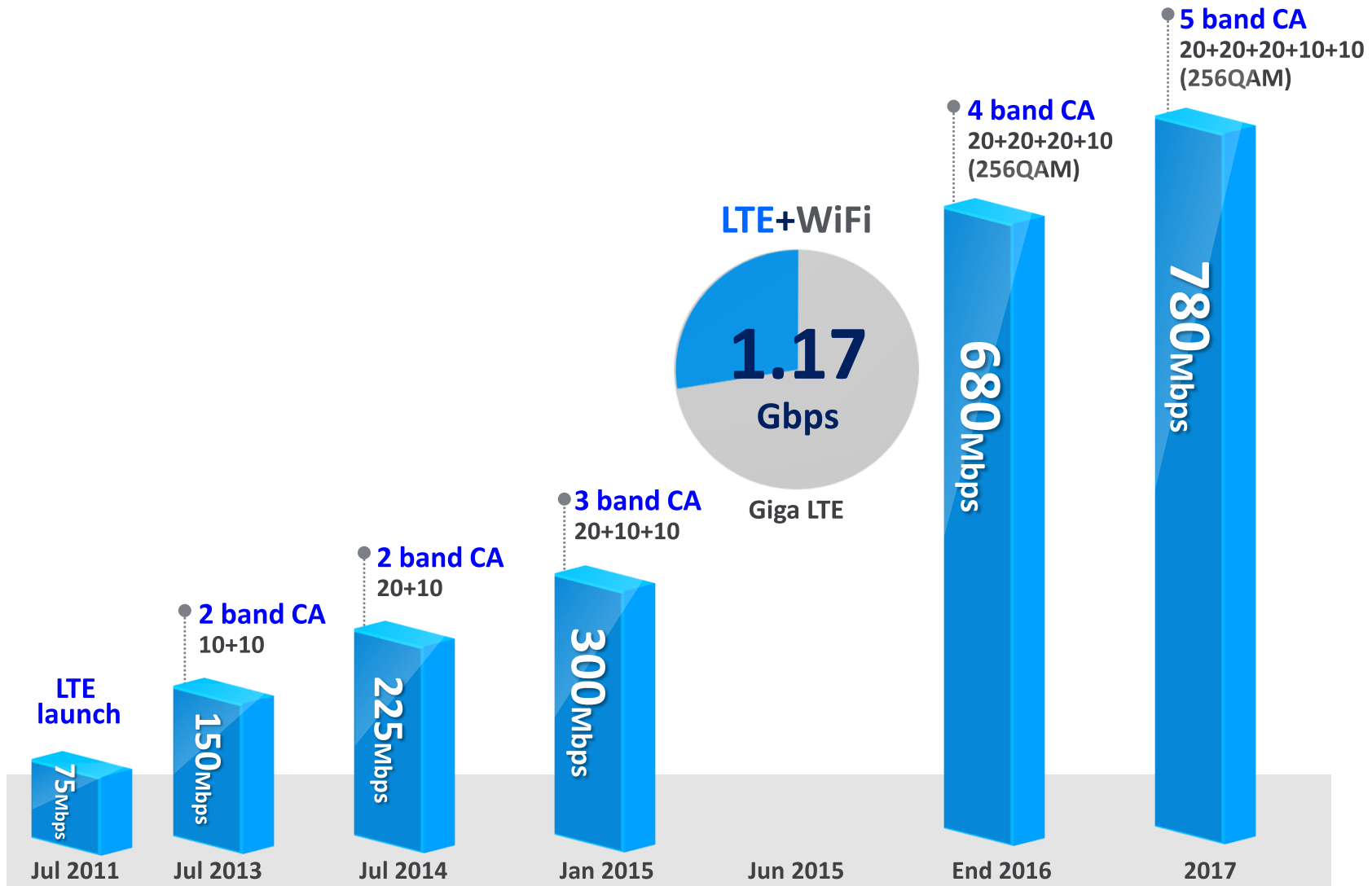


(Source : Macquarie, Samsung internal, operator, GSMA)

(Source : Macquarie, Samsung internal, operator, Dec 2015)

LTE Speed Enhancement

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VoLTE Usage Status

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✓ VoLTE active user



Korea

43%

(18/42 Million)

(Dec 2015)



AT&T

31%

(27/87 Million)

(Dec 2015)



NTT Docomo

29%

(10/34 Million)

(Sep 2015)



3UK

33%

(10/34 Million)

(Dec 2015)

✓ VoLTE only phone status

Korea

94 Types
(Since July 2013)

USA

Verizon will offer
LTE-only phones in 2016

Japan

KDDI 18 Types
(Since Dec 2014)

(Source : Samsung internal, PR)

✓ VoLTE active user

- **Korea: 43%** (18/42 Million) , **USA: 31%** (AT&T, 27/87 Million) , **Japan 29%** (Docomo, 10/34 Million)

✓ World's 1st VoLTE Interworking

- **Korea, November 2015** (Interwork among all three operators)

✓ World's 1st VoLTE International Roaming

- **Korea & Japan, April 2015**

✓ World's Largest VoLTE Only Network

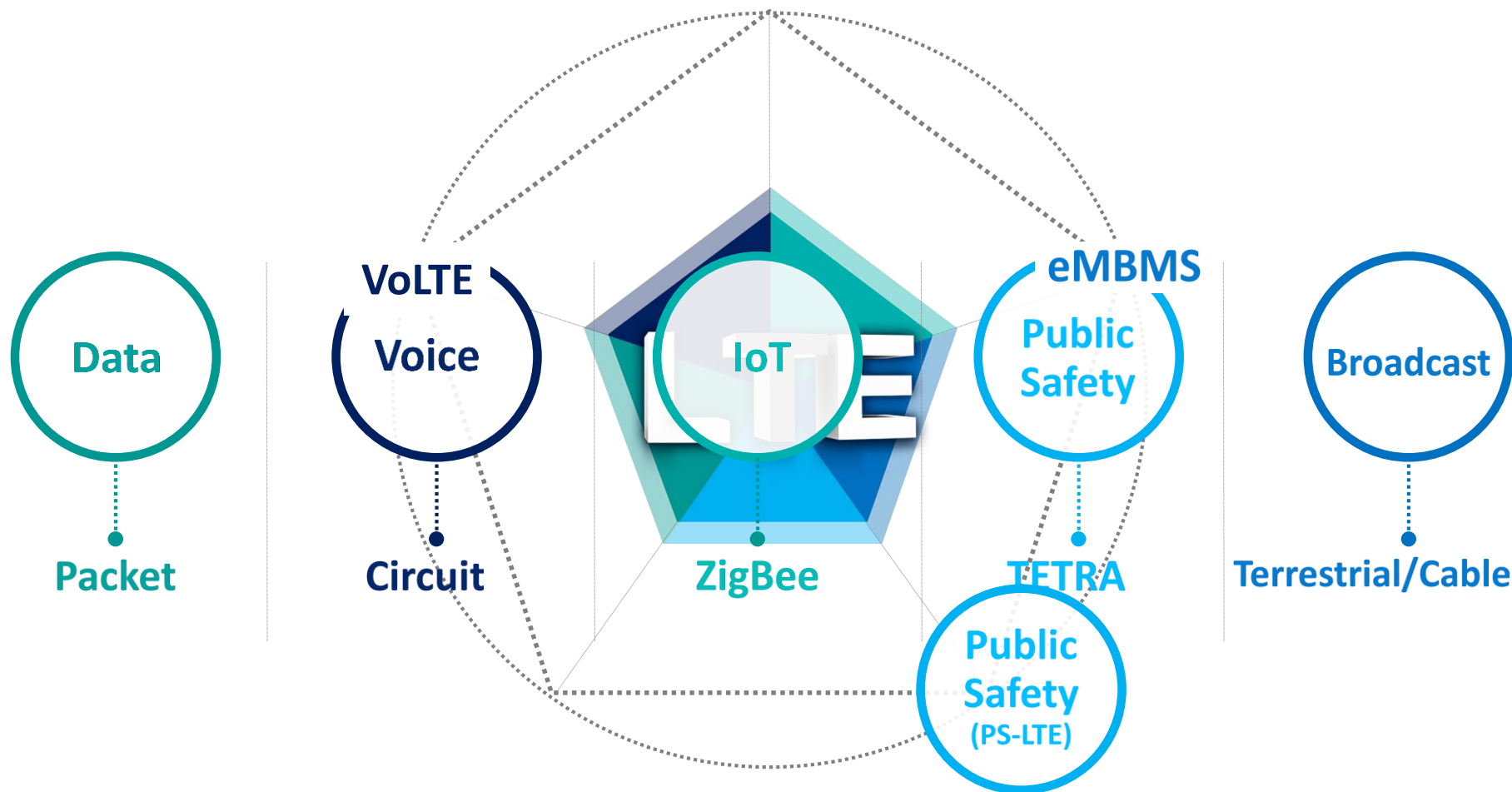
- **India, Q2 2016** (Nationwide LTE only network - No circuit voice fallback)

✓ VoMA (VoLTE Monitoring and Analysis) Tool Management

- Analyze end user's VoLTE experience including over the air
- **Muting, Loss, Jitter Analysis, Identify the location of problems** (Downlink Air Interface, Uplink Air interface from B/H)

All Services over LTE Platform

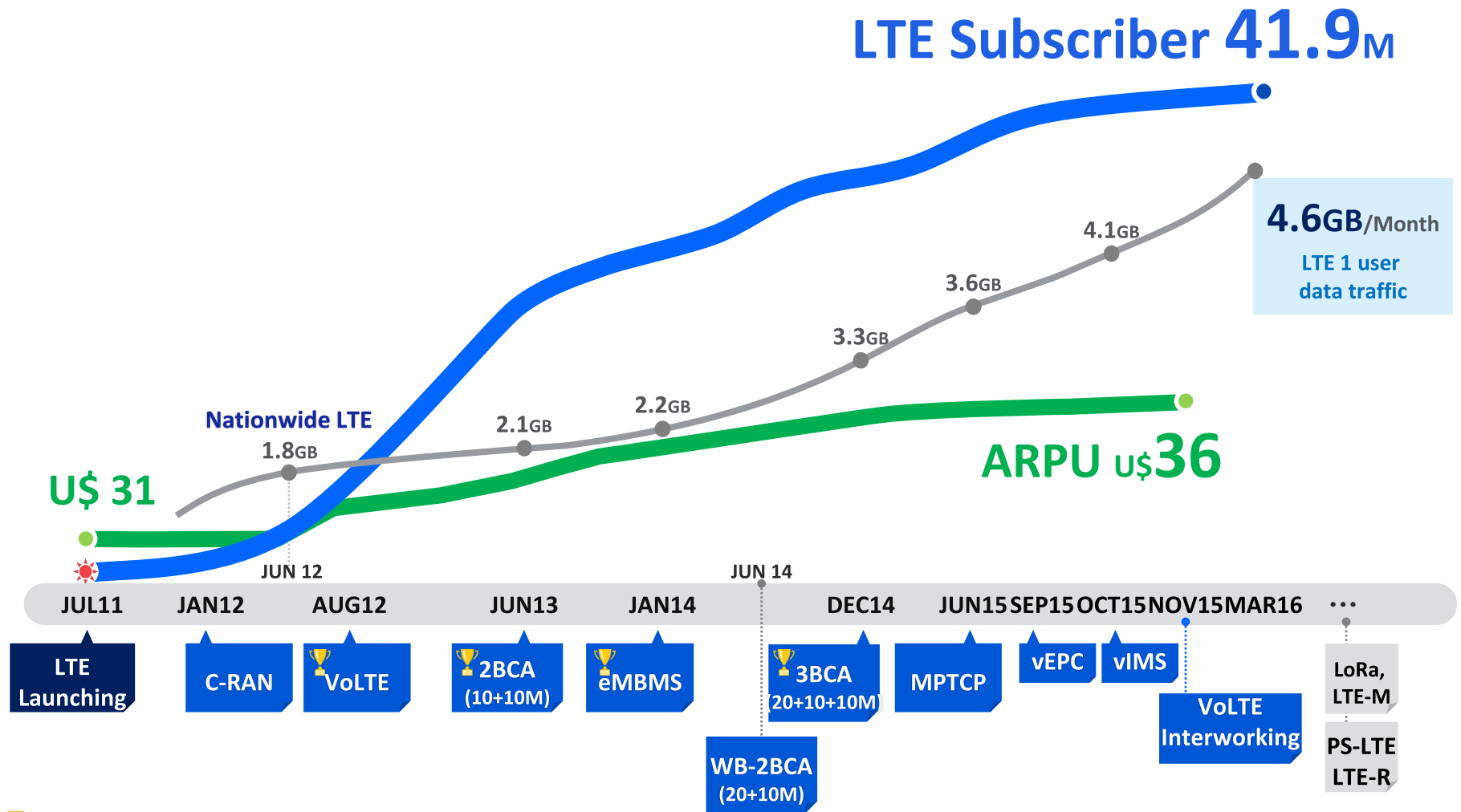
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02_LTE evolution in Korea

LTE Expansion in Korea

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Samsung World's 1st

(Source : Operator IR, Korean Government May 2016)

VoLTE is a Basic Voice Call in Korea & Japan SAMSUNG

VoLTE Roaming

(2015)



VoLTE Interworking

(Nov 2015)

18M Active User

(43% of LTE Users, Dec 2015)



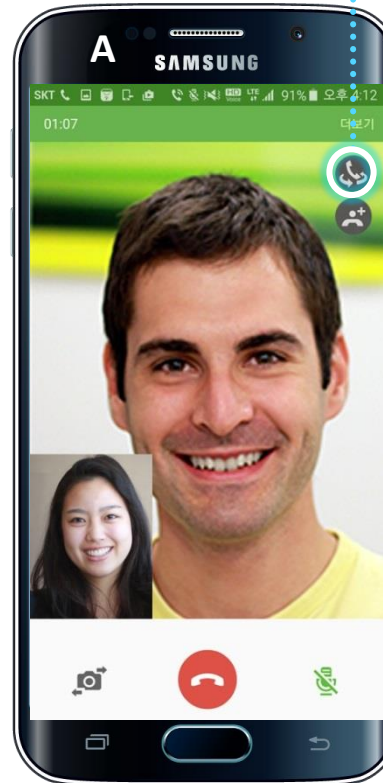
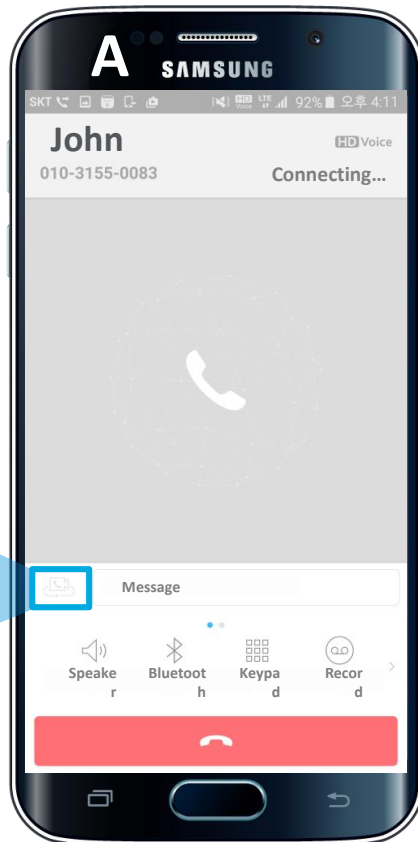
Unlimited LTE Data & VoLTE \$20/Day

Unlimited VoLTE \$10/Day

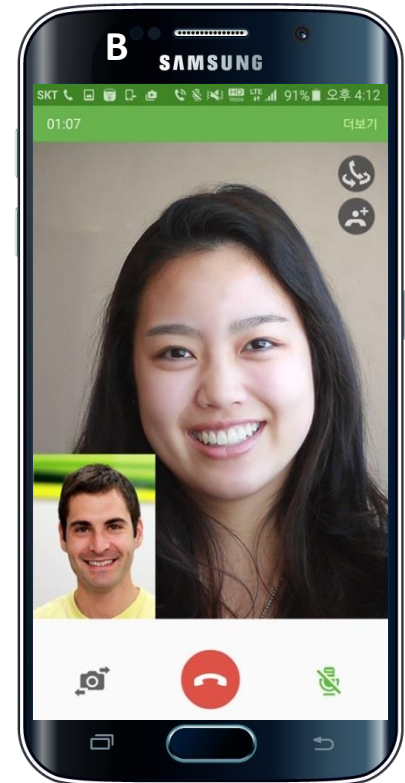


- Switch to Video Call

Click to switch
to **video call**



End video call and switch to voice call



- Multimedia sharing during video call

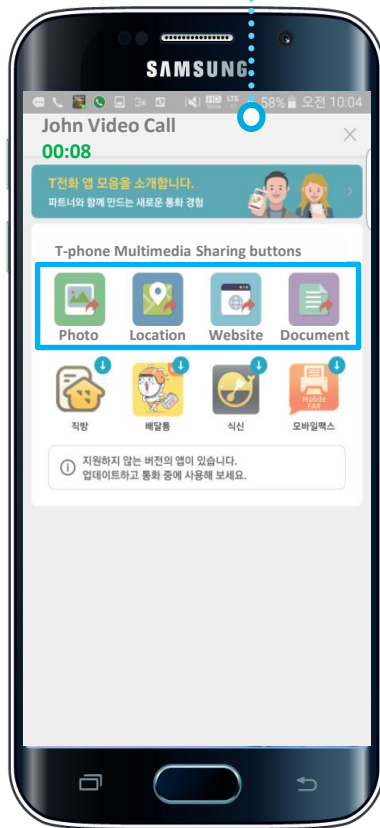
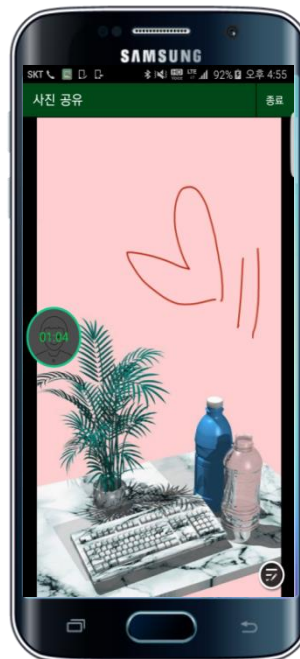


Photo sharing

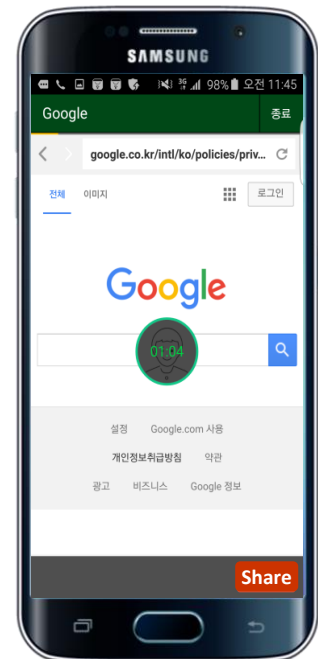


Possible to edit and draw in the shared photo

Location sharing



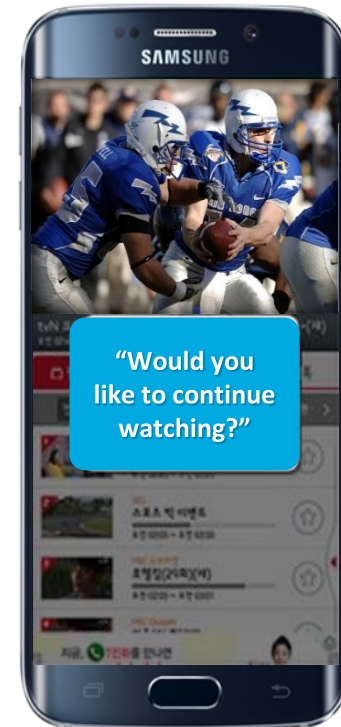
Website sharing



- Continue watching VoD outside home (Since Jul 2013)



Home IPTV



Mobile IPTV

eMBMS (LTE Broadcasting) in Korea

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Big Events



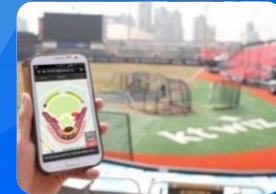
- Pope Visit (Aug '14)
- Asian Games (Oct '14)

Subway



- Seoul #2 ~ #9 line
- Busan #1 ~ #4 line

Stadium



- 6 Stadiums
Suwon, Seoul (Jamsil /Mokdong),
Incheon, Daegu, Masan



1 Channel

0 H

News

5 H



Sports
(MLB)

News

18 H



Sports
(KT Baseball)

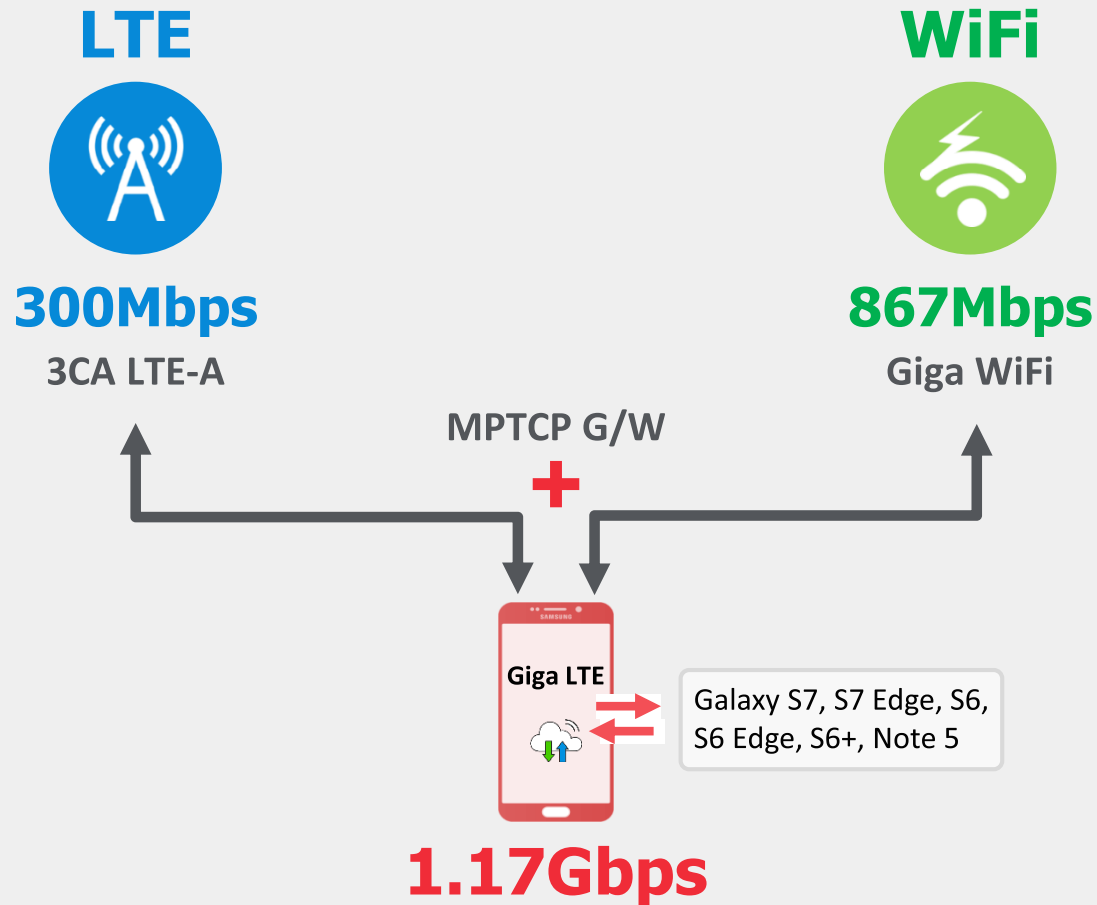
24H

News

MPTCP (Multi-Path TCP) in Korea

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- ✓ Commercial Service in Korea (Operator B, Jun 2015~)



Private-LTE Service in Korea

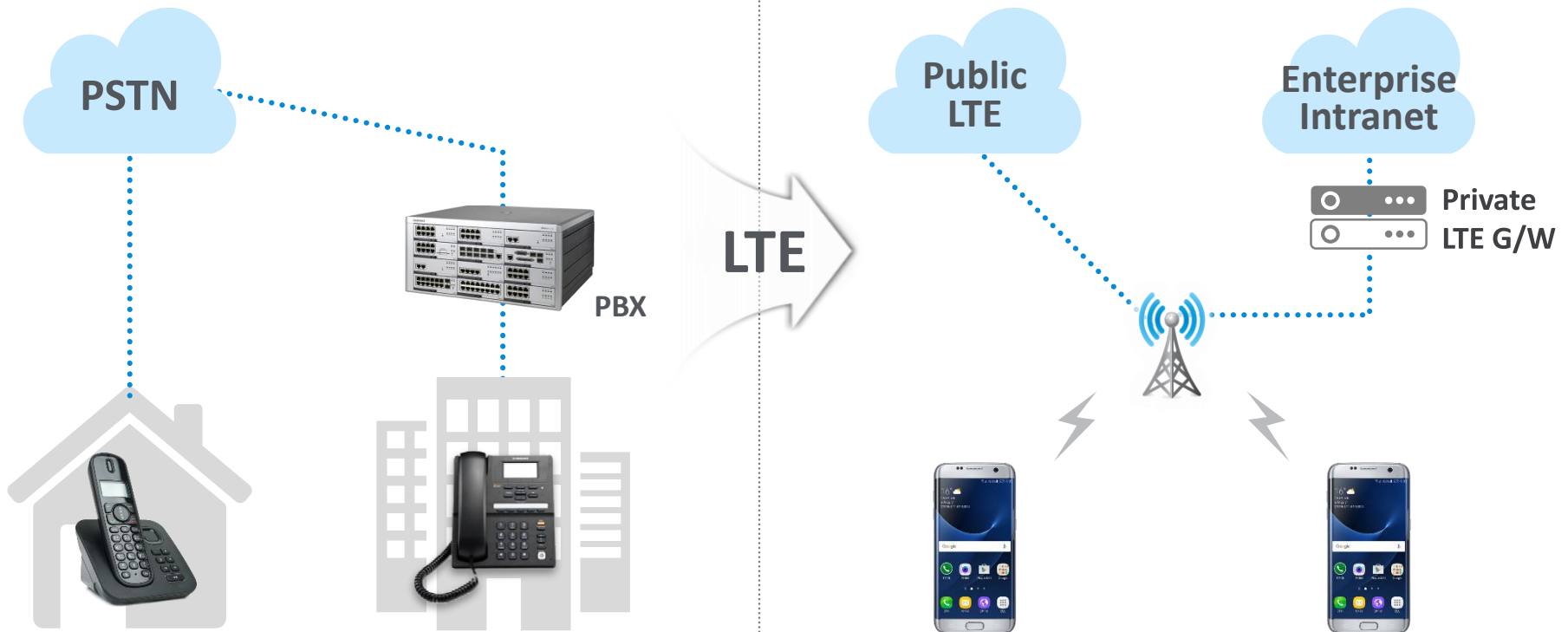
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Public Phone

Enterprise Phone

Public LTE

Enterprise LTE



LTE-M

(Jun 2016)

- Rel.8/12/13
- +15dB than LTE (<15km)
- 1Mbps

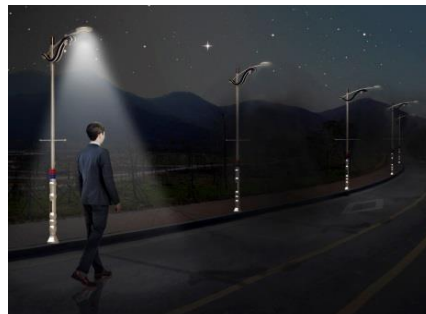
NB-IoT

(2017)

- Rel.13
- + 21dB than LTE (<22km)
- 200kbps



Tracing Public bicycle



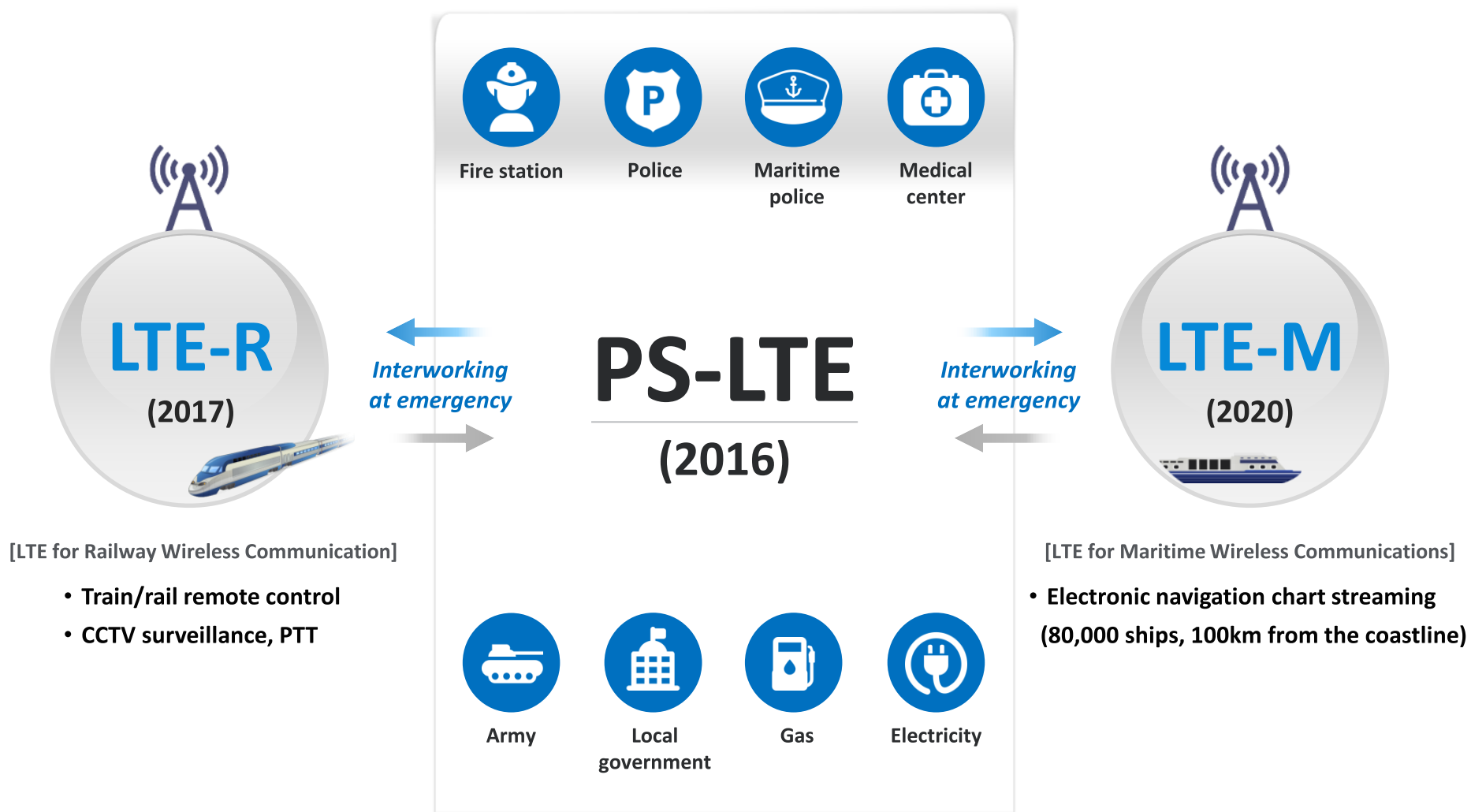
Controlling streetlight

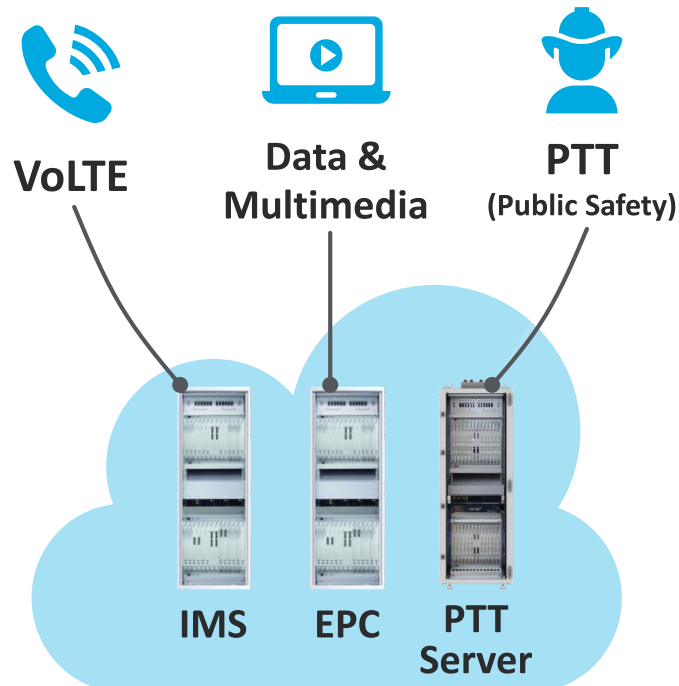


Metering service

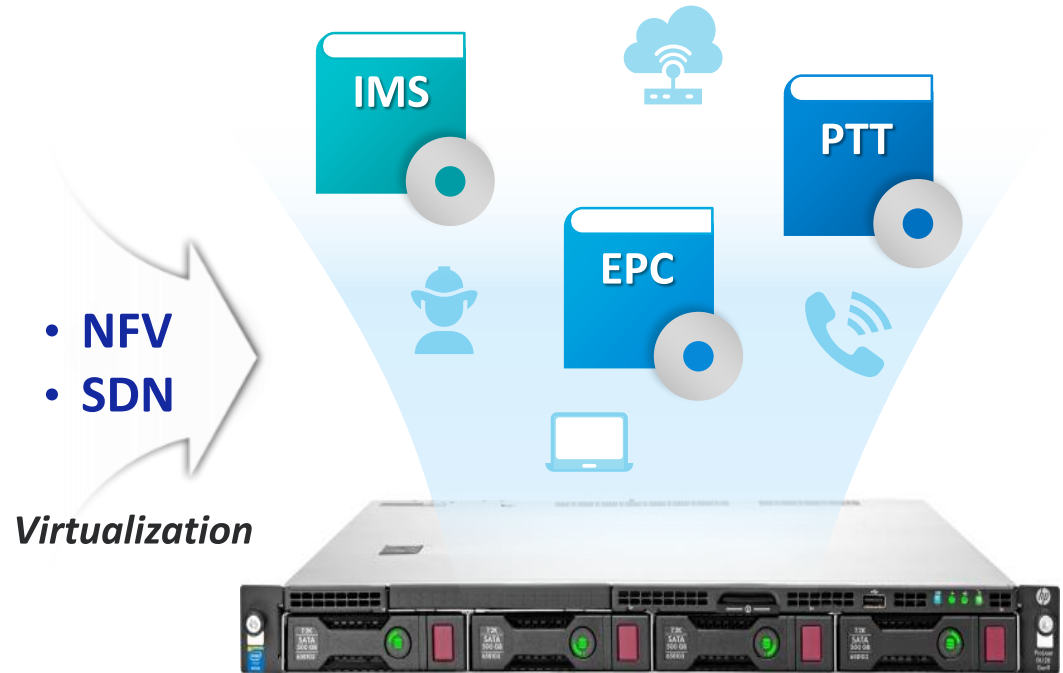


Smart Farm





Physical equipment for each service

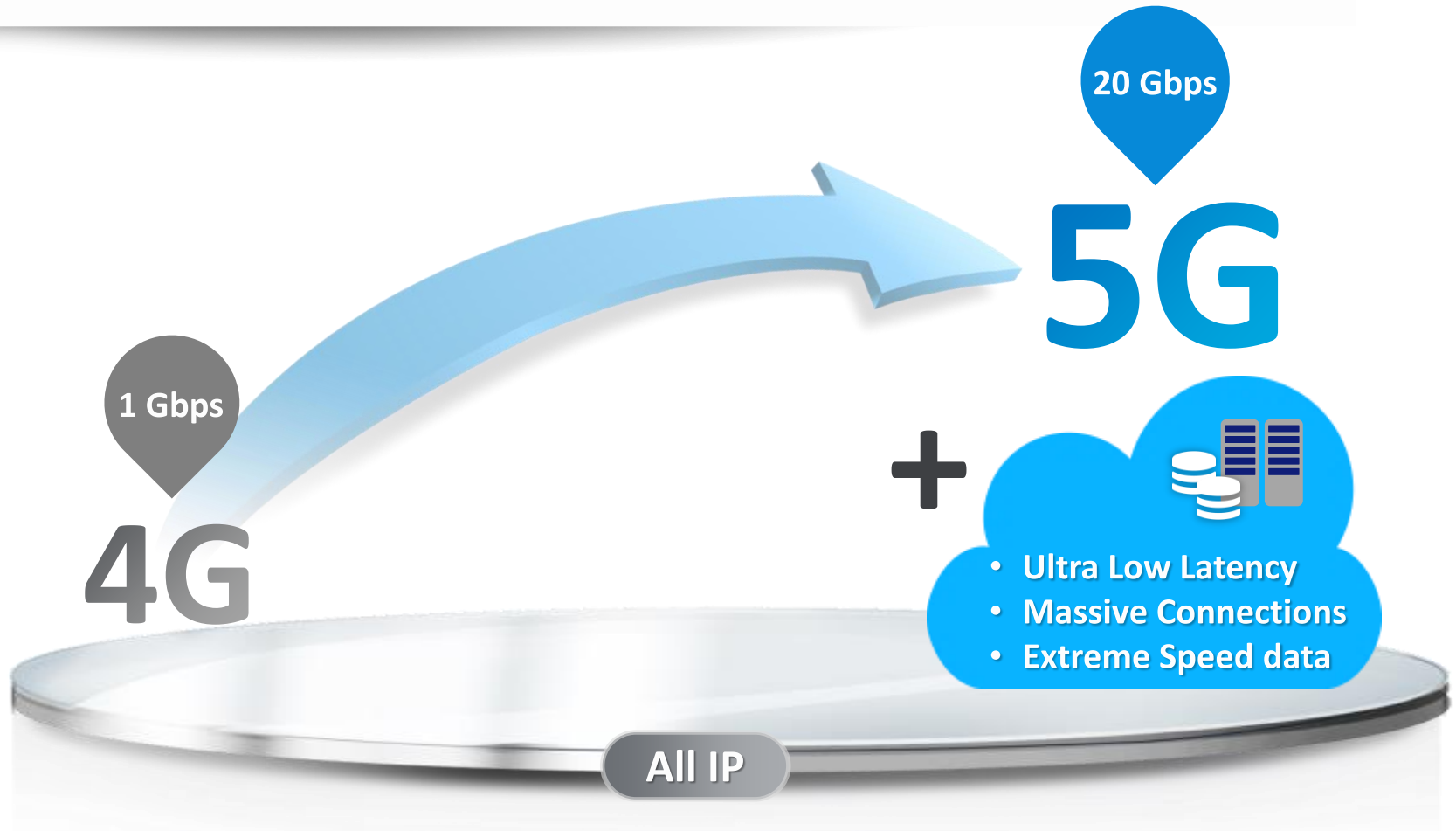


Virtualized service on one server

- vIMS for VoLTE (Sep 2015) Commercialization
- vEPC for IoT (Aug 2015) Commercialization

5G comes based on 4G

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Extreme data speed & **Immersive** experience

Thank you