

UK IPV6 COUNCIL

EE IPV6 MOBILE



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EE IPv6 Mobile Goals

- **All IPv6 migrations to be transparent to the customer**
- **IPv6 for subscribers of IMS Voice (Voice over LTE / Voice over WiFi)**
 - An IPv6 based IMS APN.
- **IPv6 for subscribers on the Data (Internet) APN to take the growth in smart devices**
 - To avoid Private IPv4 exhaustion. Mobile operators with large customer bases already use private addresses + NAT to complement public IP.
 - To ease Public IPv4 exhaustion.
 - Reduce investment in NAT. Across the globe there is regulatory pressure for logging of data. Global IP address systems cheaper than investing in NAT + associated IP logging/correlation systems.
- **Combining the above on common infrastructure in the 4G Core**

IPV6 MOBILE - 4GEE 2016

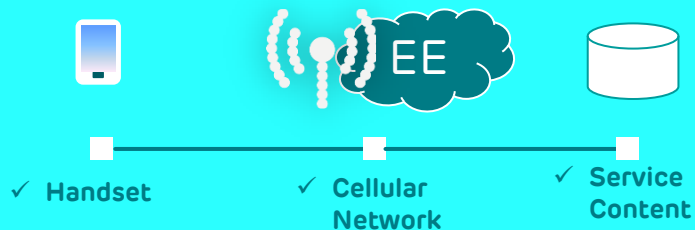
WHAT WE HAVE ACHIEVED:

- ✓ In 2014, an IPv6 IMS APN
- ✓ In 2016 H2 we switched on IPv6 for new subscribers, using a single APN strategy:
 - ✓ Legacy devices – remain IPv4
 - ✓ Eligible devices – dualstack or IPv6-only
- ✓ **Oct '16, EE have ~50k IPv6 PostPay subs**

WHAT NEXT:

- Complete the bulk migration of the existing Post Pay subscriber base:
 - Post-pay data subscribers on EE brand
 - Other subs to remain IPv4
 - Macro starting soon, ~100k subs per day

NETWORK READY:



- ✓ Smartphone handsets
- ✓ Network and IT Components for the EE Brand
- ✓ Internet Content - beyond 50% of a subscribers data usage will be to IPv6 content

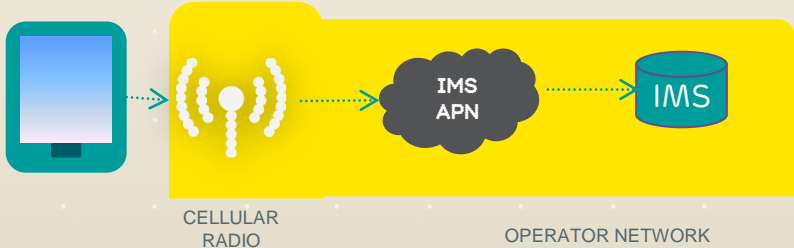
WHAT WE HAVE LEARNED:

- Need for strong E2E Delivery to break through silos
- Training and Education (no FUD!).
- International mobile roaming based on IPv6 is currently inconsistent – roaming falls back to v4.
- Major emphasis on E2E Testing, Trialling, including App testing, perf. testing and Pilot.
- App testing particular significant – IPv6-only must give the best quality of experience.

IPV6 MOBILE USECASE

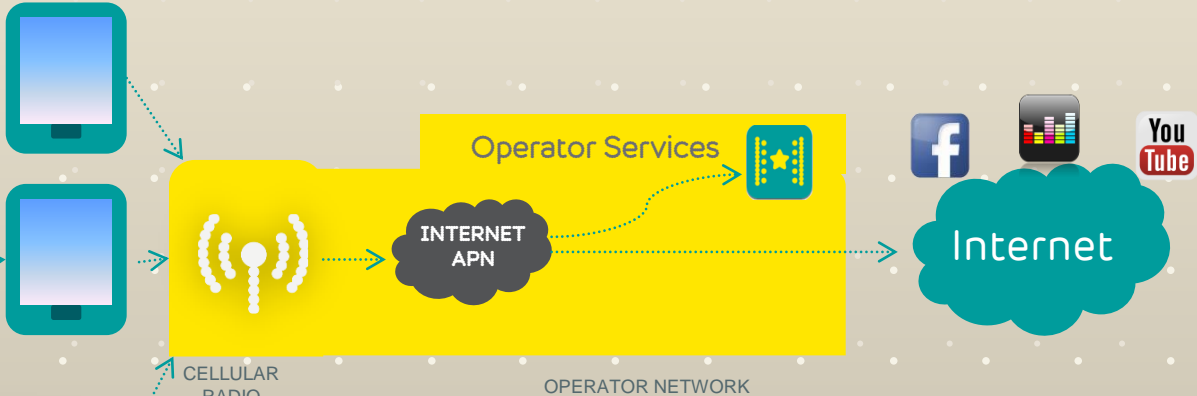
1. Voice/IMS

OPERATOR VOICE OVER IP / LTE / WIFI



2a. Data

DATA FROM INTERNET OR OPERATOR SERVICE



2b. Tethered Data

WIFI TETHERING FROM HANDSET



3. Mobile Broadband

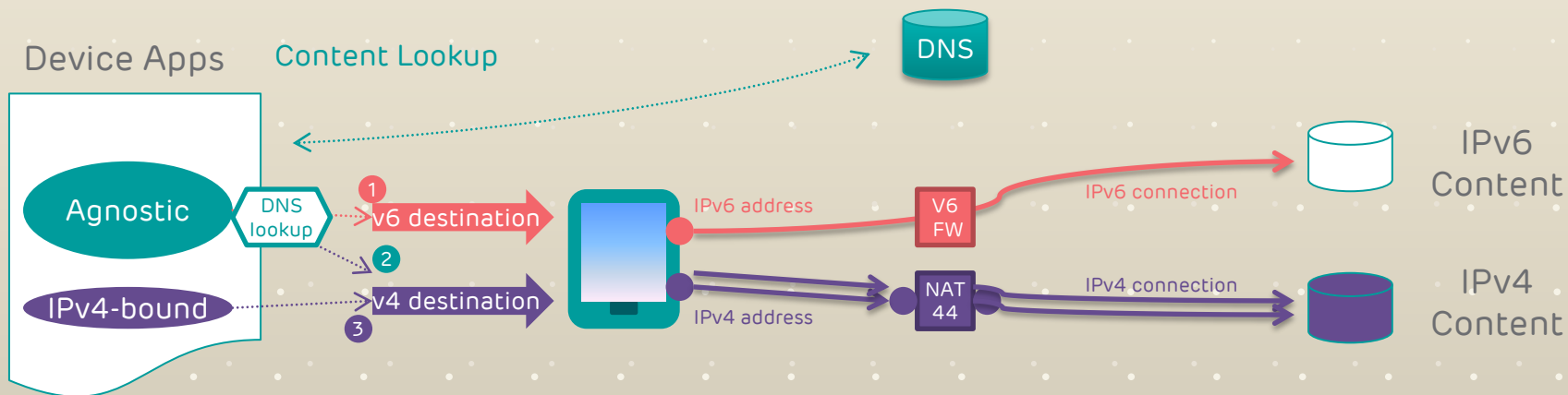
MYFI OR DONGLE



ASSURING CONNECTION TO APPS & SERVICES: DUAL STACK ARCHITECTURE

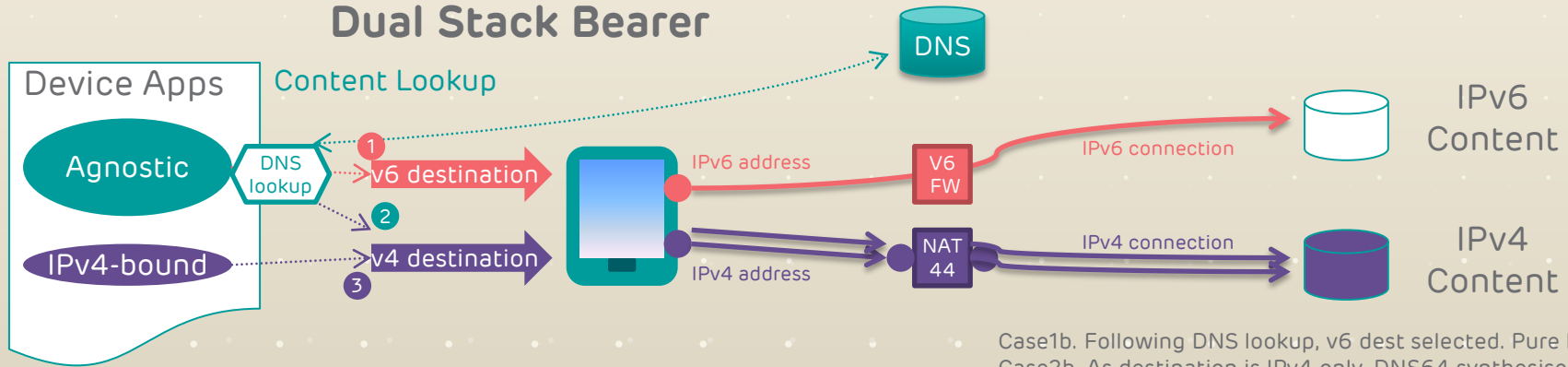
Case1. Following DNS lookup, v6 destination selected. IPv6 direct.
Case2. Following DNS lookup, v4 destination selected. NAT44 connection
Case3. IPv4 bound app, destination is "IPv4 literal". NAT44 connection

Dual Stack Bearer



ASSURING CONNECTION TO APPS & SERVICES: IPV6-ONLY WITH 464XLAT (RFC6877)

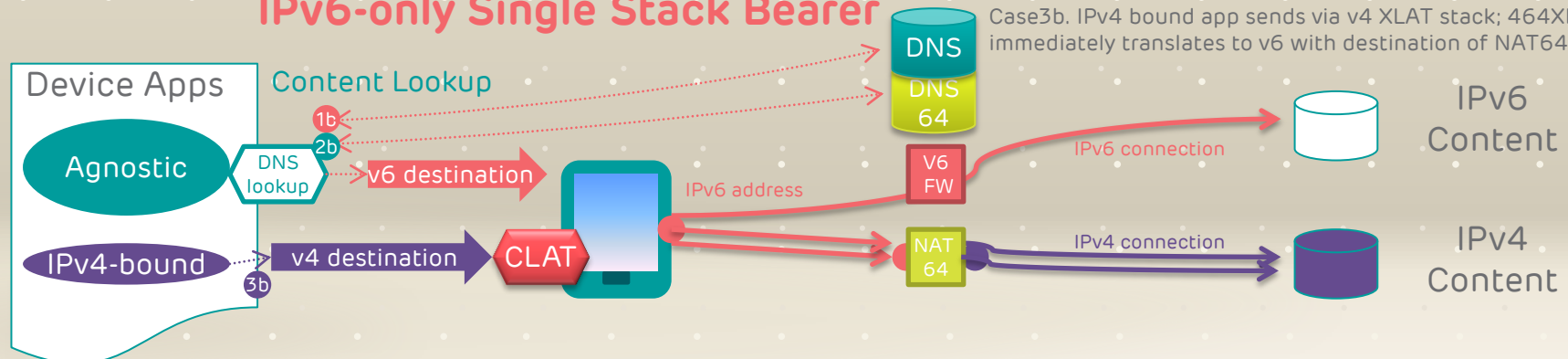
Dual Stack Bearer



Case1b. Following DNS lookup, v6 dest selected. Pure IPv6 direct.
 Case2b. As destination is IPv4 only, DNS64 synthesises v6 DNS response with v6 destination of the NAT64 gateway. NAT64 based connection.

Case3b. IPv4 bound app sends via v4 XLAT stack; 464XLAT 'CLAT' immediately translates to v6 with destination of NAT64 gateway.

IPv6-only Single Stack Bearer



Eligible smartphones

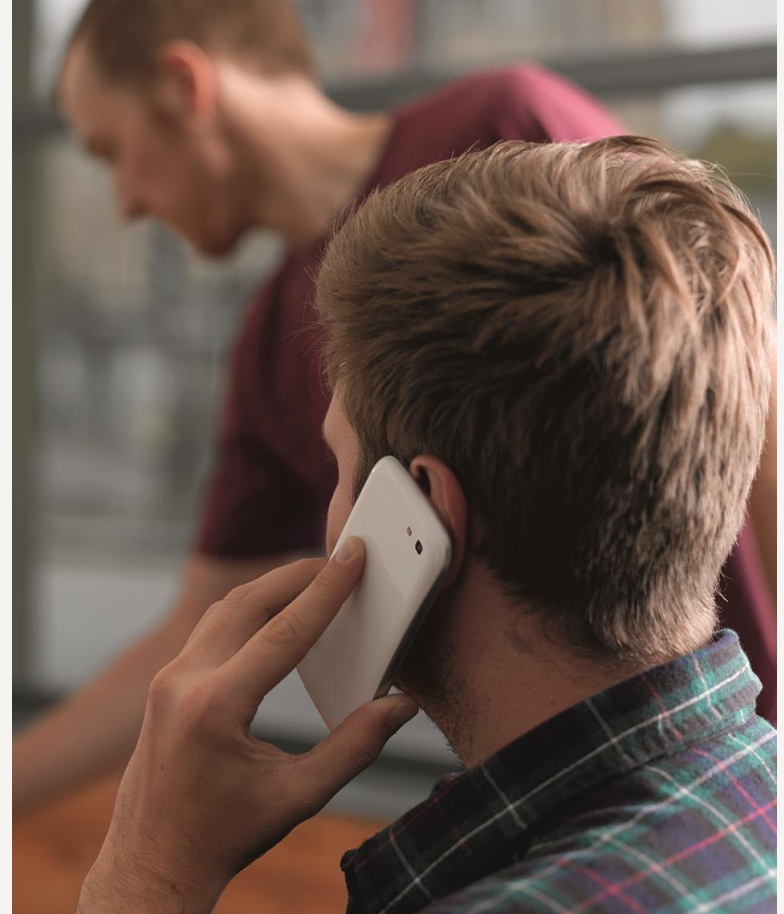
IPv6-only with 464xlat (RFC6877)

- ✓ Android OS (default on EE build)
- ✓ All key devices from 2016:
 - ✓ Samsung GS6 Edge Plus and GS7's
 - ✓ HTC M10
 - ✓ LG G5, G5 SE, K7, K8
 - ✓ All Sony's from the Z5

Dual Stack

- ✓ Blackberry OS (default on EE build)
- ✓ Windowsphone*(not default EE build)

*464xlat is supported in WP 8.1 Update1 and later



THANK YOU



LET'S
CHAT

THANK YOU

Any questions?
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