

IPv6 Avanzado

Introducción

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WHERE ARE WE?

IPv4

Yes, the IPv4 pool



IPv4 with NAT/Tunnels

But we can use IPv4 and NAT or Tunnels!!!

Yeah, right ...

IPv6



IPv6 Readiness

- › Laptops, pads, mobile phones, dongles, CPEs: Ready!
 - OS: 90% of all Operating systems are IPv6 capable
 - Browsers are ready!
 - Mobile devices: Android, IOS6, LTE devices are ready!
 - Mobile Apps: More than 85% with IPv6 support
 - CPEs: More than 25% support IPv6

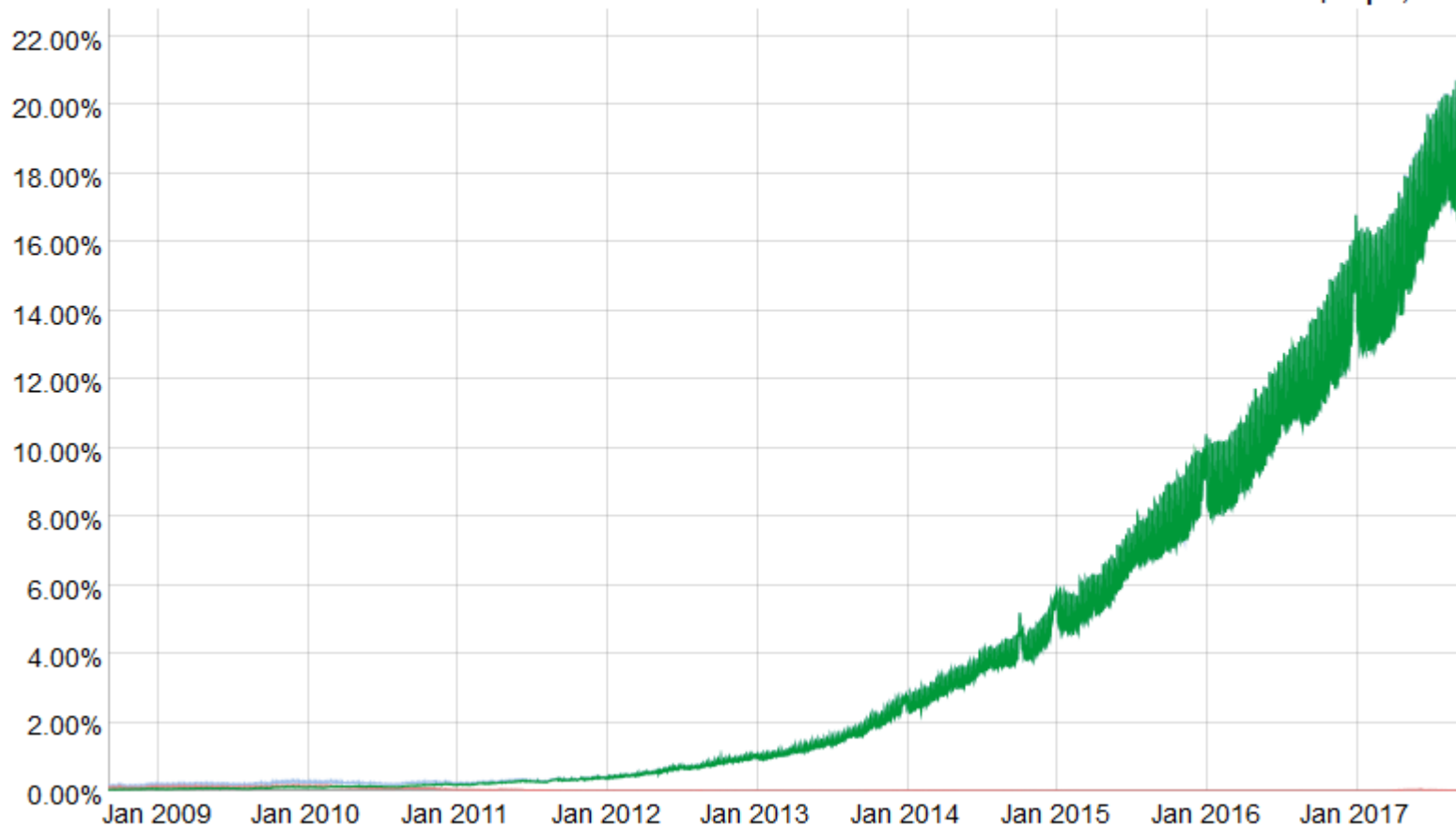


Adopción IPv6 según Google

IPv6 Adoption

We are continuously measuring the availability of IPv6 connectivity among Google users. The graph shows the percentage of users that access Google over IPv6.

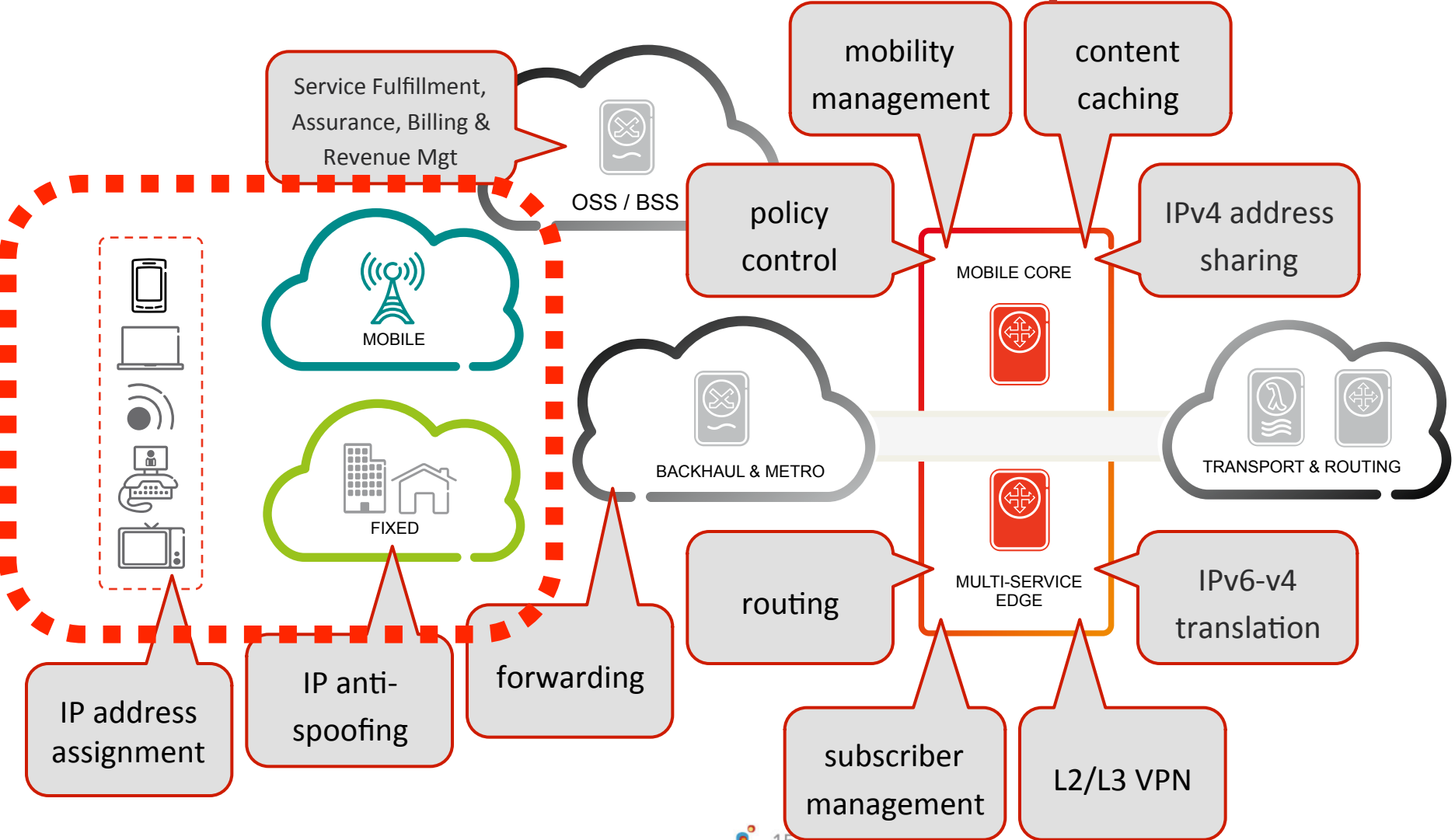
Native: 11.20% 6to4/Teredo: 0.01% Total IPv6: 11.20% | Sep 9, 2016



So ISP what are you doing?

- You may have IPv6 in your backbone:
 - Dual stack backbone, 6PE
 - Easy stuff!
 - Loopbacks, IGP, we love to configure BGP!
 - If not, what are you waiting for?
- What about your customers?
 - Mobile broadband: customers change their phone more quickly than their clothes, easy stuff but those GGSN licenses are killing me.
 - Fixed broadband: oh, no! those old IPv4 only CPE, there are millions of them! Worst than that,: NAT44 at each house.
 - Enterprise customers: do they know what IPv6 is?

Service Provider Perspective



CURRENT IPV6 DEVELOPMENTS IN BROADBAND ACCESS NETWORKS

IPv6 Market Trends

- 1 Continue to grow internet business
- 2 Continue to grow subscriber base
- 3 Modernization and transformation of network
- 4 Comply with Regulations
- 5 Roaming support

ISP	Actions Taken
S	<ul style="list-style-type: none"> • Fixed: Dual stack solution with no CGNAT / NAT64 functionality
A	<ul style="list-style-type: none"> • Mobile: Deploying Dual Stack infrastructure in 2012 as part of LTE/EPC • Fixed: Started with 6RD, but considered too expensive so moved to Dual Stack using CGNAT
V	<ul style="list-style-type: none"> • Mobile: Deploying Dual Stack infrastructure as part of LTE/EPC Network • Fixed: Dual Stack PPP and Dual Stack DHCP
C	<ul style="list-style-type: none"> • Cable network started with DS-Lite, but found too difficult to manage, shut it down in January 2011 • Now using Dual Stack

Fixed Broadband Networks Trend

IPv6 access	IPv4 depletion
6RD and/or Dual-Stack DHCP	CGNAT
Dual Stack PPP	CGNAT
Dual Stack LNS & DHCPv6	DS-Lite
Dual Stack PPP & LNS	No plans
Dual Stack PPP & LNS	TBD
Dual Stack PPP + DHCP	CGNAT+DSLite
Dual Stack PPP, DHCP, LNS	CGNAT+DSLite
Dual Stack PPP + DHCP	CGNAT
Dual Stack PPP + LNS + DHCP	TBD looking at CGNAT
Dual Stack DHCP	DS-Lite (as backup)
Dual Stack PPP	IPv4 release
Dual Stack PPP & LNS	TBD
DualStack PPP & LNS, DHCP	TBD
Dual Stack PPP	No issue foreseen
DS-Lite(target) DSPPP (backup)	DS-Lite/CGNAT
Dual Stack PPP & DHCP & LNS	TBD
Dual Stack PPP & DHCP	TBD
Dual Stack PPP	CGNAT
Dual Stack PPP & LNS	TBD
Dual Stack PPP	CGNAT
Dual Stack LNS	TBD
Dual Stack PPP & LNS	CGNAT
Dual Stack PPP	CGNAT

Mobile Broadband Networks trend

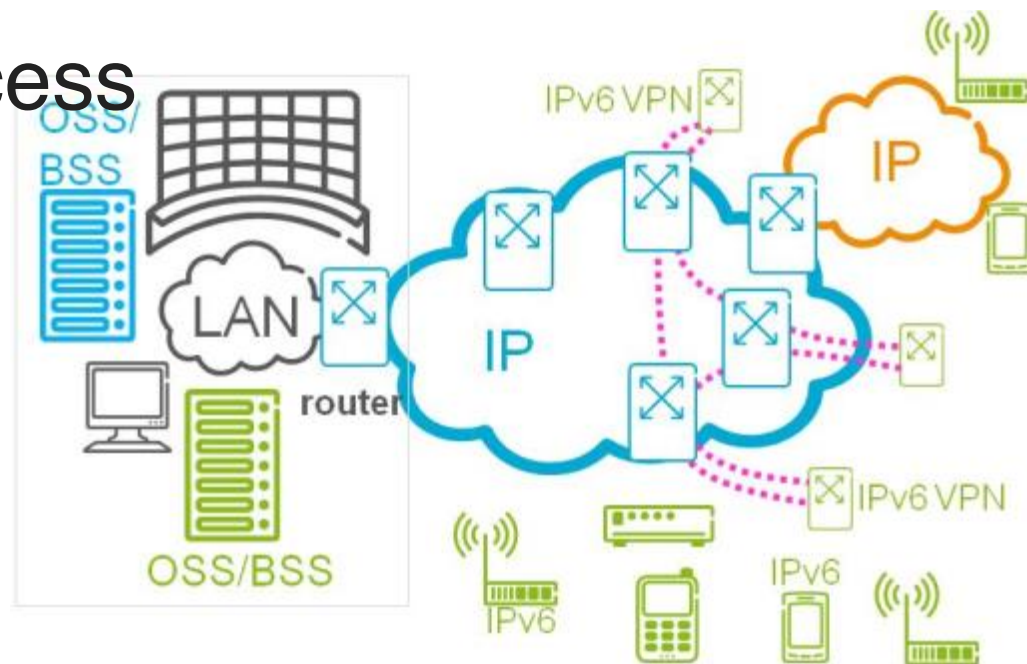
- Most operators are planning for Dual-stack deployments but also targeting IPv6-only
 - M2M and capable handsets/appliances may use IPv6-only combined with DNS64/NAT64 when accessing IPv4-only services
- LTE launches a trigger for IPv6
 - LTE Terminals are day one including IPv6
 - Part of major operators launches or planned launches
- IPv4 depletion announcement trigger/drive live deployment
- Node IP transport within Packet Core and RAN stay on IPv4 with a few exceptions.

OTHER SYSTEMS INVOLVED IN IPV6 IMPLEMENTATION

Operational considerations for IPv6

Introduction

- Operational process
- Training
- OSS/BSS
- DCN



Any function, process, OSS or BSS that utilizes IP addresses potentially impacted by IPv6
Need to get operational support for IPv6 in place prior to deployment to ensure smooth rollout and ramp up

IPv6 Operations

Potential process impacts

Fulfillment

- Service Configuration and Activation
- Resource Provisioning
- Inventory & Allocation to Service Instance (e.g., IP Address Management)

Assurance

- Service Problem Mgt.
- Service Quality Analysis Action & Reporting
- Fault, Root Cause Analysis
- Resource Data Collection, Analysis & Control

Billing & Revenue Management

- Charging
- Service Guiding and Mediation
- Resource Mediation and Reporting

- › Understand impact of IPv6 on key functions to ensure support and update process changes
- › Understand need to operate both IPv4 and IPv6 for different devices and in different parts of network
- › Configuration, diagnostic testing

USEFUL DOCUMENTS, QUESTIONS, ETC.

Useful documents

- <http://tools.ietf.org/html/rfc6586>
- <http://tools.ietf.org/html/rfc6144>
- <http://bgp.he.net/ipv6-progress-report.cgi>
- <http://bit.ly/17fFgLQ> (ALU White Paper)
- <http://bit.ly/1gK8Bln> (IPv6 and DOCSIS 3.0)
- <http://volpefirm.com/ipv6/> (IPv6 and DOCSIS 3.0)
- Ahmed, Adeel and Salman Asadullah, *Deploying IPv6 in Broadband Access Networks*, John Wiley and Sons, 2009

Questions for you

- Where would you like to be? Are you there yet?

