Status of Swisscom's IPv6 Activities, Outlook and Opportunities
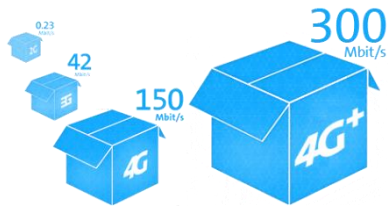
Martin Gysi, 18.06.2015
public

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Swisscom's mission:
Create the world's best network!

Top Speed:
- LTE advanced with up to 300 Mb/s
- Ultra-fast fixed broadband, 1Gb/s symmetrical

unique mobile coverage:
- 98% LTE, 99% GSM

The 6th time in a row!
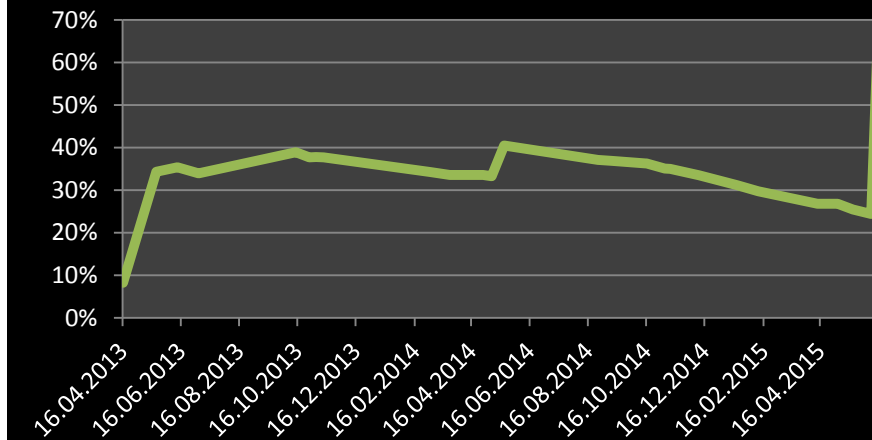
excellent voice quality:
- HD-Voice, VoLTE (10.06.2015)

connect WINNER
Swiss mobile network test
Swisscom Issue 1/2015

IPv6 enabled broadband (10.06.2015):
- by default for all wireline residential customers
- rolled out to all supported home routers

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IPv6 is now a significant part of traffic volume
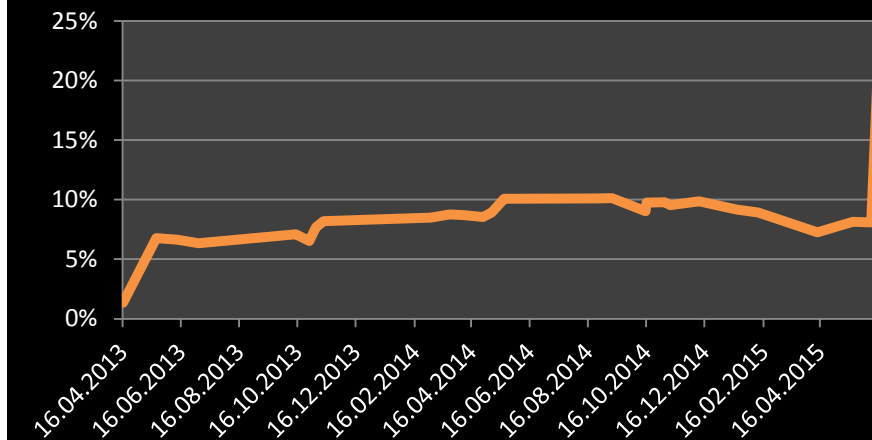
Dual-stacked customers

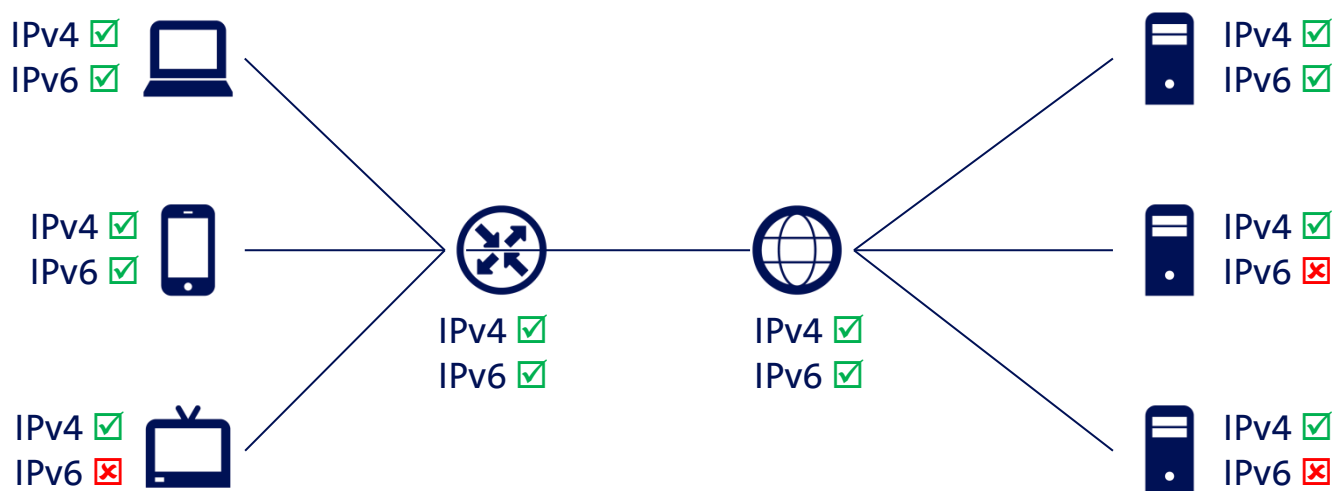- 67 % of customers are dual-stacked (IPv4 + IPv6)

IPv6 traffic share

- > 20 % of total traffic is on IPv6

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Dual-stacked devices can use both IPv4 and IPv6
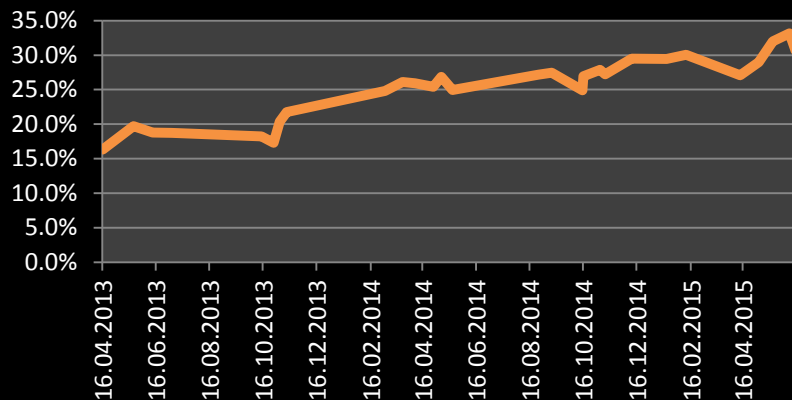
IPv4 ☑
IPv6 ☑

IPv4 ☑
IPv6 ☑

IPv4 ☑
IPv6 ☒

IPv4 ☑
IPv6 ☑

IPv4 ☑
IPv6 ☑

IPv4 ☑
IPv6 ☑

IPv4 ☑
IPv6 ☒

IPv4 ☑
IPv6 ☒

2/3 users   *****   **1/3 content**   **= 22.2% IPv6**

(- some unhappy «happy eyeballs»)

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The IPv6 ratio of dual-stacked users grows steadily

IPv6 ratio for dual-stacked customers

IPv6 traffic sources

- 31 % of a dual-stacked user's traffic is IPv6
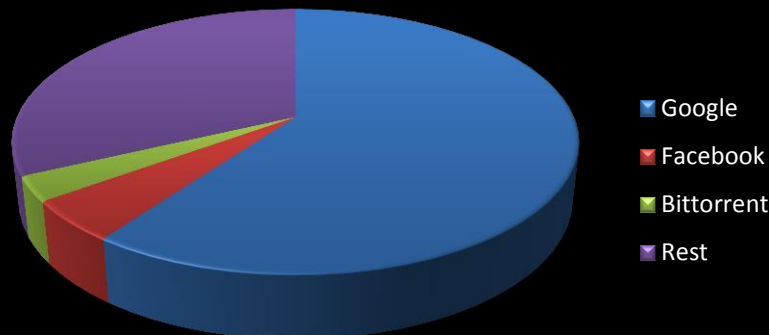
- Google sources 60 % of IPv6 traffic
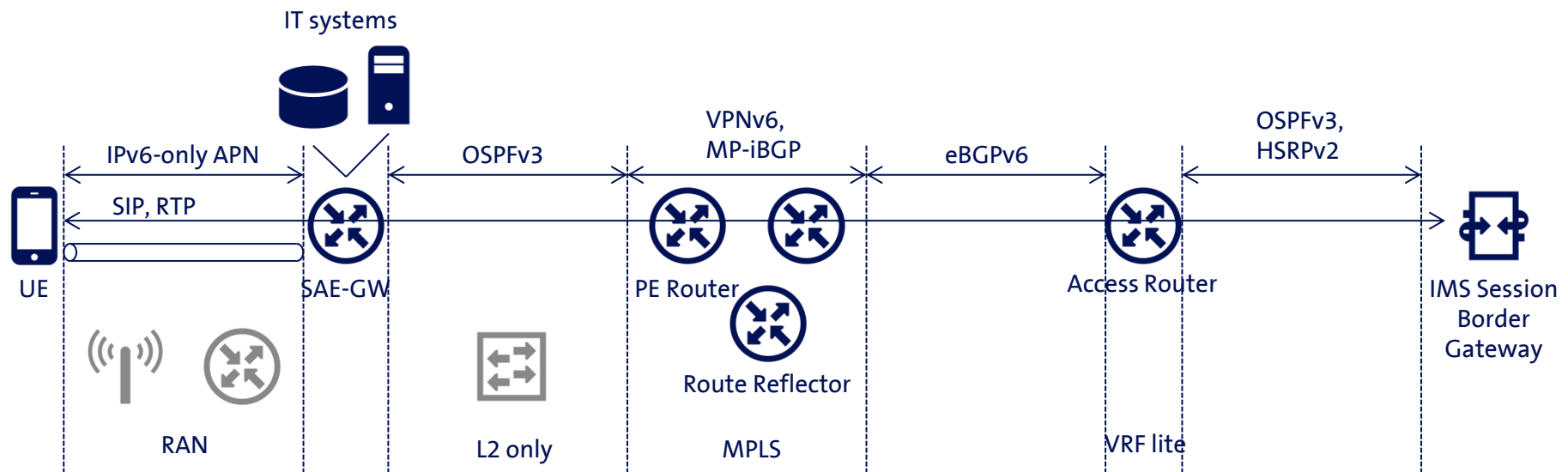
- IPv6 traffic is off-loaded from CG-NAT infrastructure

New products and outlook

VoLTE: Swisscom's first IPv6-only infrastructure

- LTE is a packet-only network. No circuit-switched voice, unlike UMTS or GSM
- Voice over IP over LTE: VoLTE
- Communication between Mobile and IMS Session Border Gateway is IPv6-only!
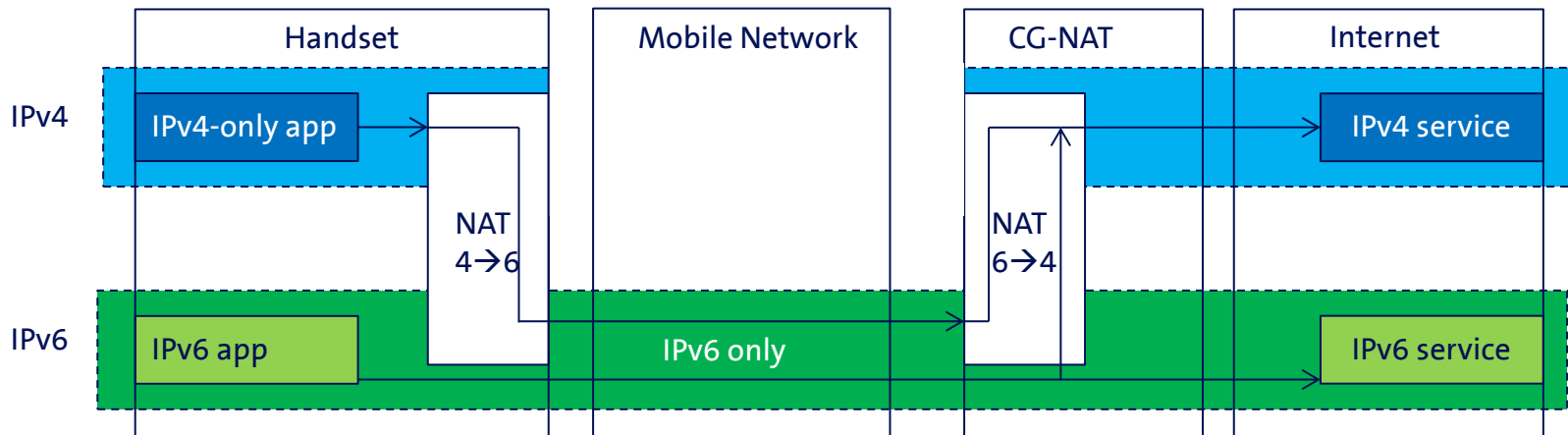

Active PDN connection		
Id	:	80600
Default Bearer Id	:	6
Type requested	:	IPv4v6
Type in use	:	IPv6
Address in use		
IPv4	:	
IPv6	:	2A02:1216:1750:4F7::1
APN requested	:	Information not available
APN in use	:	ims.mnc001.mcc228.gprs

Launched June 2015!

Internet-APN on Mobile

- Target is a single-stack, IPv6-only APN for new devices
- Android, Windows Phone: We plan on using 464XLAT (RFC 6877) to get rid of IPv4 in the mobile network, but still enable IPv4 connectivity for applications that need it.
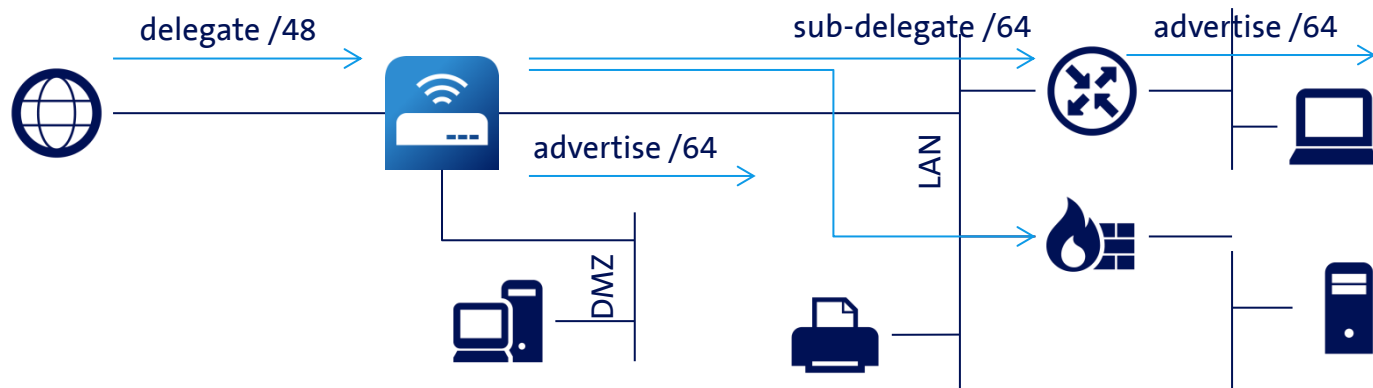- IOS: IPv6-only (see Apple's recent announcement): https://developer.apple.com/videos/wwdc/2015/?id=719)

	Handset	Mobile Network	CG-NAT	Internet
IPv4	IPv4-only app		NAT 6→4	IPv4 service
	NAT 4→6			
IPv6	IPv6 app	IPv6 only		IPv6 service

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New IPv6 offering for SME: «my KMU office»

- IPv6 product offering
  - Fixed /48 prefix per site. (65'536 /64 LAN segments).
  - DMZ & LAN
  - Prefix delegation to subtended routers/firewalls
  - Static routing to subtended routers/firewalls

My KMU Office

M

delegate /48   sub-delegate /64   advertise /64

advertise /64

LAN

DMZ

- Product to be launched in August

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Local address assignment using SLAAC, DHCPv6, or both

Finely configurable firewall with distinction between DMZ and LAN

What lies ahead?

When will IPv6 exceed IPv4? When will IPv4 start to decline? When will IPv4 disappear?

- Traffic doubles every 2 years.
- 80% of traffic is still IPv4.
- IPv6 is at 20%. Let's assume its share increases by 10 % per year
- IPv6 reaches 50% in 2018
- Percentage of CG-NAT users increases to 20% by 2025
- IPv6 off-loads traffic from CG-NAT

Year	IPv6	IPv4	CG-NAT users	CG-NAT IPv4 traffic
2015	20.0%	80.0%	5.5%	4.4%
2016	30.0%	70.0%	7.0%	4.9%
2017	40.0%	60.0%	8.5%	5.1%
2018	50.0%	50.0%	10.0%	5.0%
2019	60.0%	40.0%	11.5%	4.6%
2020	70.0%	30.0%	13.0%	3.9%
2021	80.0%	20.0%	14.5%	2.9%
2022	90.0%	10.0%	16.0%	1.6%
2023	95.0%	5.0%	17.5%	0.9%
2024	98.0%	2.0%	19.0%	0.4%
2025	100.0%	0.0%	20.5%	0.0%

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When will IPv6 exceed IPv4? When will IPv4 start to decline? When will IPv4 disappear?
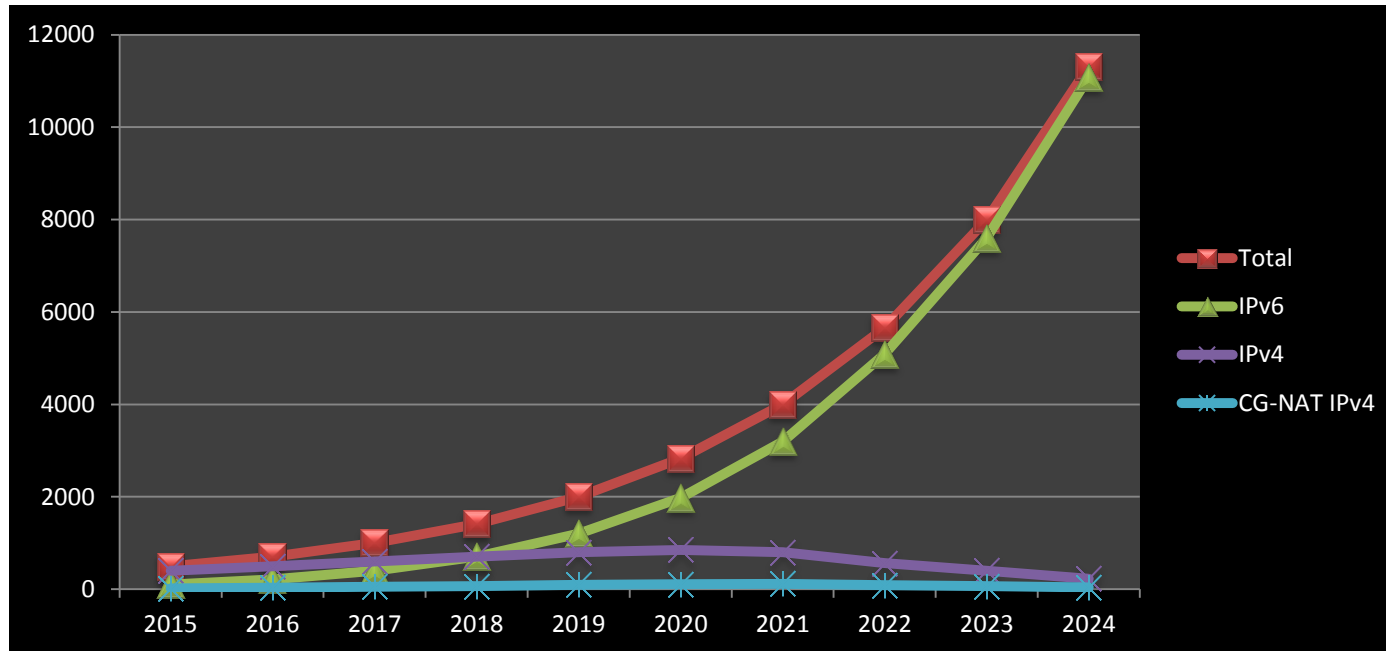
- IPv4 traffic will peak in 2020
- CG-NAT traffic will peak in 2021
- No more IPv4 traffic after 2024

Getting rid of IPv4?

Can ISPs switch off IPv4 before the last web server in the Internet is available on IPv6?

- Dual-stack is painful. It doubles resource consumption on BNGs
- Stateless
  - MAP: Mapping of address and port (draft-ietf-softwire-map-t-08, draft-ietf-softwire-map-13)
  - Similar to 6rd (IPv4 → IPv6 prefix), but the other way around
  - Algorithmic (stateless) mapping of
    IPv6 prefix to (IPv4 address + port range)
  - No stateful, central CG-NAT device
  - Need to manage IPv6 pools carefully
- Per client state
  - Lightweight 4 over 6 (draft-ietf-softwire-lw4over6-13)
  - Per-subscriber provisioned tunnel of IPv4 over IPv6
  - No stateful, central CG-NAT device
- Per-session state
  - DS-Lite (deployed, dual-NAT like ordinary CG-NAT)
  - NAT64 + DNS64 (won't work with literals or direct IPv4 sockets)

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That's all Folks!