IPv6 deployment in BH Telecom

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BH Telecom IP/MPLS network

➢IP/MPLS network is high-capacity multiservice transport network in BH Telecom for aggregation and distribution of all IP-based services in BH Telecom

➢IPMPLS development from 2007 from 4 devices till today, IPMPLS consisted of more than 325 devices

➢From 2007 and distribution only Internet traffic and today all services in BH Telecom which is distributed through IP/MPLS network

➢Access to Internet services (broadband High Speed Internet), IPTV traffic (MOJATV), Voice and signalization in fixed voice network and VoIP services , Mobile voice and data traffice in mobile network, Virtual private network (MPLS VPN)

Internet BH Mobile 1%
IPTV Multicast 1%
Internet poslovni 6%
Voice 1%
MPLS VPN 0,5%
WEB TV 8%
Intranet 1%
VoD 13%
Internet xDSL 69%
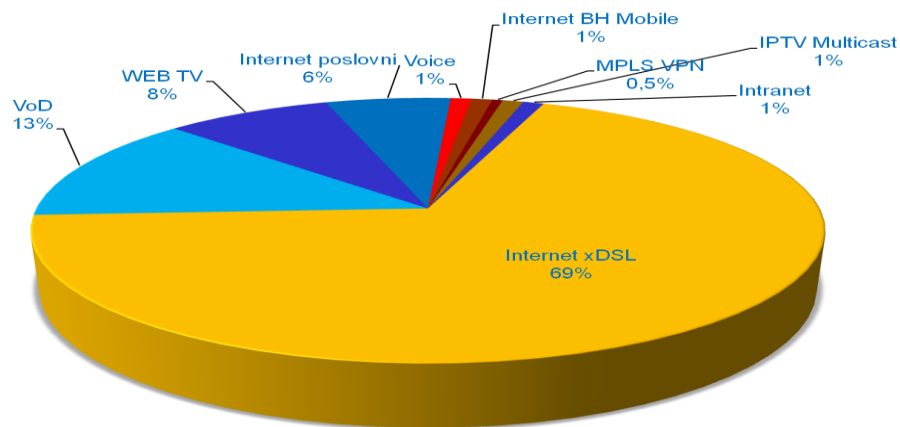
➢Internet traffic overall 75% , Internet traffic and internal video (PTV) over 90%

➢Residential fixed HSI over 100 Gbps

Distribution of Internet traffic AS9146

➢ High availability of distributing Internet traffic

➢ 4 BGP IGW for BGP downstream and upstream

➢ 8 BNG devices for broadbad residential aggregation (xDSL,FTTx)

➢ 4 CGNAT locations for NAT444 dual-stack customers

➢ Physical capacity from Core to IGW devices Sarajevo 100Gbps

➢ Physical capacity from Core to main region Tuzla and Zenica 8 x 10GE, and Bihac 3 x10GE, other 2x10GE

➢ DDOS protection implemented on all input points

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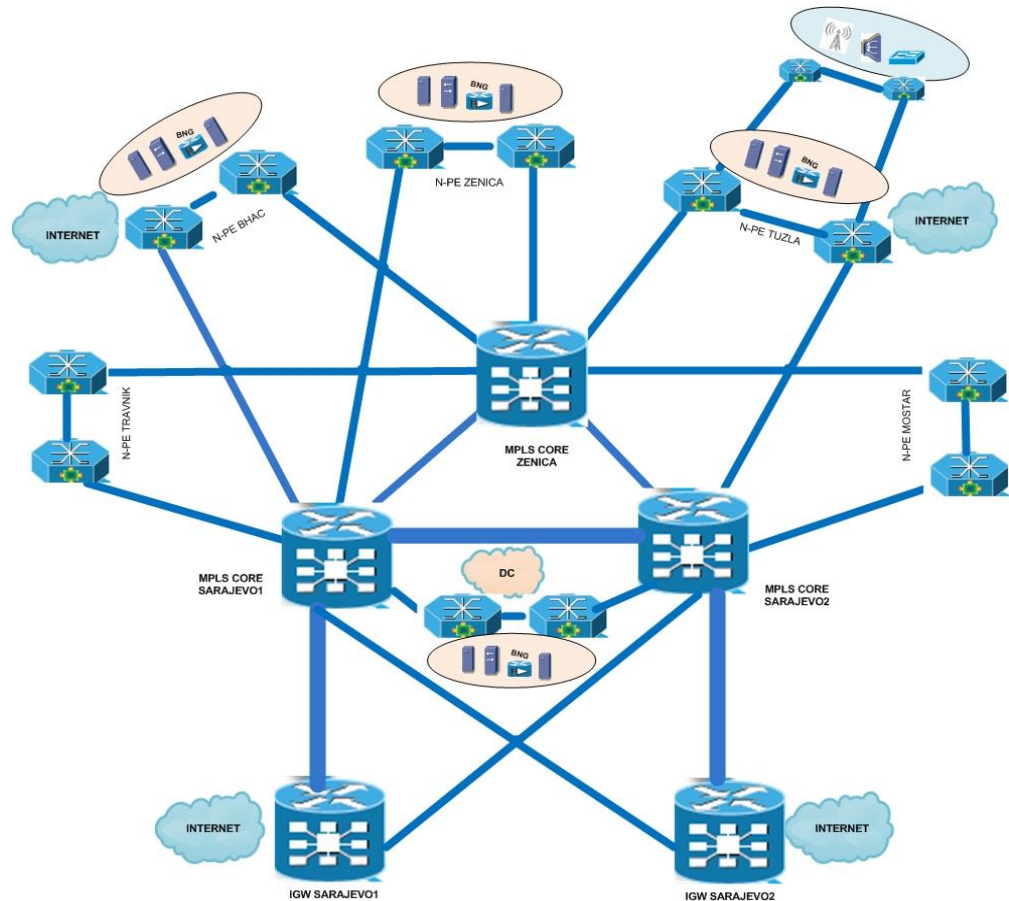
Distribution of Internet traffic AS9146

➢ BH Telecom with 3 physical direction to Internet –high level of availabiltiy of global Internet connection

➢ More than 120 Gbps of Internet capacity to upstream providers

➢ Presence in BIX Internet Exchange Poing in Budapest, and .

➢ TIER 1 upstream provider TeliaSonera and Seabone-Telecom Italia .

➢ Peering with Google in BIX, and Facebook in WIX

➢ Google (80 Gbps) and Facebook (40 Gbps) Caching servers in Sarajevo and overall 50% traffic distribution from this locations
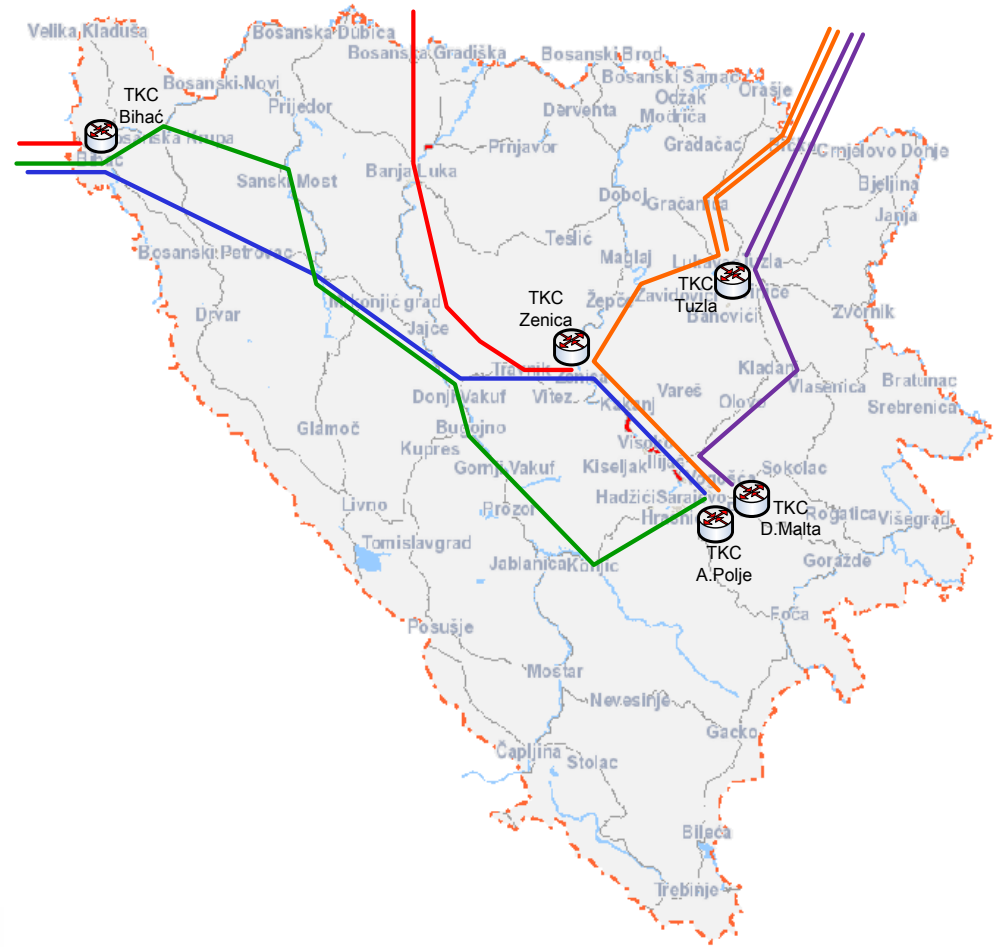
IPv6 in BH Telecom AS9146

➢Due to lack of IPv4 addresses and anouncement from RIPE at the end of 2012, BH Telecom decided to create team for proposing solution

➢Faced and the end of 2012 with no more than 10.000 IPv4 addresses, with using more than 135.000 IPv4 addresses, prediction for this number of IPv4 addresses was until begining of 2014

➢Team proposed solution based on dual-stack (private IPv4 addresses and NAT444 (CGNAT) and IPv6 addresses), and solution implied using dual-stack techonology end-to-end

- For PPPoE connection from CPE devices (DSL modem), to BNG devices
- For IP and IPMPLS connection from BNG to IGW devices (using OSPFv3 and 6VPE MPLS VPN)
-For IGW IGP (OSPFv3) and EGP (BGP) as connection to inside and outside network
- Solution practicaly changed way and design of distributing HSI internet service for residental broadband customers, and forced routing mode for CPE devices and dual-stack PPPoE connection on CPE
- Reaching IPv4 Internet world through IPv4 private address and CGNAT solution, and IPV6 Internet world over IPv6 routing mode and IPv6 address on end devices

➢At that moment we were faced with potentional problems: 50% of DSL CPE devices does not support IPv6, old BNG/BRAS devices with no support for dual-stack, lack of CGNAT solution/devics etc.

➢Also we were aware off the lack of this solution mainly CGNAT (NAT444): SPAM/Black list, problem with VPN connection, problem with private address overlapping, initiating connection from outside to inside etc.
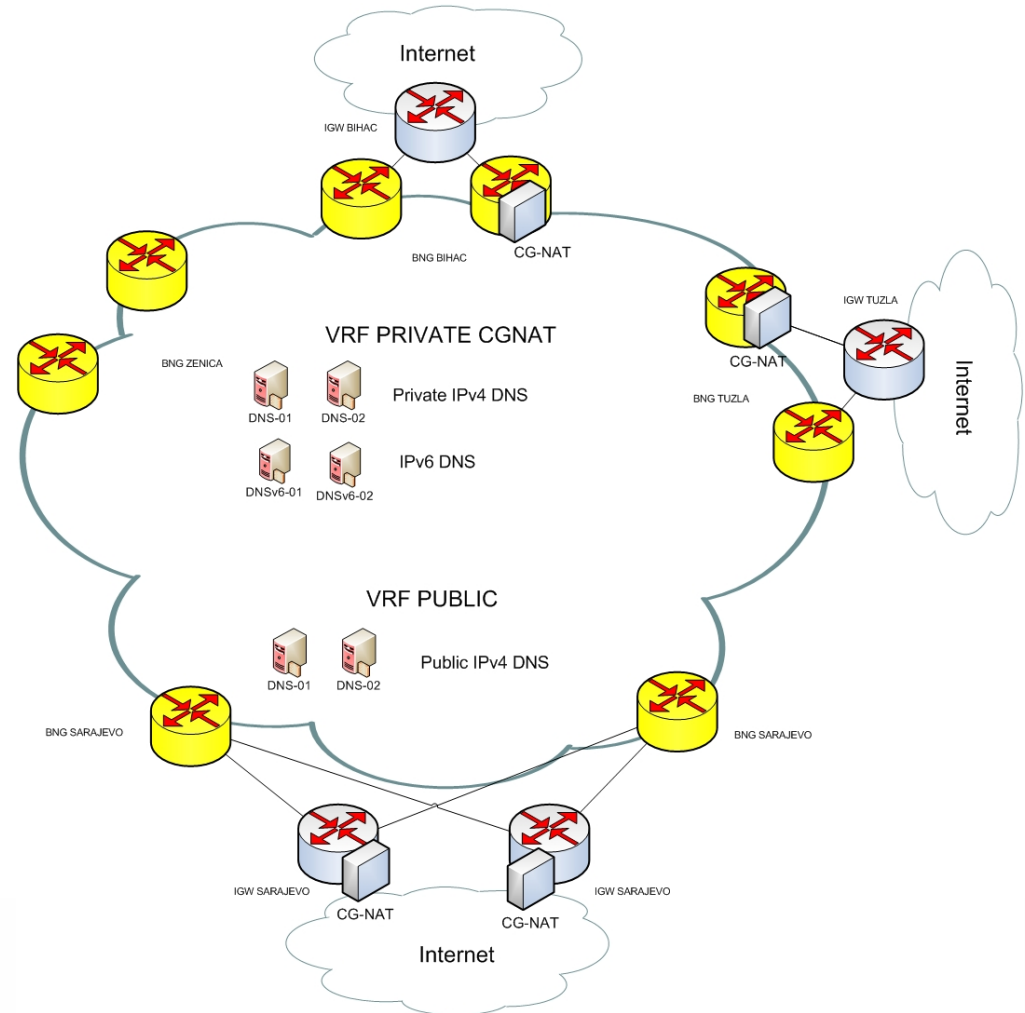
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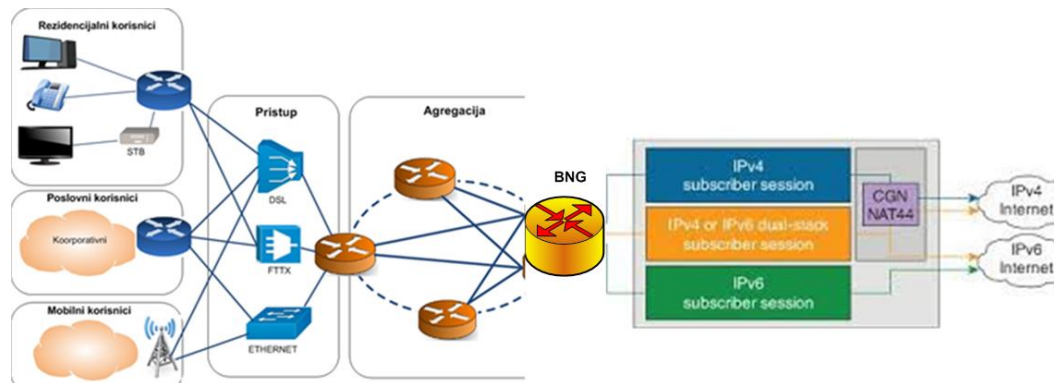
During 2013

1) Replaced old BNG/BRAS devices with devices supporting dual-stack PPPoE and IPoE solution
2) Implementing CGNAT solution as modules in current routers supporting over 20 million of connection
3) Implementing IPv6 techonology in part of BH Telecom LAN network
4) BH Telecom allocated /32 IPv6 addresses 2a02:27b0::/32
6) Created private IPv4 and IPv6 address plan and allocating prefixes
7) Created MPLS VPN and new one VRF MPLS VPN for private IPV4 traffic to CGNAT

D –Day 14.04. 2014

1) Identified potential CPE devices with dual-stack support ~35000
2) With ACS solution and matching HSI username to CPE devices, migration of CPE devices to routing mode and in parallel to new VRF on BNG devices and IPMPLS network
3) In first two months overall migrated customers was ~30500 (~87% from overall potential)
4) Migration was sucesfull with minimum of issues, mainly with VPN, Video survivalence etc.
5) After fisrt step of migration overall new free public IPv4 addresse was ~15000
6) After migration due to google statistics traffic from BiH increase to 1,2% from 0%

Current deployment of IPv6 in BH Telecom AS9146

- Allocated /40 and /44 pools on BNG for CPE
and customer LAN side

- Overall IPv6 addresses with /64 prefix for CPE
  modems 71.956. (30% of overall number of
  customers)

- Overall delegated IPv6 addresses with /60
  prefix for LAN customer side (68.596).

- CGNAT solution for fixed and mobile
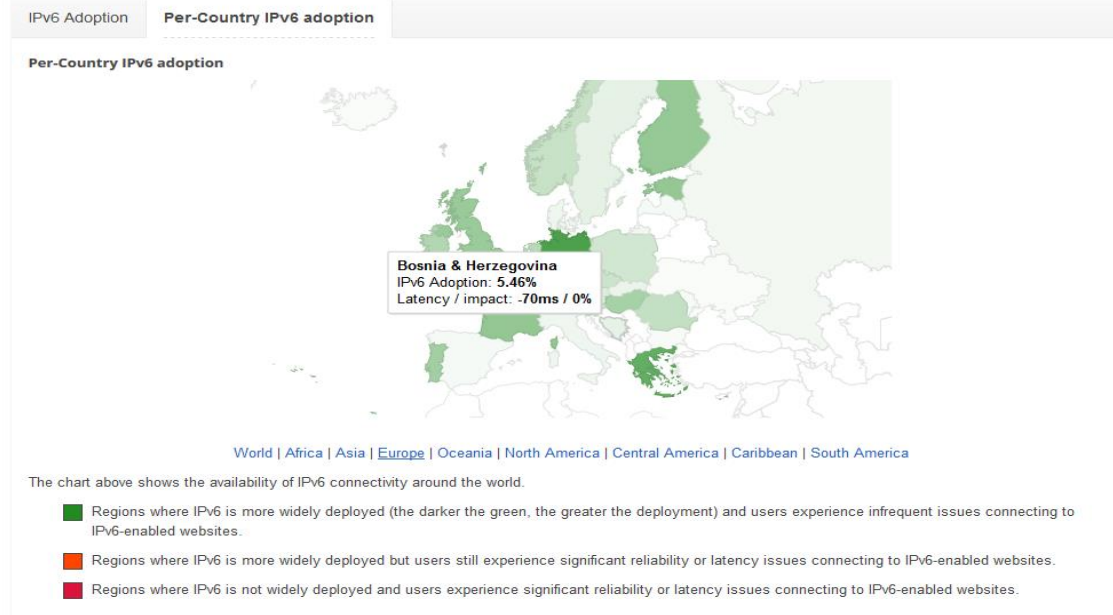 broadband

- IPv6 vs CGNAT traffic 2:1

Current IPv6 in BH Telecom

BH Telecom as leader in IPv6, in BiH 5, 4% of traffic is IPv6.

> **In BH Telecom IP network 25 Gbps of Internet traffic is IPv6, more than 15%**

Goals for IPv6 in BH Telecom AS9146

➢ *In BH Telecom IP network 25 Gbps of Internet traffic is IPv6, more than 15%, goal is in five years 50%*

➢ *Decreasing CGNAT traffic and increasing IPv6 traffic*

➢ *IPv6 iplementation in 4G LTE mobile network of BH Telecom*

➢ *IPv6 peering with downstream providers and IPv6 for bussiness customers*

➢ *More IPv6 peering with partners in IXP*

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