

IPv6 in Crnogorski Telekom

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Core Platforms and Services

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```
inet6num.....: 2a00:fe80::/29
netname.....: ME-CRNA-20110603
country.....: ME
org.....: ORG-ICGd1-RIPE
admin-c.....: TMa29-RIPE
tech-c.....: VR3145-RIPE
status.....: ALLOCATED-BY-RIR
notify.....: ripeadmin@telekom.me
mnt-by.....: RIPE-NCC-HM-MNT
mnt-by.....: AS8585-MNT
mnt-lower....: AS8585-MNT
mnt-routes...: AS8585-MNT
created.....: 2016-01-29T08:17:38Z
last-modified: 2016-08-15T10:43:35Z
source.....: RIPE
```

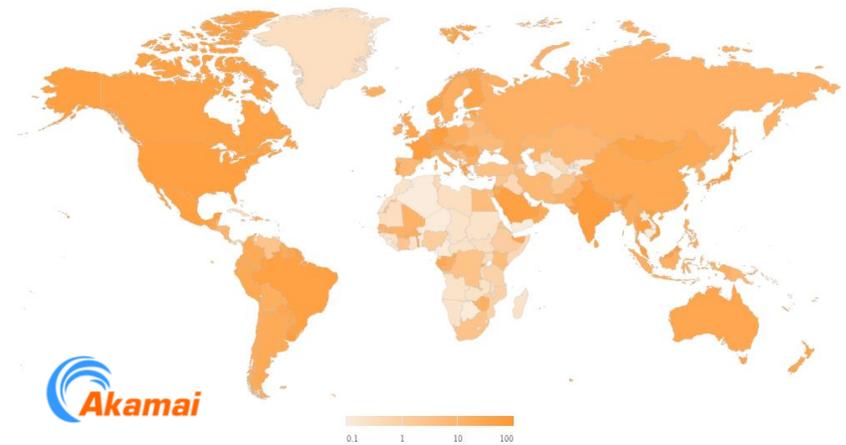
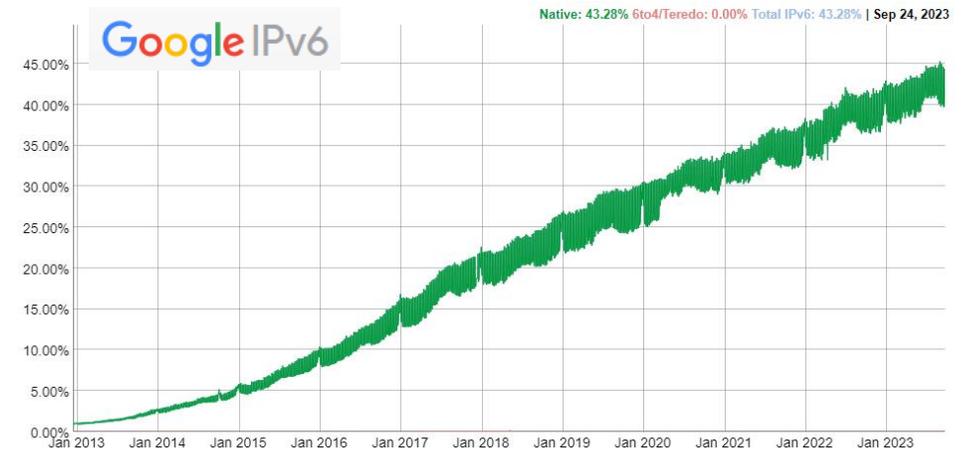
CRNOGORSKI TELEKOM IPV6 ON RIPE NCC

Origin	Prefix
AS 8585	2a00:fe80::/29



IPv6 Deployment – Motivation and Rationale

- 01 No new IPv4 ranges available
- 02 IPv4 space exhaustion confirms the predictions
- 03 Heavy CGNAT brings a number of “challenges”
- 04 New services are taking off (SmartX, m2m/IoT)
- 05 Simplified future-proof approach is IPv6-only



IPv6 in Crnogorski Telekom – State of Operation

Internet Core and Gateway

- IPv6 dual-stack active in ICG Core and GW
- Active IPv6 peering with Gia and sub-providers
- ISIS configured as inter-IGW IPv6 protocol
- Range `2a00:fe80::/32` announced publicly



IPv4
PAST

IPv6
FUTURE

Mobile Packet Core

- IPv6 fast convergence
- IPv6 routing
- IPv6 security
- IPv6 management

MPLS and Transport

- IPv6 support configured on RR and PE machines
- Infrastructure ready for IPv6 services in B2B/WS

Fix BroadBand Core

- IPv6 routing
- BRAS (PPPoE sessions)
- SP WiFi termination (IP sessions)
- Dual stack support for PPPoE and IP sessions

CT IPv6 Dual Stack Pilot in Mobile Broad Band

MBB e2e segment IPv6 ready

Core Network features made IPv4v6-DS possible

Subscriber Database Management
 Mobility Management
 Gateway functions

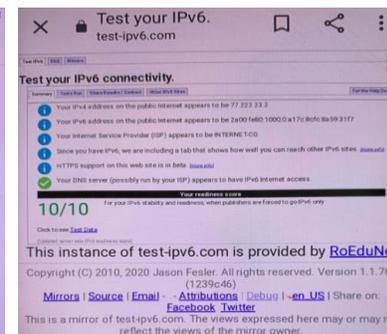
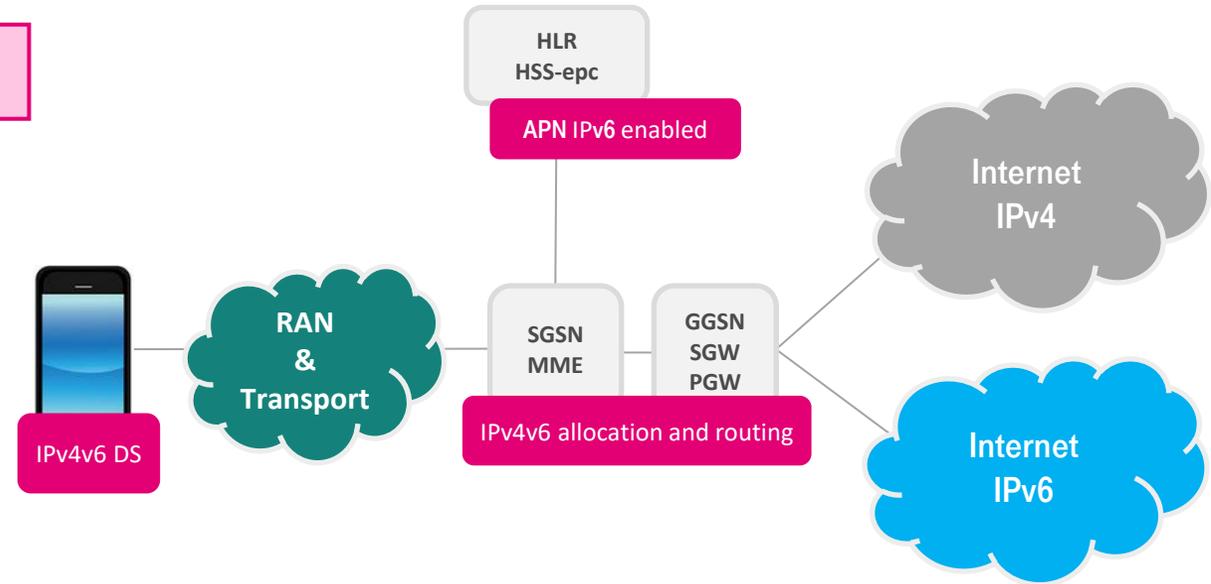
IP routers affected

Back-Bone network
 Internet Core segment
 Internet Gateway

IPv6 CT range advertisement sessions

Test scenarios in two groups

- e2e service
- Internet visibility
 - test-ipv6.com
 - ipv6-test.com
 - ipv6test.google.com
 - <https://lg.he.net/>



Looking Glass

Welcome to Hurricane Electric's Network Looking Glass. The information provided by and the support of this service are on a best effort basis. These are some of our routers at core locations within our network. We also operate a public route server accessible via telnet at route-server.he.net.

Show options

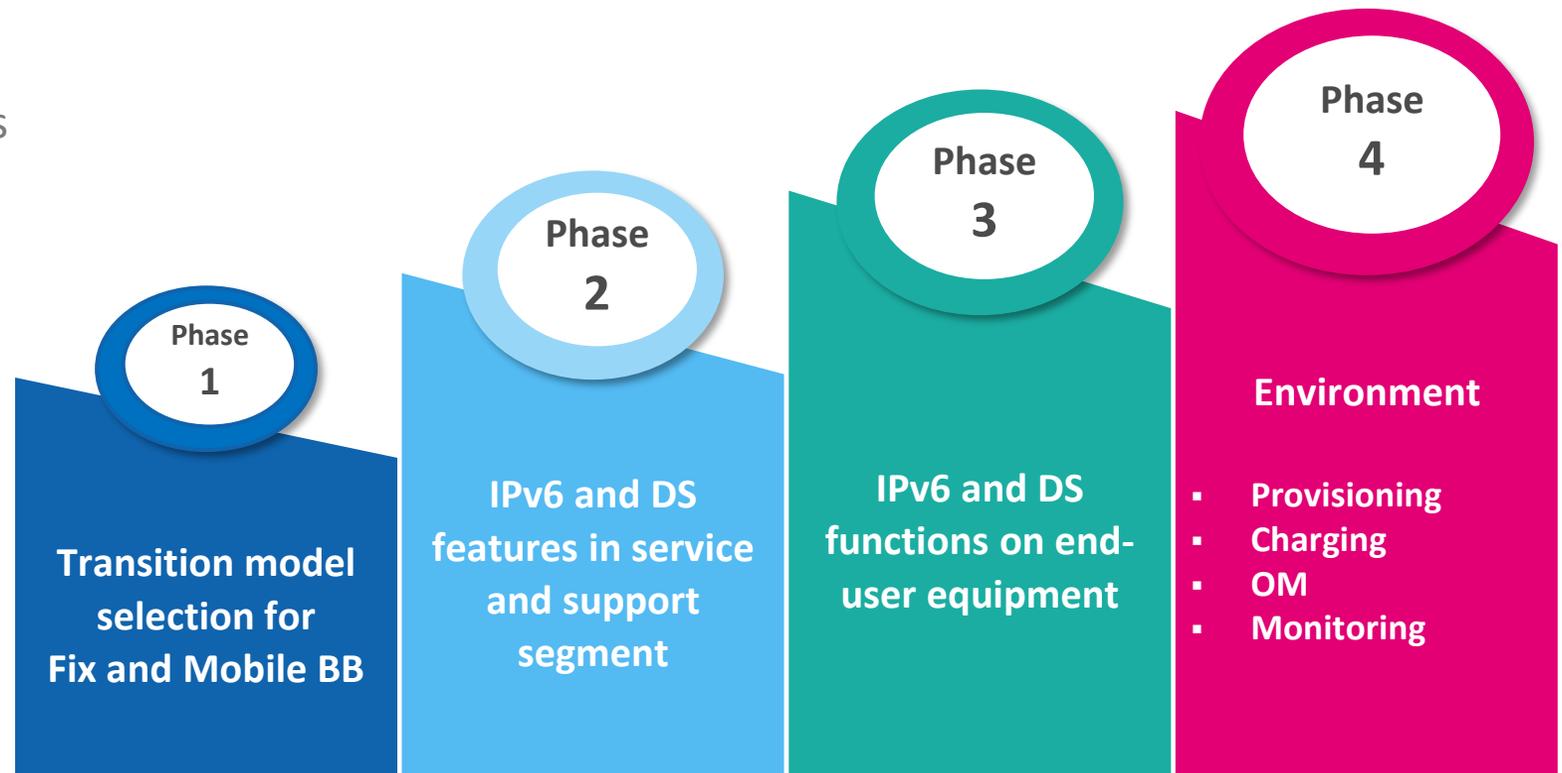
```
core3.fmt1.he.net> traceroute ipv6 2a00:fe80:1000:0:22d6:8a0:8b05:23d5 source 2001:470:0:427::1 numeric
```

Hop	Packet 1#	Packet 2#	Packet 3#	Hostname
0				2a00:fe80:1000:0:22d6:8a0:8b05:23d5
1				1
2	63 ms	63 ms	69 ms	100ge10-2.core1.nyc4.he.net (2001:470:0:296::1)
3	152 ms	146 ms	155 ms	100ge4-1.core1.par2.he.net (2001:470:0:33b::2)
4	149 ms	159 ms	149 ms	100ge5-2.core1.vie1.he.net (2001:470:0:394::2)
5	198 ms	155 ms	155 ms	100ge1-1.core1.zag1.he.net (2001:470:0:448::2)
6	176 ms	157 ms	155 ms	hrvatski-telekom-d-4.100gigabitethernet2-2.core1.zag1.he.net (2001:470:1:855::2)
7	"	"	"	"
8	198 ms	181 ms	159 ms	2a00:c30:b000::113
9	178 ms	166 ms	183 ms	2a00:c30:b000:10:61
10	166 ms	181 ms	187 ms	2a00:fe80:0:1:14
11	166 ms	167 ms	166 ms	2a00:fe80:0:1:25
12	"	"	"	"
13	190 ms	190 ms	200 ms	2a00:fe80:1000:0:22d6:8a0:8b05:23d5



Moving further - Challenges

- Large existing network and interconnectivity
- Variety of vendors and NEs
- Different IPv6 plans and RMs
- Difference in operational tools
- IPv4 world still dominant





THANK YOU