

AIS 2013, Zambia



Mobile broadband and IPv6 in Slovenia



jan@go6.si

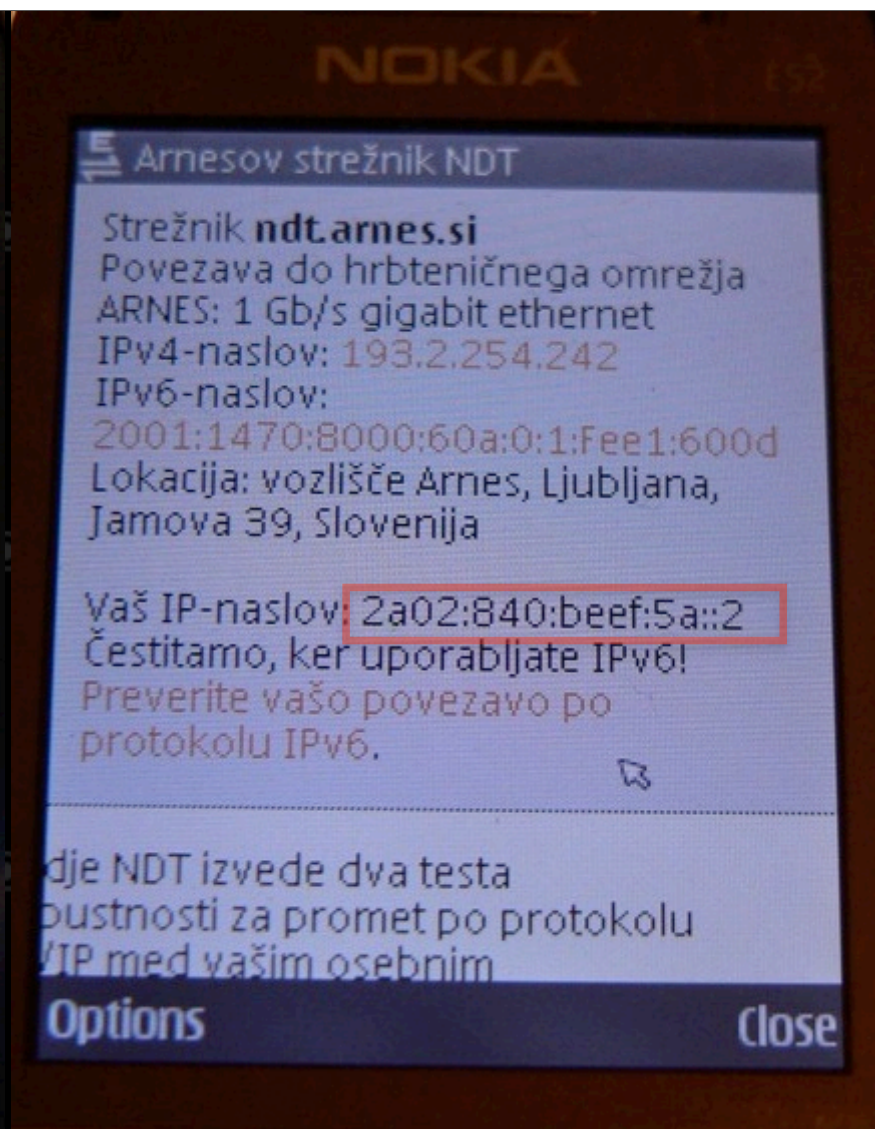
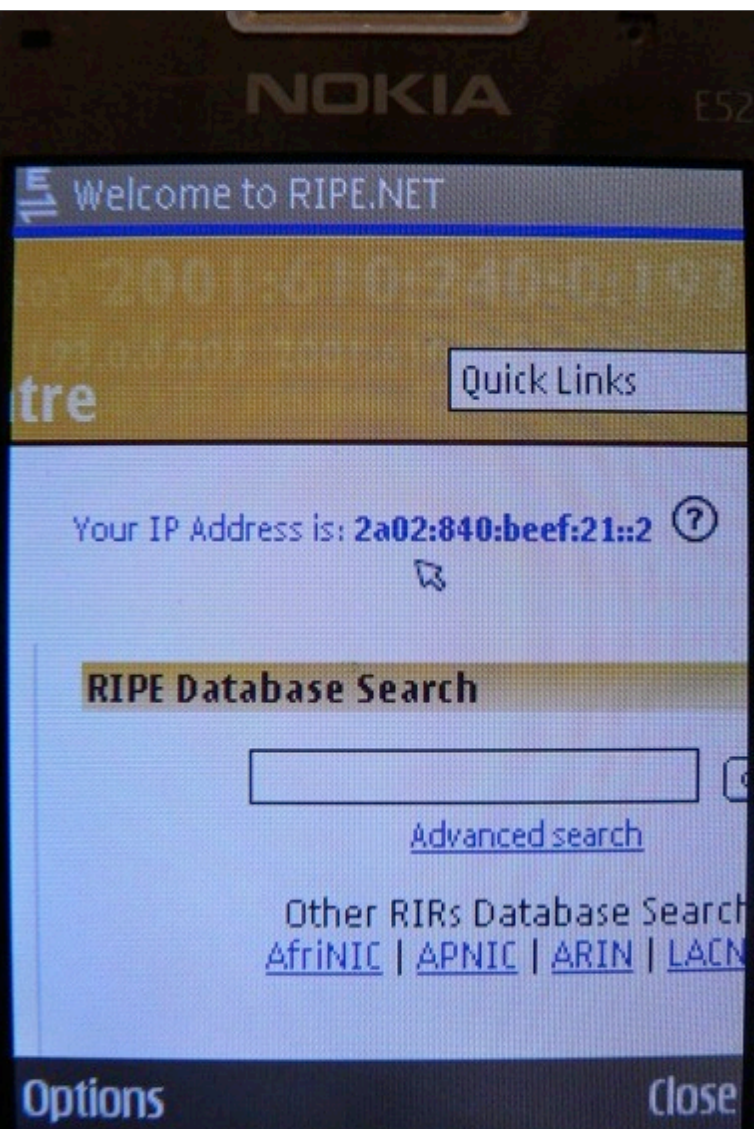
Cooperation work: Go6 as a catalyst

Disclaimer:

IPv6 in Slovenia is being promoted by the Go6 institute, this is an industry body (important message here: self regulation can work!!!) and here is one of our success stories.

Go6 as an IPv6 catalyst got 3 mobile operators **together** deploying IPv6 on 3GPP **at the same time** and here is how they did it.

Tušmobil - 2a02:840::/32AS41828





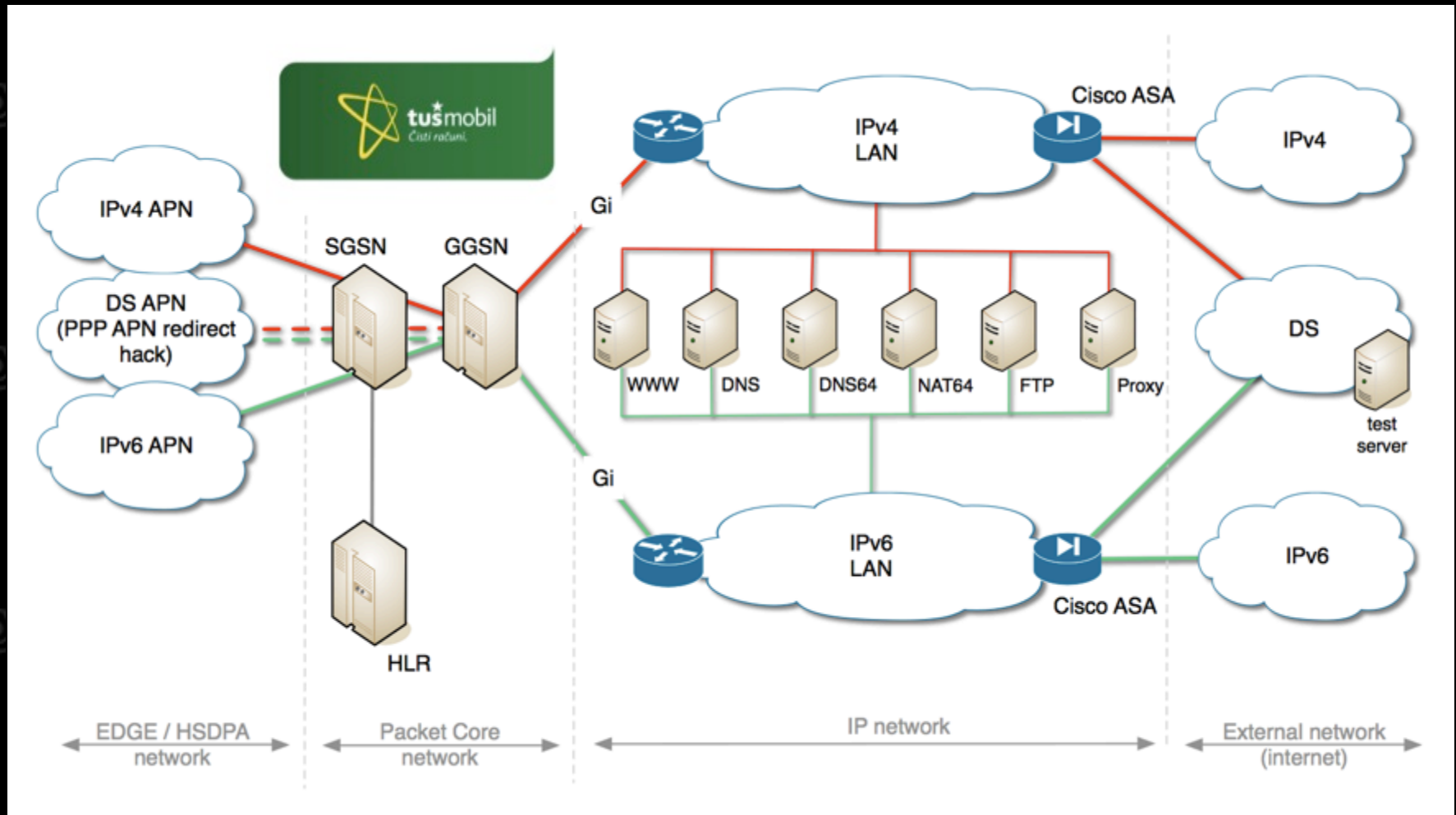
IMAP login log record:

```
Mar 5 12:07:47 go6lab dovecot: imap-  
login: Login: user=, method=PLAIN,  
rip=2a02:840:beef:4c::2,  
lip=2a02:e8:0:1::babe:face, TLS
```

SMTP log record (sending mail):

```
Mar 5 12:18:32 go6lab postfix/smtpd  
[24374]: 4AB9F2378666: client=unknown  
[2a02:840:beef:47::2],  
sasl_method=LOGIN, sasl_username=jan
```

Tušmobil - 2a02:840::/32 AS41828





Versions of software used:

- SGSN NSN, SG6
- GGSN NSN, FlexiISN v 3.2 CD7
- Firewall Cisco ASA v7.2
- DNS64 totd 1.5.1
- NAT64 ecdysis-nf-nat64-20100226 @gentoo 2.6.3
- Mobile Nokia e52

Mobitel - 2a02:e20::/32AS29276

NOKIA ES2

Welcome to RIPE.NET

About RIPE NCC | Contact | Search

2001:610:240:0:193

Quick Links

Your IP Address is:
2a02:e20:c000:102:fdaa:eccc:e0a0:c70e

RIPE Database Search

Advanced search

Other RIRs Database Search:
[Afrinic](#) | [APNIC](#) | [ARIN](#) | [LACNIC](#)

Možnosti Zapri

NOKIA ES2

3G Arnesov strežnik NDT

Strežnik **ndt.arnes.si**
Povezava do hrbteničnega omrežja
ARNES: 1 Gb/s gigabit ethernet
IPv4-naslov: 193.2.254.242
IPv6-naslov:
2001:1470:8000:60a:0:1:fee1:600d
Lokacija: vozlišče Arnes, Ljubljana,
Jamova 39, Slovenija

Vaš IP-naslov:
2a02:e20:c000:101:2524:e756:99cf:d20

Čestitamo, ker uporabljate IPv6!
Preverite vašo povezavo po
protokolu IPv6.

ie NDT izvede dva testa

Možnosti Zapri



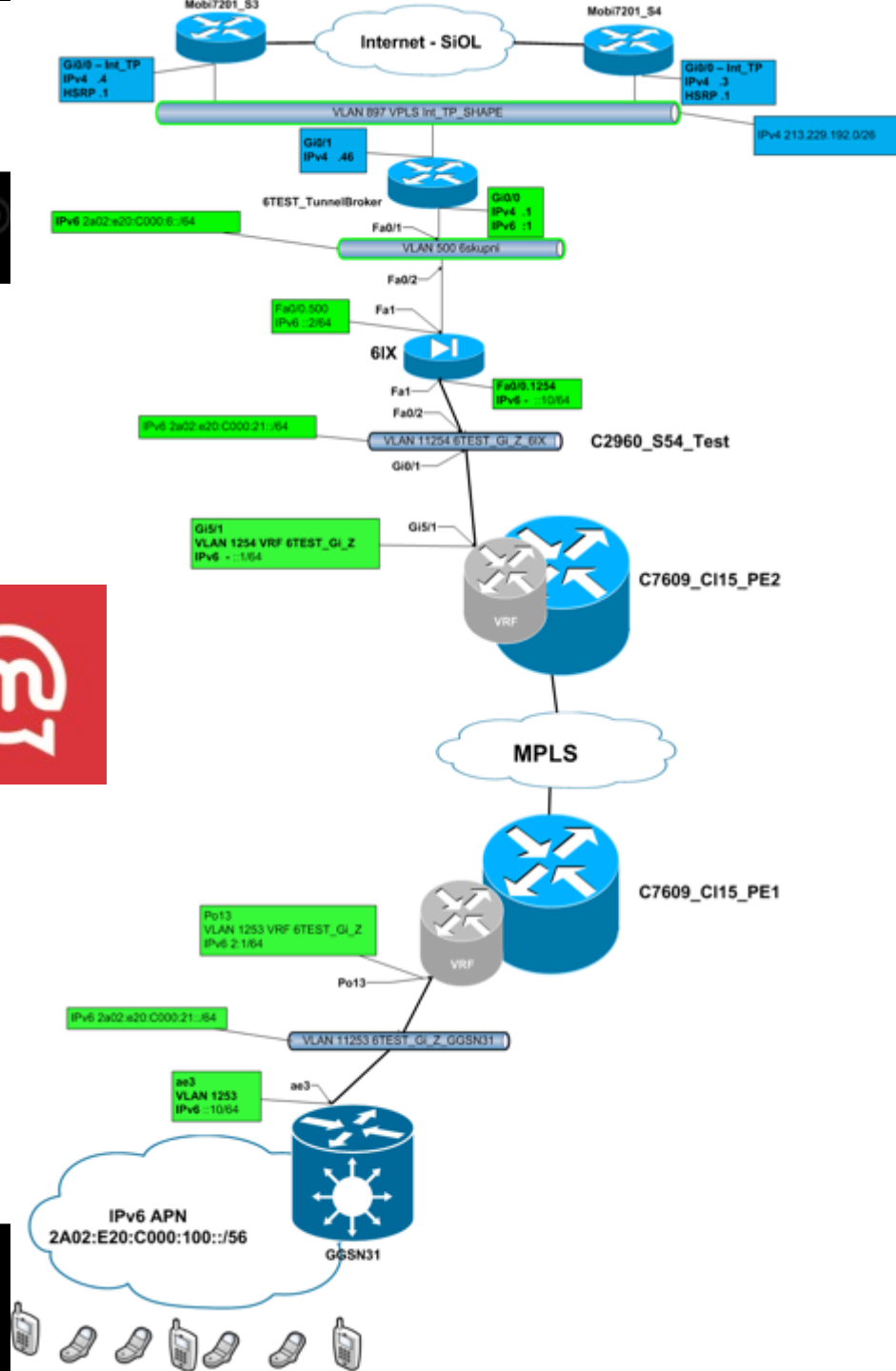
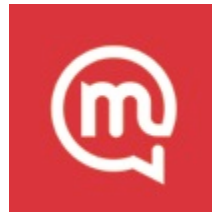
Mobitel and IPv6



- Packet core is IPv6 ready
- IPv6 only PDP context
 - IPv4 and IPv6 in same PDP context not supported jet
- 6VPE over MBICORE
 - Static routing

Terminals

- Each terminal gets /64
- Problems with IPv6 PPP and DNS
 - Manual config
- Limited terminal support
 - Nokia E and N series → OK
 - Window mobile 6.1 → No support
 - Data cards → Natively no support





Versions of software used:

- SGSN Ericsson Mk IV 2008B Dual Access
- GGSN Ericsson/Juniper J120 2009A
- MPLS Cisco 7609 Version 12.2(33)SRC2



Show stoppers...

What is still missing?

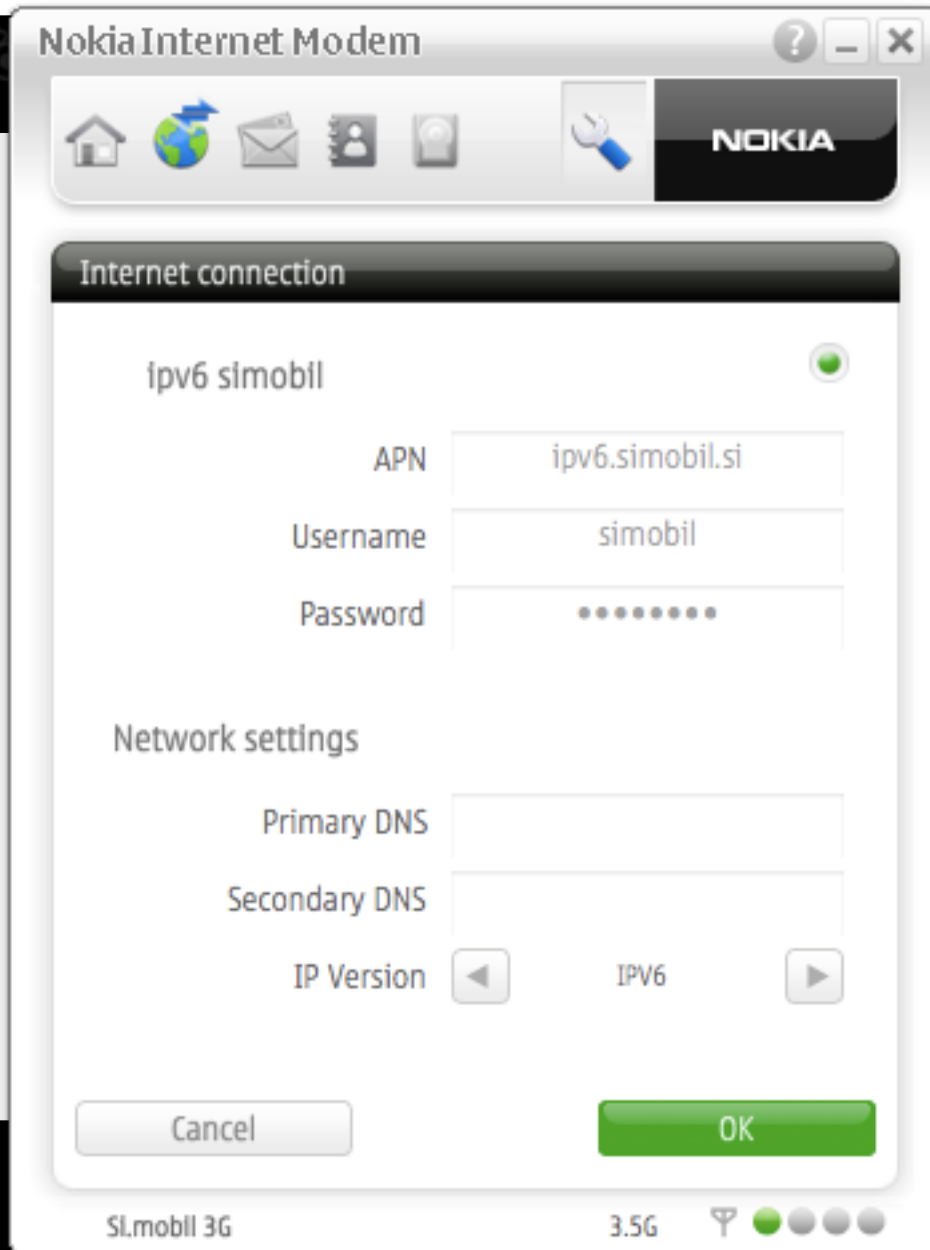
- No wide support in mobile terminals (Symbian, Meego and Android 4)
- Content based charging – not existent
- Limited or no support for dual-stack in terminals

Simobil network



- Test IPv6 enabled APN was fully functional in December 2011
- Dual-stacked (IPv4 and IPv6 PDP connections possible)
- Cisco GGSN will support PDPv4v6 in Q1 2012

Simobil network



Simobil network



```
en2: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
    ether 02:94:72:dc:0b:8a
    inet6 fe80::94:72ff:fedc:b8a%en2 prefixlen 64 scopeid 0x8
    inet6 2a00:1a20:2000:79:94:72ff:fedc:b8a prefixlen 64 autoconf
    inet6 2a00:1a20:2000:79:9096:d8c7:286a:6168 prefixlen 64 autoconf temporary
    media: autoselect (10baseT/UTP <full-duplex>)
    status: active
```

```
jan-mac:~ janzorz$ ping6 go6.si
PING6(56=40+8+8 bytes) 2a00:1a20:2000:79:9096:d8c7:286a:6168 --> 2a02:e8:0:1::babe:face
16 bytes from 2a02:e8:0:1::babe:face, icmp_seq=0 hlim=57 time=265.979 ms
16 bytes from 2a02:e8:0:1::babe:face, icmp_seq=1 hlim=57 time=645.656 ms
16 bytes from 2a02:e8:0:1::babe:face, icmp_seq=2 hlim=57 time=1036.864 ms
16 bytes from 2a02:e8:0:1::babe:face, icmp_seq=3 hlim=57 time=357.058 ms
16 bytes from 2a02:e8:0:1::babe:face, icmp_seq=4 hlim=57 time=296.313 ms
16 bytes from 2a02:e8:0:1::babe:face, icmp_seq=5 hlim=57 time=277.160 ms
16 bytes from 2a02:e8:0:1::babe:face, icmp_seq=6 hlim=57 time=267.538 ms
```


Simobil network



This page shows your IPv6 and/or IPv4 address

You are connecting with an **IPv6** Address of:

2a00:1a20:2000:79:9096:d8c7:286a:6168

[IPv4 only Test](#)

[Normal Test](#)

[IPv6 only Test](#)

If the IPv6 only test shows "The page cannot be displayed" (Internet Explorer), "Server not found" (Firefox), any error or search page then you do not have working IPv6 connectivity. "Normal Test" shows which protocol your browser prefers when you have both IPv4 and IPv6 connectivity. This page should work even on computers with IPv6 only connectivity.

Simobil network



This page shows your IPv6 and/or IPv4 address

You are connecting with an **IPv4** Address of:

109.239.178.7

[IPv4 only Test](#)

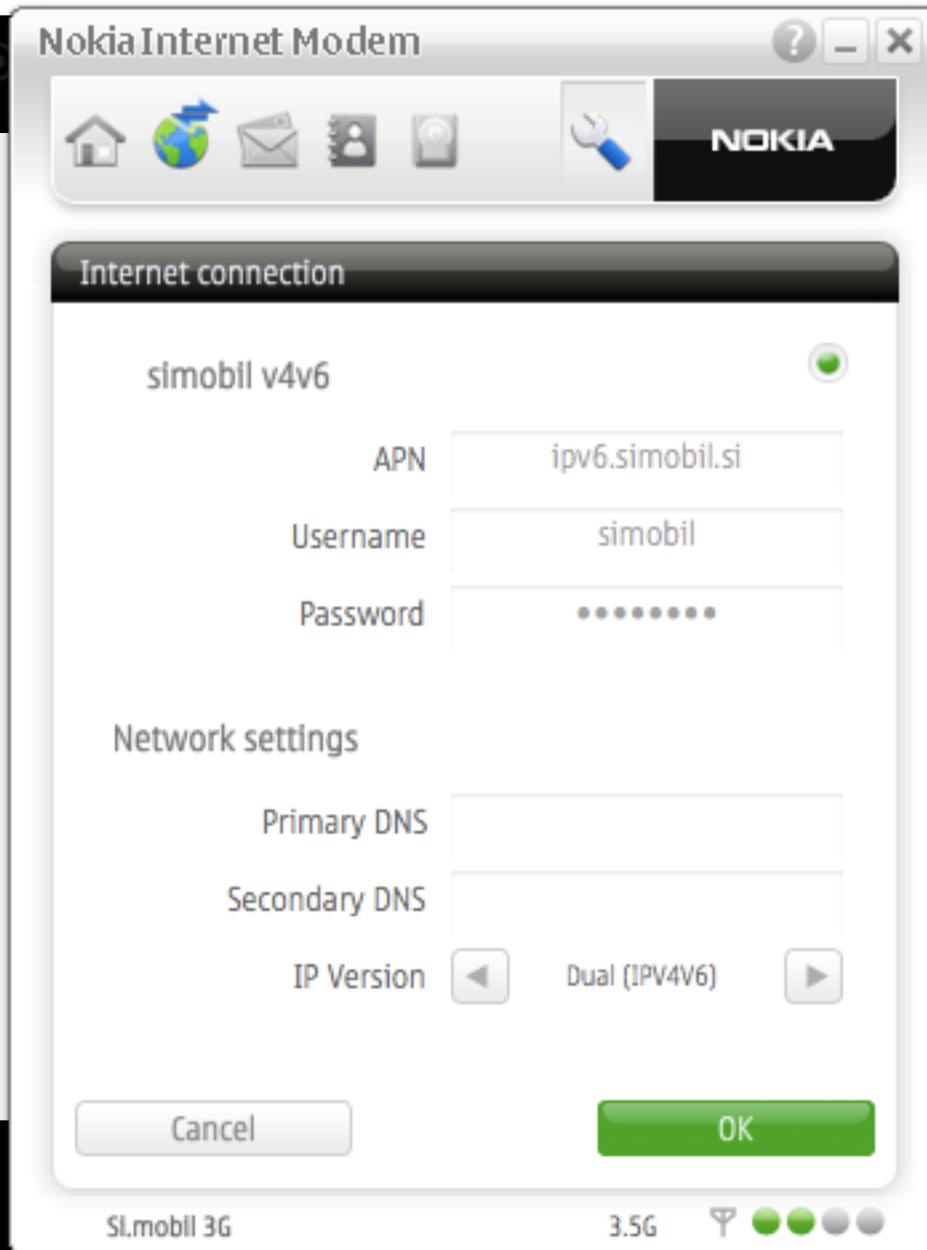
[Normal Test](#)

[IPv6 only Test](#)

If the IPv6 only test shows "The page cannot be displayed" (Internet Explorer), "Server not found" (Firefox), any error or search page then you do not have working IPv6 connectivity. "Normal Test" shows which protocol your browser prefers when you have both IPv4 and IPv6 connectivity. This page should work even on computers with IPv6 only connectivity.

You can access this page with any of these easy to remember url's:

Simobil network



Simobil network



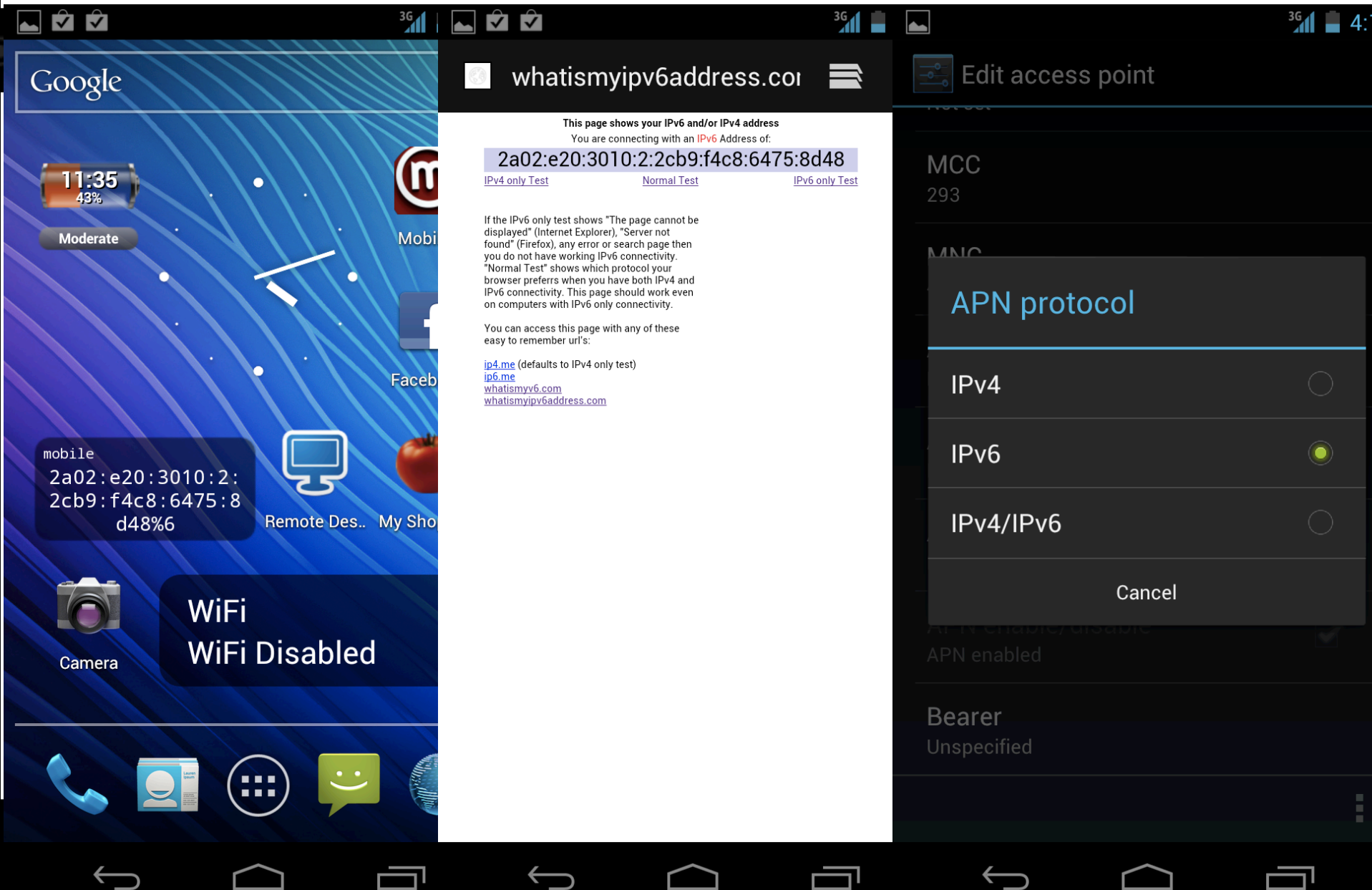
Two PDP contexts also works in parallel
PDPv4 and PDPv6.

```
status: inactive
en2: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
ether 02:94:72:dc:0b:8a
inet6 fe80::94:72ff:fedc:b8a%en2 prefixlen 64 scopeid 0x8
inet6 2a00:1a20:2000:7b:94:72ff:fedc:b8a prefixlen 64 autoconf
inet6 2a00:1a20:2000:7b:d5e0:4fd3:5e34:dddc prefixlen 64 autoconf temporary
inet 46.122.127.196 netmask 0xffffffff broadcast 46.122.127.255
media: autoselect (10baseT/UTP <full-duplex>)
status: active
```


Nokia is ahead with IPv6 on mobile devices (21M-02)



Samsung Galaxy Nexus (Android 4) - IPv6 on 3G capable



Recommended reading – RFC 6459

← → ↻ art.tools.ietf.org/html/rfc6459

Internet Engineering Task Force (IETF)
Request for Comments: 6459
Category: Informational
ISSN: 2070-1721

J. Korhonen, Ed.
Nokia Siemens Networks
J. Soininen
Renesas Mobile
B. Patil
T. Savolainen
G. Bajko
Nokia
K. Iisakkila
Renesas Mobile
January 2012

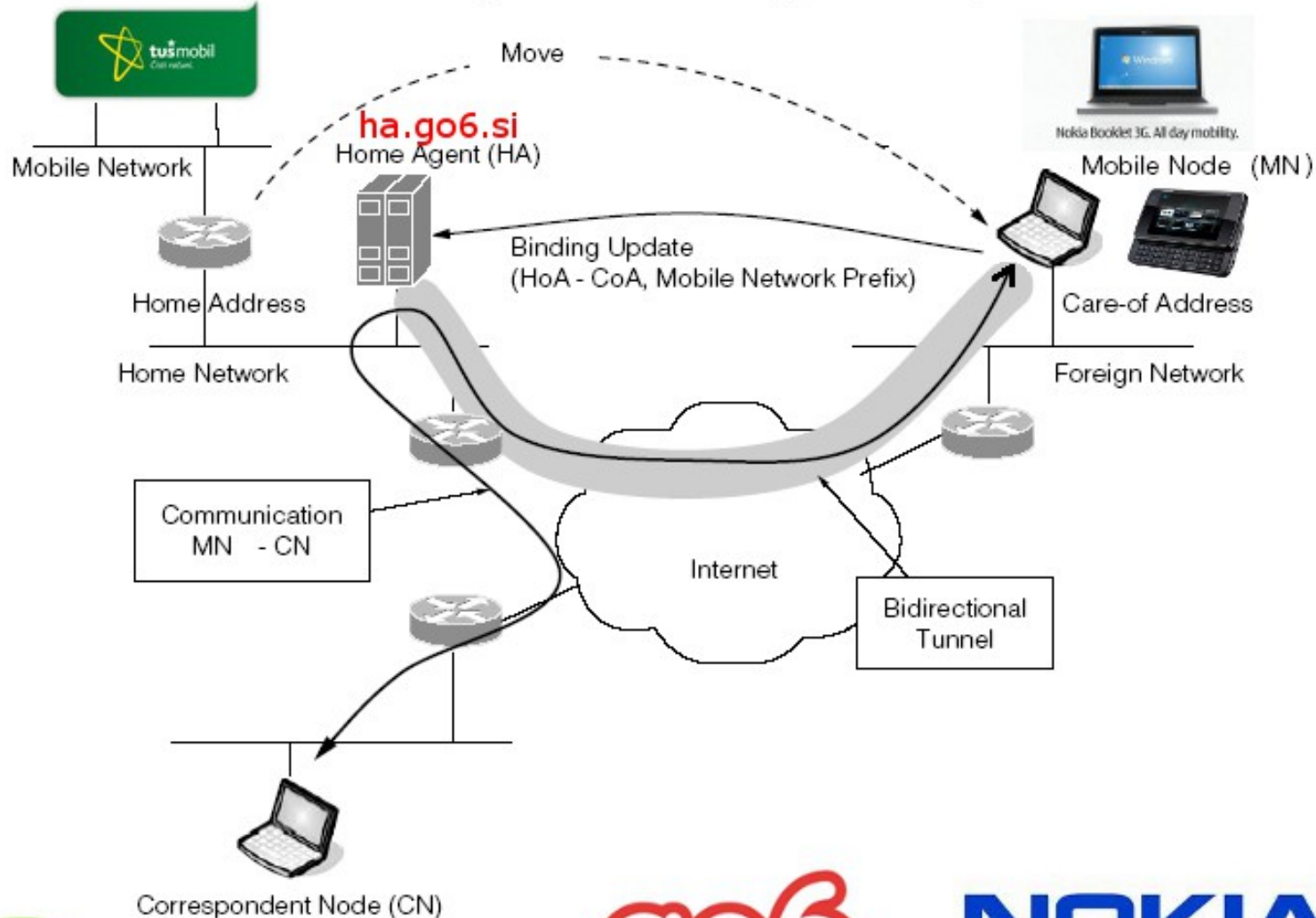
IPv6 in 3rd Generation Partnership Project (3GPP) Evolved Packet System (EPS)

Abstract

The use of cellular broadband for accessing the Internet and other data services via smartphones, tablets, and notebook/netbook computers has increased rapidly as a result of high-speed packet data networks such as HSPA, HSPA+, and now Long-Term Evolution (LTE) being deployed. Operators that have deployed networks based on 3rd Generation Partnership Project (3GPP) network architectures are facing IPv4 address shortages at the Internet registries and are feeling pressure to migrate to IPv6. This document describes the support for IPv6 in 3GPP network architectures.

Dual Stack Mobile IPv6

DSMIPv6-TLS Home Agent server setup, hosted by Tušmobil



Nokia Research Center



NOKIA
CONNECTING PEOPLE

Contacts...



- Questions regarding go6 institute, platform and Slo IPv6 initiative: jan@go6.si
- Questions regarding IPv6 in Tušmobil: miha.petkovsek@tusmobil.si
- Questions regarding IPv6 in Mobitel: primoz.jenko@mobitel.si
- Questions regarding IPv6 in Simobil: petra.verlic@simobil.si

Questions?



- Thank you.

<http://go6.si/>

