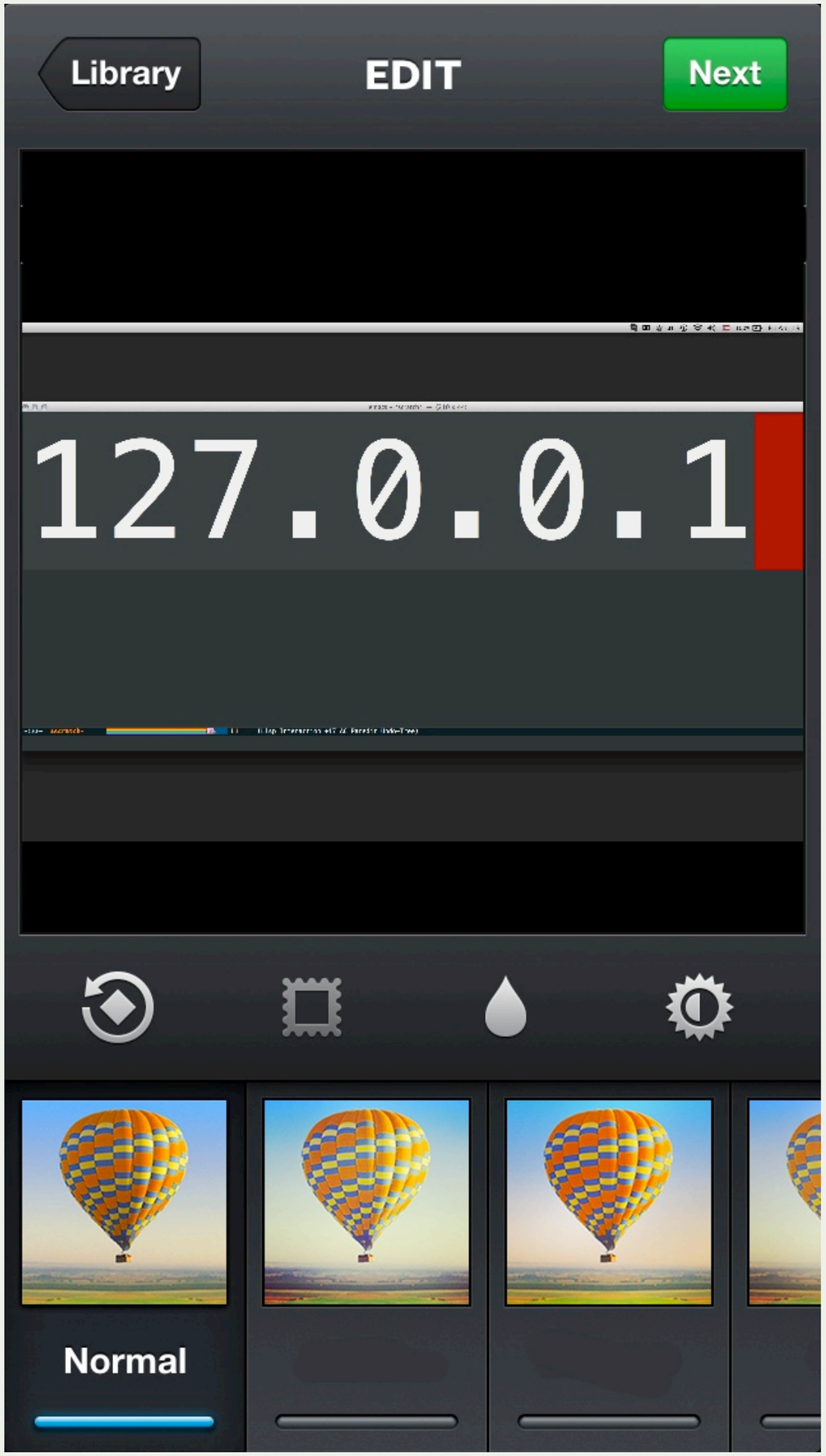
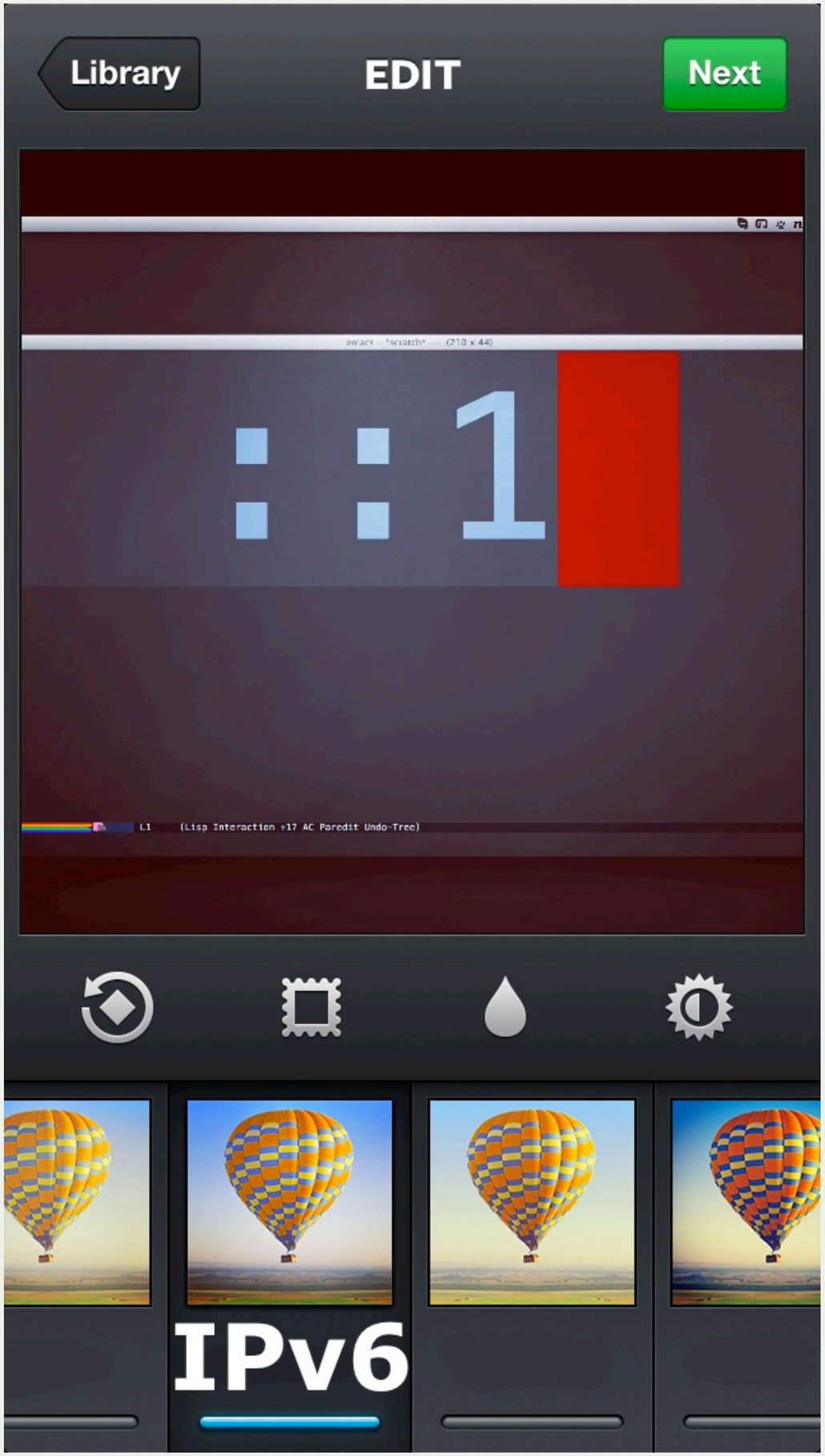
IPv6

@dk379 :: @darkproger

@dk379 :: @darkproger


Library
EDIT
Next
127.0.0.1
Normal


Library
EDIT
Next
::1
IPv6

проблемы v4

NAT

```
# pfctl -sn
nat on em0 inet from 10.10.10.0/24    \
                    to any -> 11.22.33.44
```

Highscore: 60
Score:

Приватные IP

Публичные IP

NAT роутер
с публичным IP

пробивание NAT

Highscore: 39340
Score: 5850
500
500
500
Moby Games

p2p-приложения

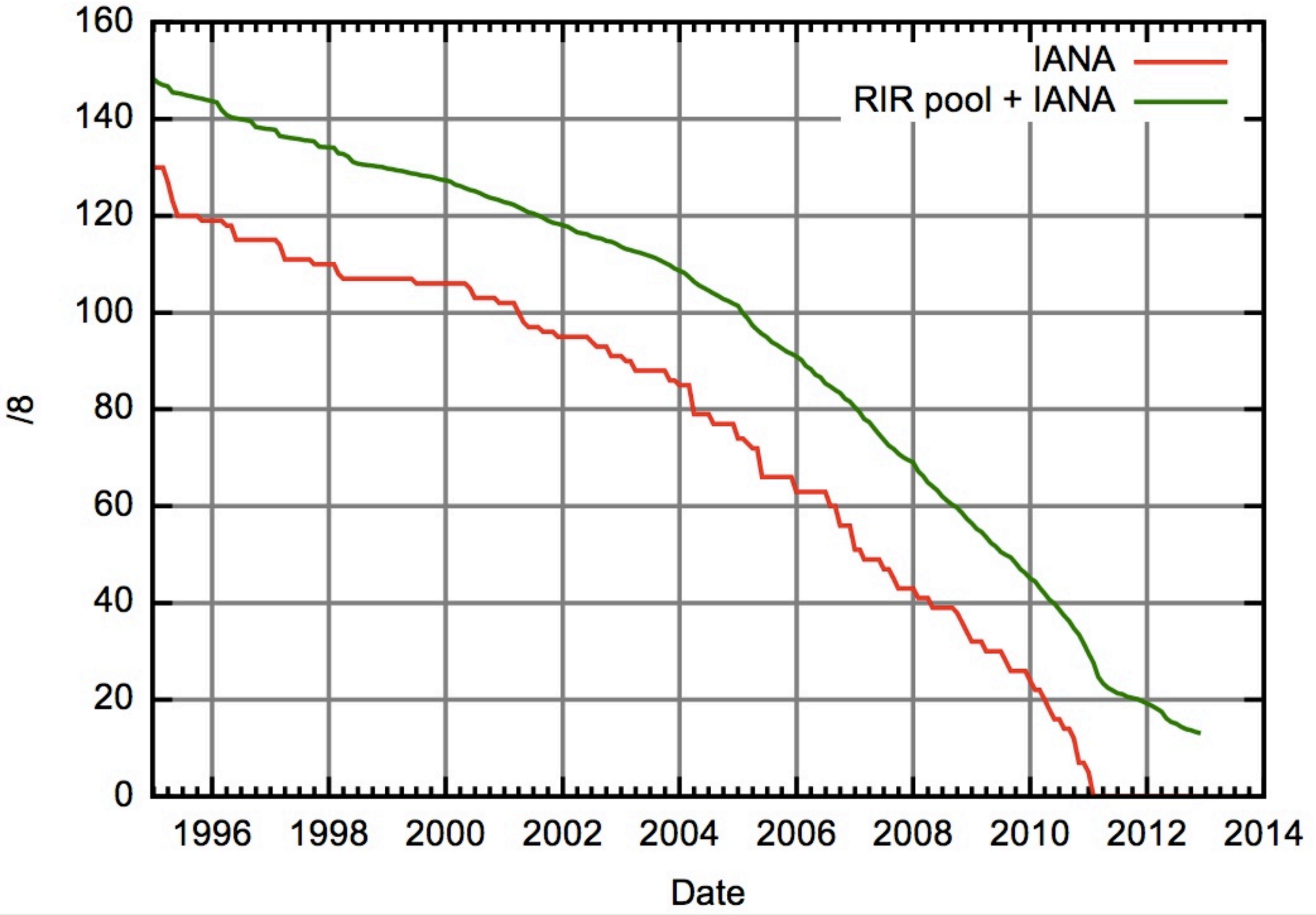
p2p-приложения

Relays

Hole punching

STUN TURN ICE NAT-T

количество адресов


160
140
120
100
80
60
40
20
0
/8
IANA
RIR pool + IANA
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
Date

“Microsoft bought 666,624 IPv4 addresses from Nortel's liquidation sale for $7.5 million”

http://en.wikipedia.org/wiki/IPv4_address_exhaustion

“Microsoft ,624 IPv4 addre ortel's liquidatio .5 million”

http://en.wikipedia.org/wiki/IPv4_address_exhaustion

IPv6

NAT не нужен!

IPsec

(из коробки)

мультикаст

(из коробки)

NO DHCP SERVER
169.254.14.7
quickmeme.com

HBO's Game of Thrones : Locations Guide *with Spoilers!*

мобильность

RIR/12 Site/48 MAC

1337:face:dead:beef:ba5e:ba11:cafe:babe

ISP/32 Net/64

Приложения

QUAKE III ARENA

LOADING... CLIENTS

EVIL PLAYGROUND
TOURNAMENT
FRAGLIMIT 10

Moby Games

210 fps

Orbb

20 1 0

66 94 67

Moby Games

```
% ping 255.255.255.255
PING 255.255.255.255 (255.255.255.255): 56 data bytes
64 bytes from 192.168.60.68: icmp_seq=0 ttl=64 time=0.077 ms
64 bytes from 192.168.60.84: icmp_seq=0 ttl=64 time=1.436 ms
64 bytes from 192.168.60.21: icmp_seq=0 ttl=255 time=1.876 ms
64 bytes from 192.168.60.20: icmp_seq=0 ttl=255 time=1.880 ms
64 bytes from 192.168.60.114: icmp_seq=0 ttl=64 time=1.883 ms
64 bytes from 192.168.60.123: icmp_seq=0 ttl=255 time=36.435 ms
64 bytes from 192.168.60.77: icmp_seq=0 ttl=64 time=53.567 ms
64 bytes from 192.168.60.98: icmp_seq=0 ttl=64 time=53.575 ms
...
```

```
# tcpdump -ni en0 ip broadcast
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on en0, link-type EN10MB (Ethernet), capture size 65535 bytes
17:09:20.938067 IP 192.168.60.92.17500 > 255.255.255.255.17500: UDP, length 142
17:09:21.143404 IP 192.168.60.77.17500 > 255.255.255.255.17500: UDP, length 323
17:09:22.638120 IP 192.168.60.252.32772 > 255.255.255.255.7423: UDP, length 173
17:09:22.780173 IP 192.168.60.55.17500 > 255.255.255.255.17500: UDP, length 111
17:09:22.991891 IP 0.0.0.0.68 > 255.255.255.255.67: BOOTP/DHCP, Request from
98:d6:f7:64:93:3e, length 300
17:09:25.033924 IP 192.168.60.104.17500 > 255.255.255.255.17500: UDP, length 130
17:09:25.037686 IP 192.168.60.104.17500 > 255.255.255.255.17500: UDP, length 130
17:09:25.039651 IP 192.168.60.104.17500 > 255.255.255.255.17500: UDP, length 130
17:09:25.858068 IP 192.168.60.252.32772 > 255.255.255.255.7423: UDP, length 173
17:09:28.925428 IP 192.168.60.252.32772 > 255.255.255.255.7423: UDP, length 173
```

tcpdump -ni en0 ip broadcast

```
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on en0, link-type EN10MB (Ethernet), capture size 65535 bytes
17:09:20.938067 IP 192.168.60.92.17500 > 255.255.255.255.17500: UDP, length 142
17:09:21.143404 IP 192.168.60.77.17500 > 255.255.255.255.17500: UDP, length 323
17:09:22.638120 IP 192.168.60.252.32772 > 255.255.255.255.7423: UDP, length 173
17:09:22.780173 IP 192.168.60.92.17500 > 255.255.255.255.17500: UDP, length 111
17:09:22.991891 IP 0.0.0.0.68 > 255.255.255.255.67: BOOTP/DHCP, Request from
98:d6:f7:64:93:3e, length 300
17:09:25.033924 IP 192.168.60.104.17500 > 255.255.255.255.17500: UDP, length 130
17:09:25.037686 IP 192.168.60.104.17500 > 255.255.255.255.17500: UDP, length 130
17:09:25.039651 IP 192.168.60.104.17500 > 255.255.255.255.17500: UDP, length 130
17:09:25.858068 IP 192.168.60.252.32772 > 255.255.255.255.7423: UDP, length 173
17:09:28.925428 IP 192.168.60.252.32772 > 255.255.255.255.7423: UDP, length 173
```

DHCP

Dropbox

Shared Printer

```
# tcpdump -ni en0 ip6 multicast
```

пикап

пикап

tcpdump -ni en0 ip6 multicast

```
21:38:08.629032 IP6 fe80::165a:5ff:fe8a:5d70.5353 > ff02::fb.5353: 0*- [0q] 4/0/4 (Cache
flush) PTR Xenias-iPhone.local., (Cache flush) AAAA fe80::165a:5ff:fe8a:5d70, (Cache
flush) PTR Xenias-iPhone.local., (Cache flush) A 192.168.22.53 (276)
21:38:09.040701 IP6 fe80::52ea:d6ff:fe0a:f6d2.5353 > ff02::fb.5353: 0*- [0q] 8/0/4
(Cache flush) TXT "", PTR _apple-mobdev._tcp.local., PTR
50:ea:d6:0a:f6:d2@fe80::52ea:d6ff:fe0a:f6d2._apple-mobdev._tcp.local., (Cache flush) SRV
Tina4.local.:62078 0 0, (Cache flush) PTR Tina4.local., (Cache flush) PTR Tina4.local.,
(Cache flush) AAAA fe80::52ea:d6ff:fe0a:f6d2, (Cache flush) A 192.168.22.44 (413)
21:38:15.691150 IP6 fe80::66a3:cbff:fe3e:de92.5353 > ff02::fb.5353: 0 [2q] PTR (QU)?
_airplay._tcp.local. PTR (QU)? _raop._tcp.local. (49)
21:38:36.071442 IP6 :: > ff02::1:ff28:c9cc: ICMP6, neighbor solicitation, who has
fe80::76e2:f5ff:fe28:c9cc, length 24
21:38:36.072375 IP6 fe80::76e2:f5ff:fe28:c9cc > ff02::2: ICMP6, router solicitation,
length 8
21:38:36.477083 IP6 fe80::76e2:f5ff:fe28:c9cc > ff02::16: HBH ICMP6, multicast listener
report v2, 2 group record(s), length 48
21:38:40.991596 IP6 fe80::52ea:d6ff:fe0a:f6d2.5353 > ff02::fb.5353: 0*- [0q] 8/0/4
(Cache flush) TXT "", PTR _apple-mobdev._tcp.local., PTR
50:ea:d6:0a:f6:d2@fe80::52ea:d6ff:fe0a:f6d2._apple-mobdev._tcp.local., (Cache flush) SRV
Tina4.local.:62078 0 0, (Cache flush) PTR Tina4.local., (Cache flush) PTR Tina4.local.,
(Cache flush) AAAA fe80::52ea:d6ff:fe0a:f6d2, (Cache flush) A 192.168.22.44 (413)
21:38:43.542790 IP6 :: > ff02::16: HBH ICMP6, multicast listener report v2, 2 group
record(s), length 48
21:38:43.548251 IP6 :: > ff02::1:ff3b:1c4: ICMP6, neighbor solicitation, who has
fe80::42a6:d9ff:fe3b:1c4, length 24
21:38:43.549206 IP6 fe80::42a6:d9ff:fe3b:1c4 > ff02::2: ICMP6, router solicitation,
length 8
21:38:44.056222 IP6 fe80::42a6:d9ff:fe3b:1c4 > ff02::16: HBH ICMP6, multicast listener
report v2, 2 group record(s), length 48
21:38:44.771675 IP6 :: > ff02::16: HBH ICMP6, multicast listener report v2, 2 group
record(s), length 48
```

tcpdump -ni en0 ip6 multicast

```
21:38:08.629032 IP6 fe80::165a:5ff:fe8a:5d70.5353 > ff02::fb.5353: 0*- [0q] 4/0/4 (Cache flush)
PTR Xenias-iPhone.local., (Cache flush) AAAA fe80::165a:5ff:fe8a:5d70, (Cache
flush) PTR Xenias-iPhone.local., (Cache flush) A 192.168.22.53 (276)
21:38:09.040701 IP6 fe80::52ea:d6ff:fe0a:f6d2.5353 > ff02::fb.5353: 0*- [0q] 8/0/4 (Cache
flush) TXT "", PTR _apple-mobdev._tcp.local., PTR
50:ea:d6:0a:f6:d2@fe80::52ea:d6ff:fe0a:f6d2._apple-mobdev._tcp.local., (Cache flush) SRV
Tina4.local.:62078 0 0, (Cache flush) PTR Tina4.local., (Cache flush) PTR Tina4.local.,
(Cache flush) AAAA fe80::52ea:d6ff:fe0a:f6d2, (Cache flush) A 192.168.22.44 (413)
21:38:15.691150 IP6 fe80::66a3:cbff:fe3e:de92.5353 > ff02::fb.5353: 0 [2q] PTR (QU)?
_airplay._tcp.local. PTR (QU)? _raop._tcp.local. (49)
21:38:36.071442 IP6 :: > ff02::1:ff28:c9cc: ICMP6, neighbor solicitation, who has
fe80::76e2:f5ff:fe28:c9cc, length 24
21:38:36.072375 IP6 fe80::76e2:f5ff:fe28:c9cc > ff02::2: ICMP6, router solicitation, length 8
21:38:36.477083 IP6 fe80::76e2:f5ff:fe28:c9cc > ff02::16: HBH ICMP6, multicast listener report
v2, 2 group record(s), length 48
21:38:40.991596 IP6 fe80::52ea:d6ff:fe0a:f6d2.5353 > ff02::fb.5353: 0*- [0q] 8/0/4 (Cache
flush) TXT "", PTR _apple-mobdev._tcp.local., PTR
50:ea:d6:0a:f6:d2@fe80::52ea:d6ff:fe0a:f6d2._apple-mobdev._tcp.local., (Cache flush) SRV
Tina4.local.:62078 0 0, (Cache flush) PTR Tina4.local., (Cache flush) PTR
Tina4.local., (Cache flush) AAAA fe80::52ea:d6ff:fe0a:f6d2, (Cache flush) A
192.168.22.44 (413)
21:38:43.542790 IP6 :: > ff02::16: HBH ICMP6, multicast listener report v2, 2 group record(s),
length 48
21:38:43.548251 IP6 :: > ff02::1:ff3b:1c4: ICMP6, neighbor solicitation, who has
fe80::42a6:d9ff:fe3b:1c4, length 24
21:38:43.549206 IP6 fe80::42a6:d9ff:fe3b:1c4 > ff02::2: ICMP6, router solicitation, length 8
21:38:44.056222 IP6 fe80::42a6:d9ff:fe3b:1c4 > ff02::16: HBH ICMP6, multicast listener report
v2, 2 group record(s), length 48
21:38:44.771675 IP6 :: > ff02::16: HBH ICMP6, multicast listener report v2, 2 group record(s),
length 48
```

tcpdump -ni en0 ip6 multicast

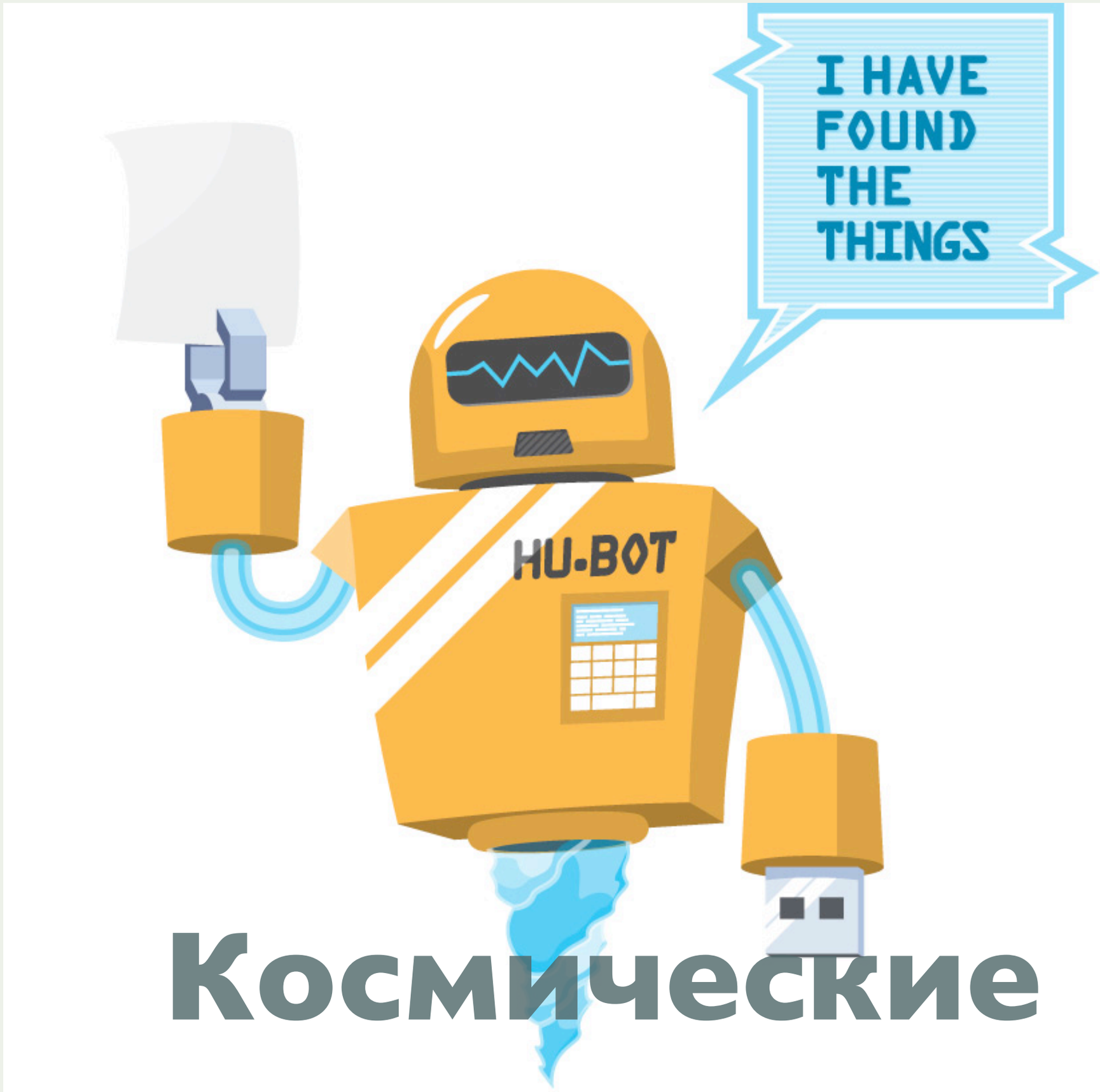
21:38:08.629032 IP6 fe80::165a:5ff:fe8a:5d70.5353 > ff02::fb.5353: 0*- [0q] 4/0/4 (Cache flush) PTR Xenias-iPhone.local., (Cache flush) AAAA fe80::165a:5ff:fe8a:5d70, (Cache flush) PTR Xenias-iPhone.local., (Cache flush) A 192.168.22.53 (276)
21:38:09.040701 IP6 fe80::52ea:d6ff:fe0a:f6d2.5353 > ff02::fb.5353: 0*- [0q] 8/0/4 (Cache flush) TXT "", PTR _apple-mobdev._tcp.local., PTR 50:ea:d6:0a:f6:d2@fe80::52ea:d6ff:fe0a:f6d2._apple-mobdev._tcp.local., (Cache flush) SRV Tina4.local.:62078 0 0, (Cache flush) PTR Tina4.local., (Cache flush) PTR Tina4.local., (Cache flush) AAAA fe80::52ea:d6ff:fe0a:f6d2, (Cache flush) A 192.168.22.44 (413)
21:38:15.691150 IP6 fe80::66a3:cbff:fe3e:de92.5353 > ff02::fb.5353: 0 [2q] PTR (QU)? _airplay._tcp.local. PTR (QU)? _raop._tcp.local. (49)
21:38:36.071442 IP6 :: > ff02::1:ff28:c9cc: ICMP6, neighb[illegible]ication, who[illegible] fe80::76e2:f5ff:fe28:c9cc, length 24
21:38:36.072375 IP6 fe80::76e2:f5ff:fe28:c9cc > ff02[illegible], rout[illegible]solicitation, [illegible]8
21:38:36.477083 IP6 fe80::76e2:f5ff:fe28:c9cc > ff02[illegible] HBH ICMP6, m[illegible]icast listen[illegible] report v2, 2 group record(s), length 48
21:38:40.991596 IP6 fe80::52ea:d6ff:fe0a:f6d2.5353 > [illegible]::fb.5353: 0*- [0[illegible] 8/0/4 (Ca[illegible] flush) TXT "", PTR _apple-mobdev._tcp.local., PTR 50:ea:d6:0a:f6:d2@fe80::52ea:d6ff:fe0a:f6d2._apple-mo[illegible]_tcp.loca[illegible]., (Cache flush) SR[illegible] Tina4.local.:62078 0 0, (Cache flush) PTR Tin[illegible].local., (Cache fl[illegible]TR Tina4.local., (Cache flush) AAAA fe80::52ea:d6ff:fe0a:f[illegible]2, (Cache flush) A 192.168.22.44 (413)
21:38:43.542790 IP6 :: > ff02::16: HBH ICMP6, multicast listen[illegible]report v2, 2 gr[illegible]p record(s), length 48
21:38:43.548251 IP6 :: > ff02::1:ff3b:1c4: ICMP6, neighbor solicit[illegible]tion, who h[illegible] fe80::42a6:d9ff:fe3b:1c4, length 24
21:38:43.549206 IP6 fe80::42a6:d9ff:fe3b:1c4 > ff02::2: ICMP6, [illegible]so[illegible]n, length 8
21:38:44.056222 IP6 fe80::42a6:d9ff:fe3b:1c4 > ff02::16: HBH ICM[illegible]ult[illegible]listener report v2, 2 group record(s), length 48
21:38:44.771675 IP6 :: > ff02::16: HBH ICMP6, multicast listener report v2, 2 group record(s), length 48

Tiësto`s club life podcast 315
Henrix & Jakob Liedholm Ft. Giuseppe Viola - Losing My Mind
33:28 -25:27

Search Library

Unplayed Podcasts List 2 Devices iTunes Store

		Time	Release Date	Rating	Description
o Therapy	SUBSCRIBE	2:00:00	12/28/12		
al Podcast		27:58	4/12/13		Every week, Armin selects his fav
ast					Can't get enough of the radiosho
cast 315					The Sound Of Tiësto!
cast 314					The Sound Of Tiësto!
cast 313					The Sound Of Tiësto!
cast 312					The Sound Of Tiësto!
cast 311					The Sound Of Tiësto!
cast 310				★★★★★	The Sound Of Tiës
cast 309					The Sound
cast 308					Tiësto!
cast 307					ound Of Tiësto!
cast 306					The Sound Of Tiësto!
cast 305				★★★★	The Sound Of Tiësto!
cast 304					The Sound Of Tiësto!
cast 303					The Sound Of Tiësto!
cast 302					The Sound Of Tiësto!
cast 301					The Sound Of Tiësto!
cast 300					The Sound Of Tiësto!
cast 299					The Sound Of Tiësto!
cast 298					The Sound Of Tiësto!
cast 297					The Sound Of Tiësto!
cast 296					The Sound Of Tiësto!
cast 295					The Sound Of Tiësto!
cast 294					The Sound Of Tiësto!
cast 293					The Sound Of Tiësto!
cast 292		57:37	11/5/12		The Sound Of Tiësto!
cast 291		57:20	10/29/12		The Sound Of Tiësto!
cast 290		57:16	10/22/12		The Sound Of Tiësto!
cast 289		57:24	10/15/12		The Sound Of Tiësto!



Космические технологии

Skype

Vladimir Kirillov

Search

UM Team Chat [redacted] https://sites.google.com/a/universalmind.com/i...

12 people

Call

Vladimir Kirillov

[redacted]

я сейчас скришнот сделаю, так что улыбайтесь 17:51

hubot sup 17:51

Hubot

sup bud, 17:51

Brian O'Connor - Universal-Minds-MacBook-Pro-4 (now)
Eldar Djafarov - Eldar-Djafarovs-iPhone (now)
Eldar Djafarov - Eldars-MacBook-Pro (now)
Julia Ilyuhina - Julias-MacBook-Air (now)
Tanya Rusanova - Tetianas-MacBook-Air (now)
Vitaliy Vilyay - vvv-mac (now)
Vladimir Agafonkin - Mourners-MacBook (now)
Vladimir Kirillov - ponycorn (now)

[redacted]

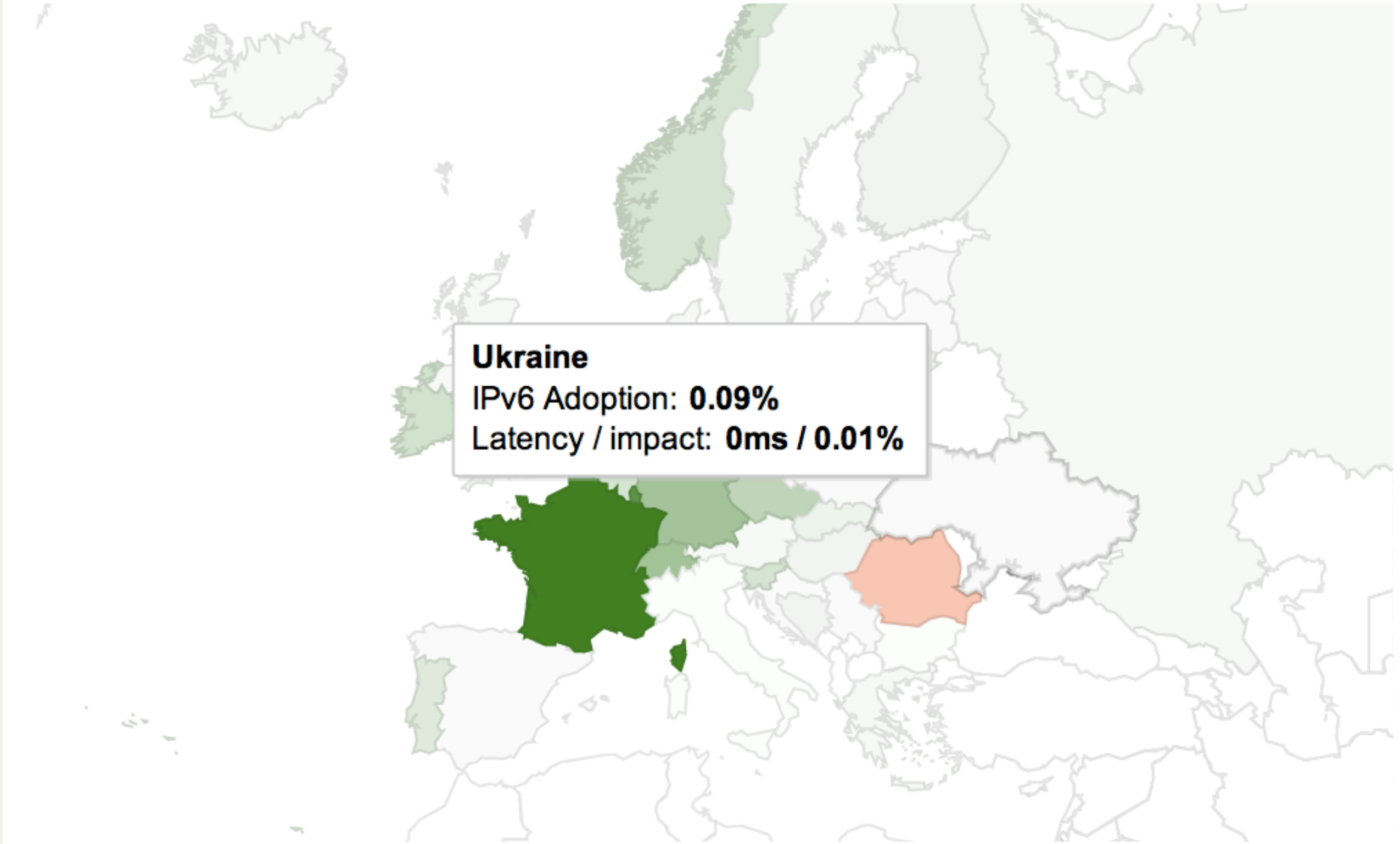
https://github.com/proger/whobot

```
% ping6x -Qwc1 ff02::1%en0
26 bytes from fe80::1610:9fff:fee2:1431%en0: xnu
33 bytes from fe80::226:bbff:fe55:bebc%en0: iMac.local
31 bytes from fe80::1610:9fff:fed7:1f73%en0: nb.local
51 bytes from fe80::22c9:d0ff:fea9:6400%en0: um-airport-express-3rd-floor
49 bytes from fe80::288:65ff:fe3d:ce8c%en0: Tetianas-MacBook-Air.local
44 bytes from fe80::22c9:d0ff:fe91:f28d%en0: xnud.um.darkproger.net.
36 bytes from fe80::1610:9fff:fee2:1b57%en0: vvv-mac.local
...
```

https://github.com/proger/whobot

адаптация

Per-Country IPv6 adoption



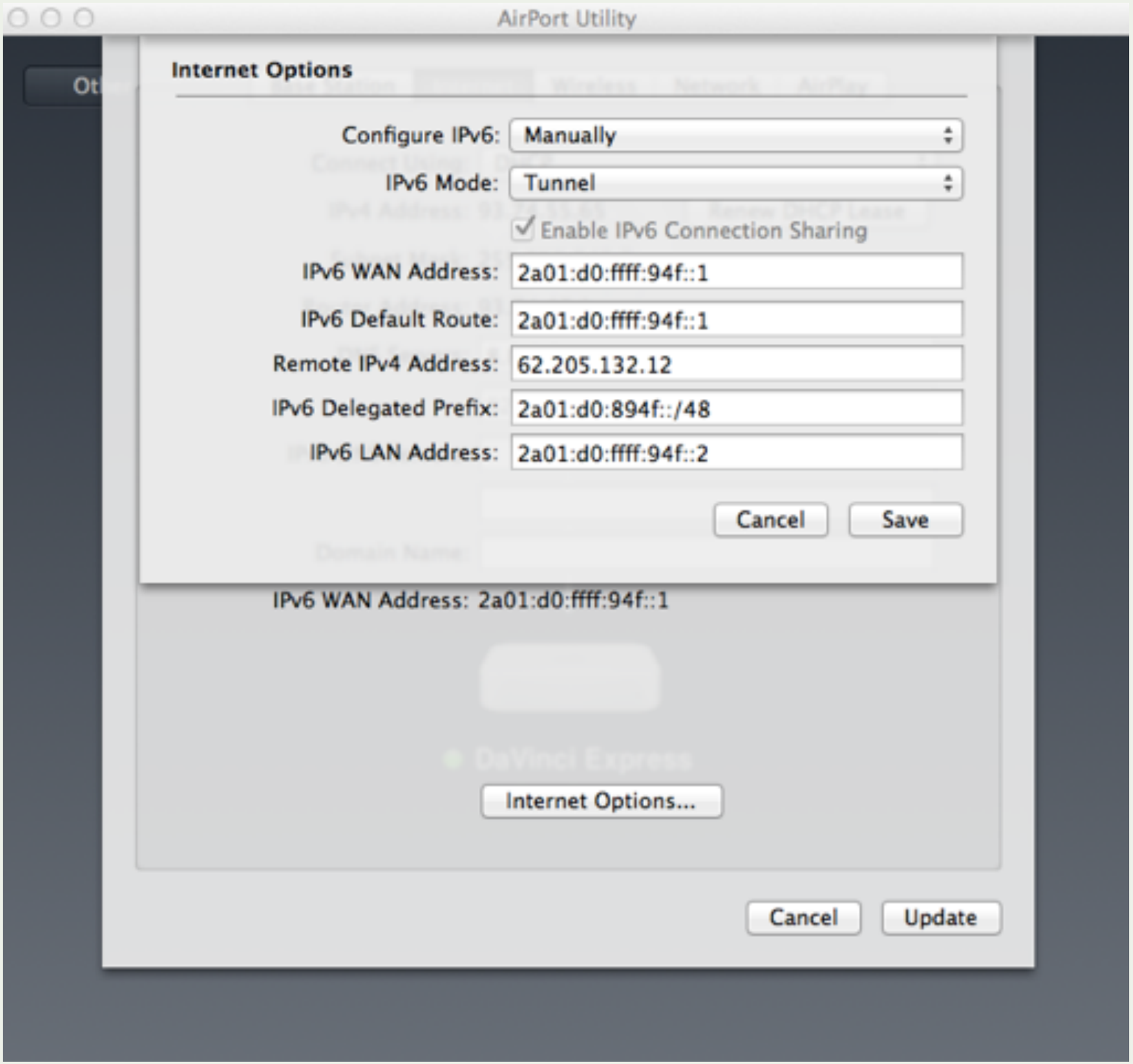
Туннель

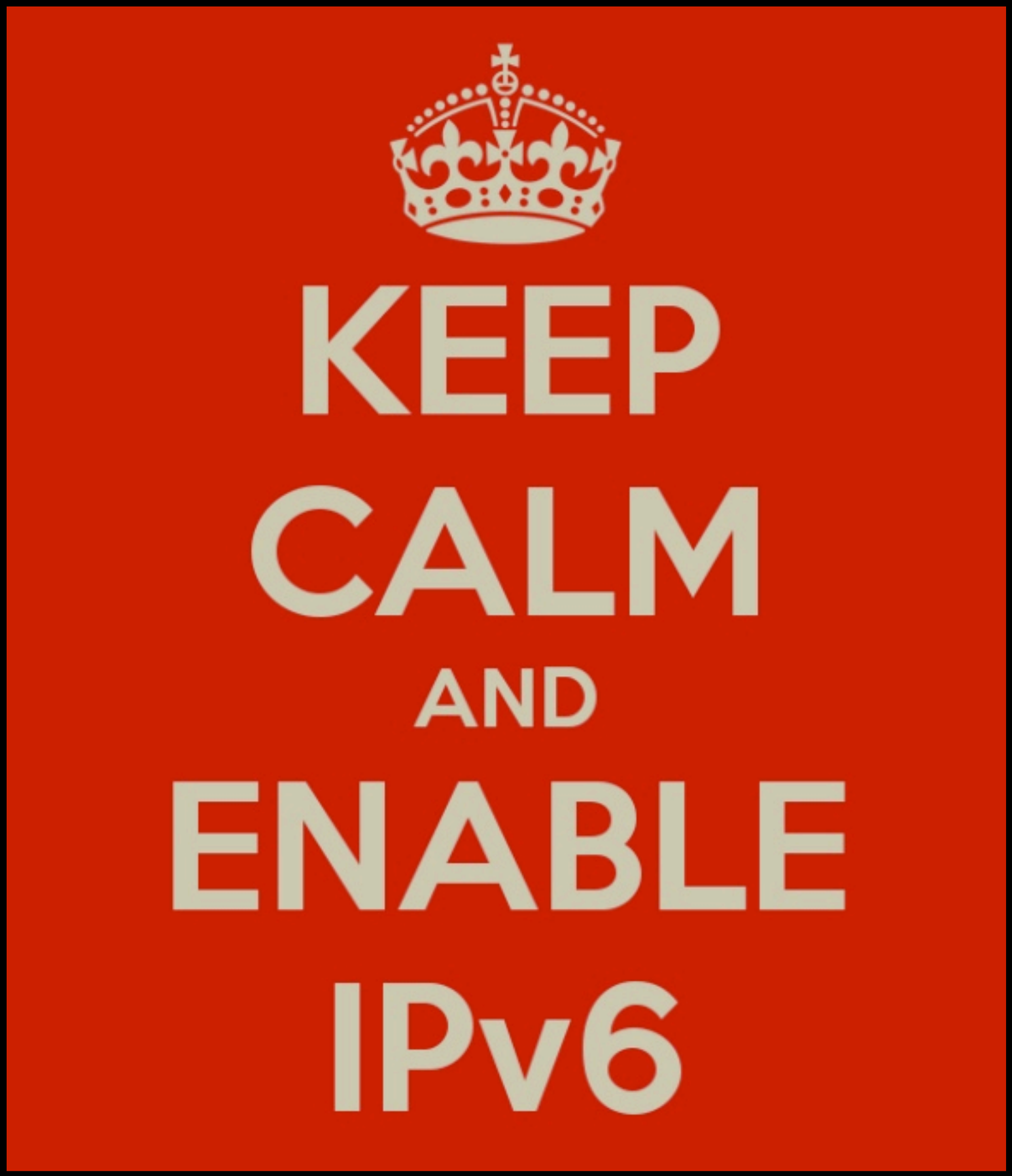
IPv6 на кухне

туннельный

брокер

tb.netassist.ua


AirPort Utility
Internet Options
Configure IPv6: Manually
IPv6 Mode: Tunnel
Enable IPv6 Connection Sharing
IPv6 WAN Address: 2a01:d0:ffff:94f::1
IPv6 Default Route: 2a01:d0:ffff:94f::1
Remote IPv4 Address: 62.205.132.12
IPv6 Delegated Prefix: 2a01:d0:894f::/48
IPv6 LAN Address: 2a01:d0:ffff:94f::2
Cancel
Save
IPv6 WAN Address: 2a01:d0:ffff:94f::1
Internet Options...
Cancel
Update


KEEP
CALM
AND
ENABLE
IPv6