IPv6 Deployment Survey (Residential/Household Services)

How IPv6 is being deployed?

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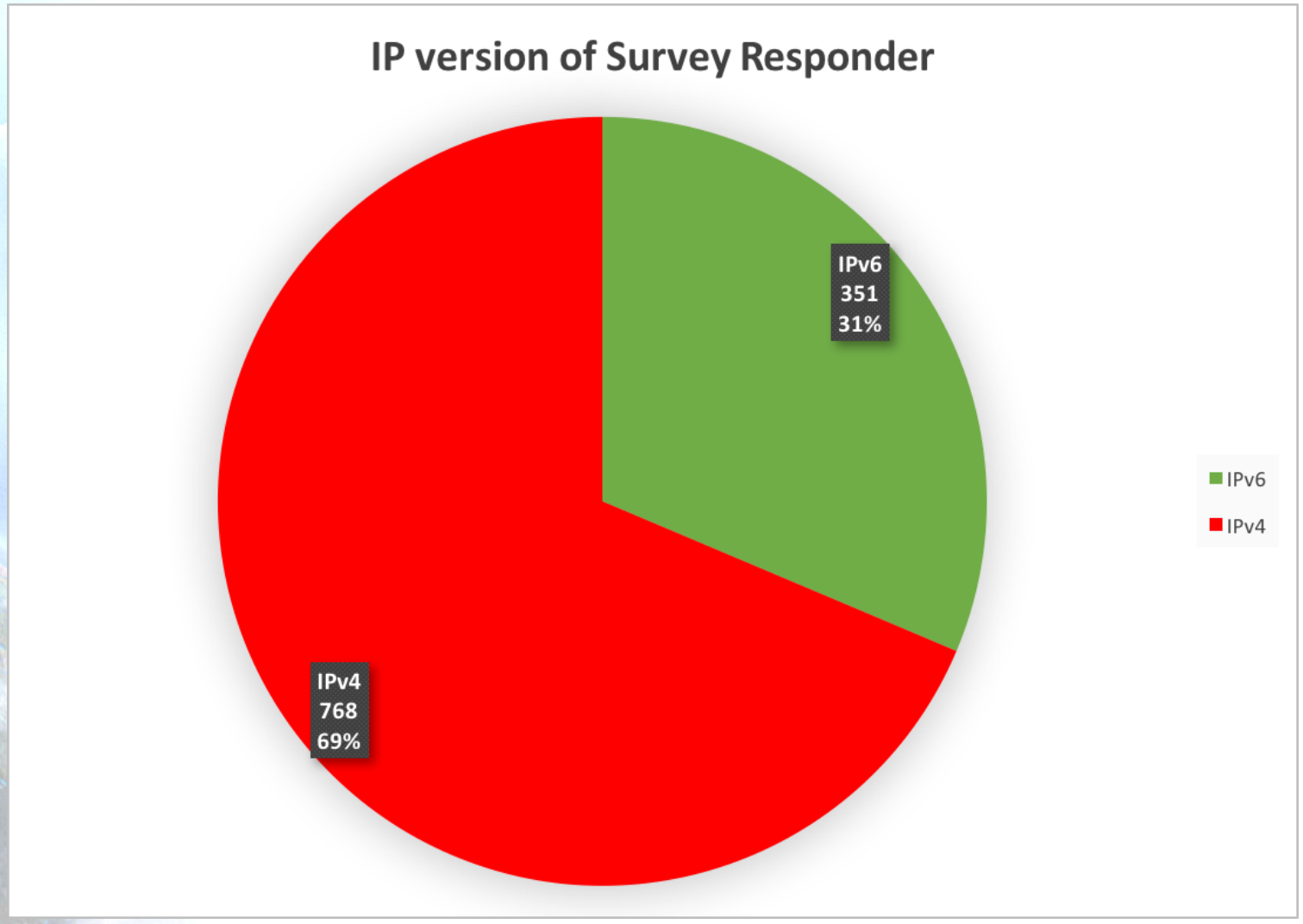
Consulintel, CEO/CTO

Survey Contents

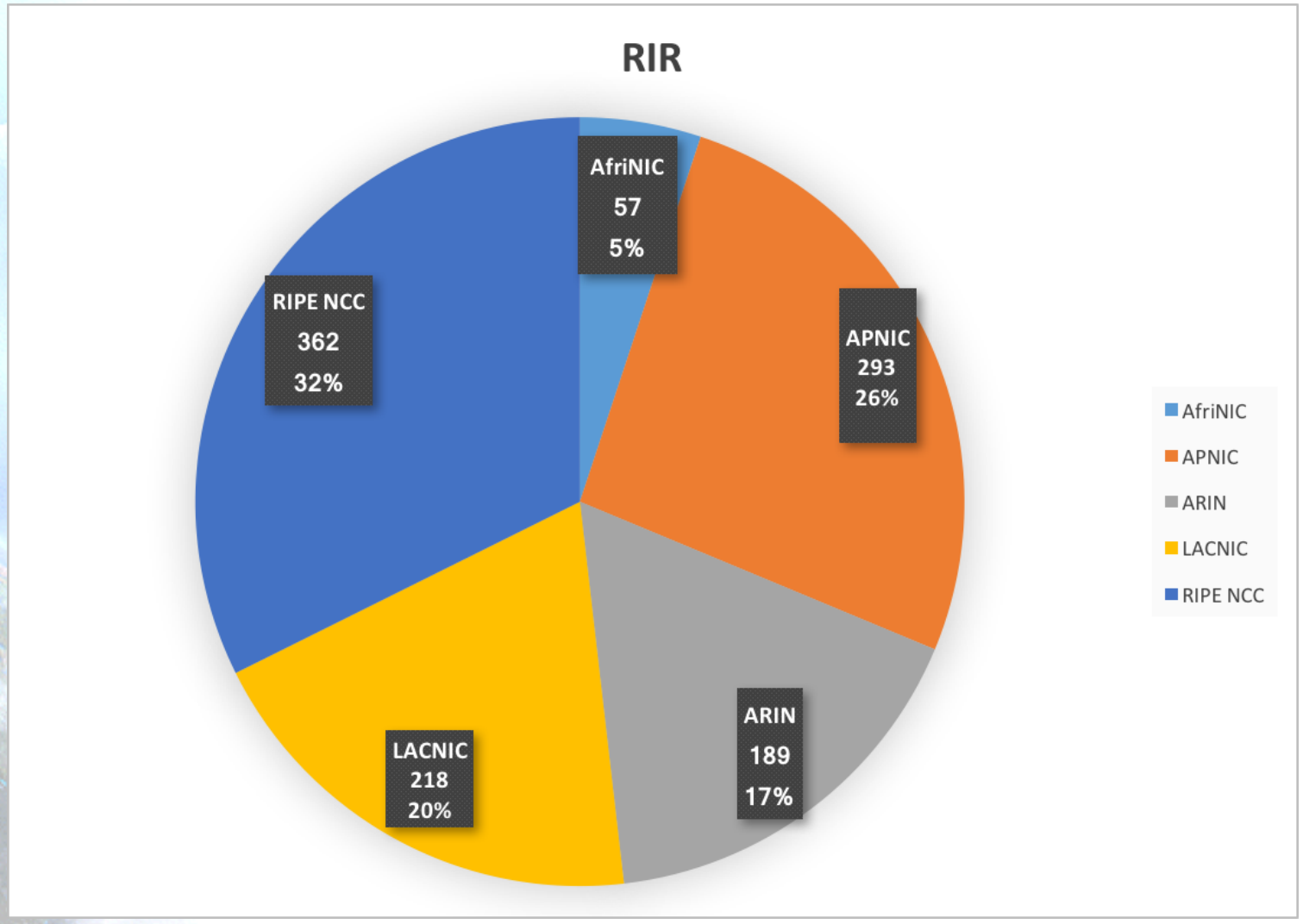
- Basic ISP data (name, country, RIR)
- Technology of the customer link
- Is it a commercial service or a “pilot”
- IPv6 WAN link
- IPv6 customer addressing
- IPv4 service
- Transitioning and provisioning
- IPv6 DNS services
- Other data (optional contact details)

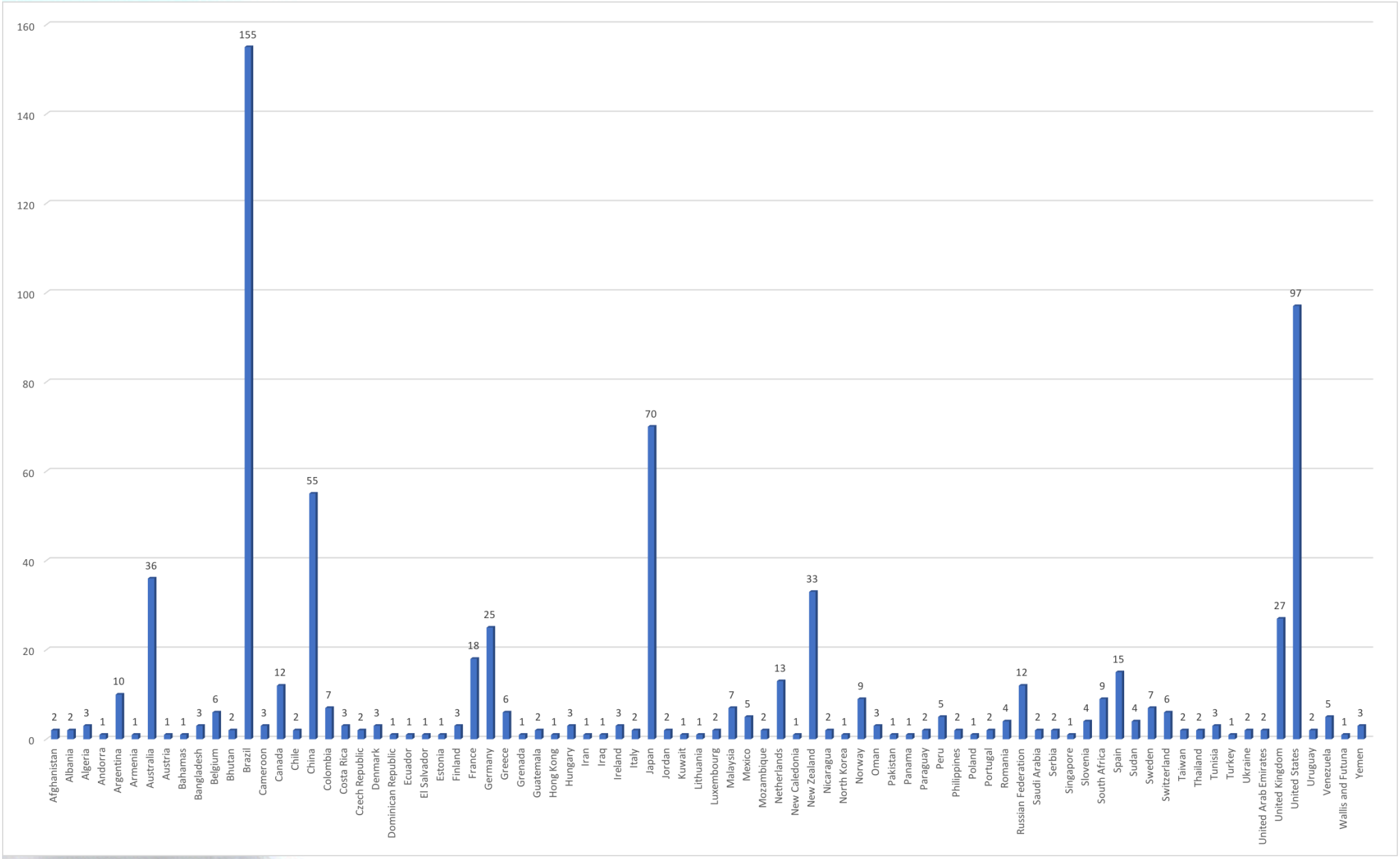
Note: Survey not intended for service to mobile phones, however, 2G/3G/4G response can be provided for service via a “CPE/modem”


IP version of Survey Responder
IPv6
351
31%
IPv4
768
69%
IPv6
IPv4

Who is responding?

- Looking at whois …
- ISP employees
  - From their own network most of the time
- Customers
  - Most of the time from their own residential networks
- Most of the responder “networks” have both IPv4 and IPv6 allocations
  - Responding with IPv4 from ISP network probably means, even if they have deployed IPv6 to residential customers, may be not in (all) the corporate LANs.
- Other observations, looking at bind and apache logs:
  - Happy-eye-balls timeout …
  - Is that anymore needed? Time to retire it?
  - Hiding IPv6 network problems?

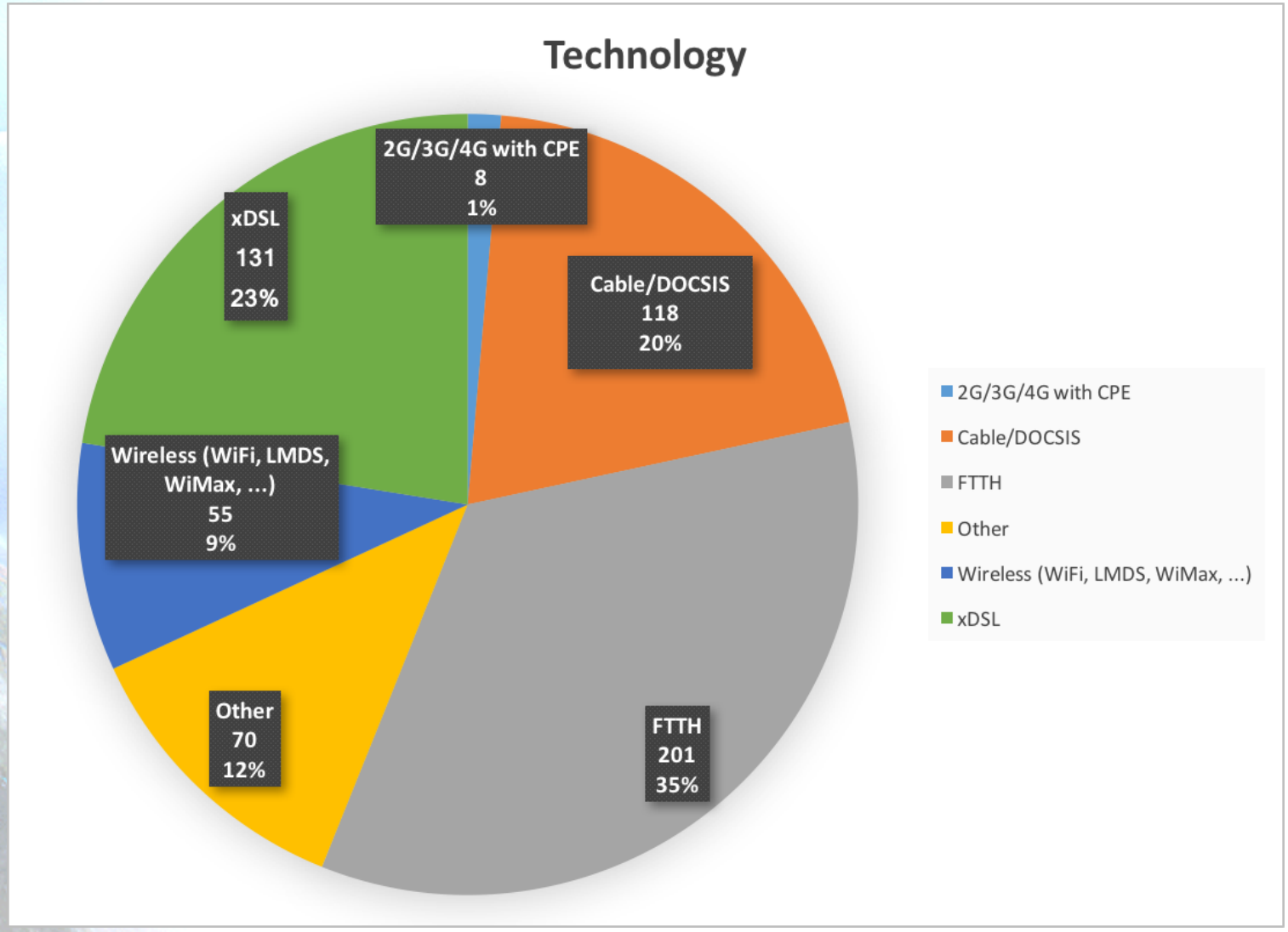

RIR
AfriNIC
57
5%
APNIC
293
26%
ARIN
189
17%
LACNIC
218
20%
RIPE NCC
362
32%
AfriNIC
APNIC
ARIN
LACNIC
RIPE NCC


160
140
120
100
80
60
40
20
0
Afghanistan 2
Albania 2
Algeria 3
Andorra 1
Argentina 10
Armenia 1
Australia 36
Austria 1
Bahamas 1
Bangladesh 3
Belgium 6
Bhutan 2
Brazil 155
Cameroon 3
Canada 12
Chile 2
China 55
Colombia 7
Costa Rica 3
Czech Republic 2
Denmark 3
Dominican Republic 1
Ecuador 1
El Salvador 1
Estonia 1
Finland 3
France 18
Germany 25
Greece 6
Grenada 1
Guatemala 2
Hong Kong 1
Hungary 3
Iran 1
Iraq 1
Ireland 3
Italy 2
Japan 70
Jordan 2
Kuwait 1
Lithuania 1
Luxembourg 2
Malaysia 7
Mexico 5
Mozambique 2
Netherlands 13
New Caledonia 1
New Zealand 33
Nicaragua 2
North Korea 1
Norway 9
Oman 3
Pakistan 1
Panama 1
Paraguay 2
Peru 5
Philippines 2
Poland 1
Portugal 2
Romania 4
Russian Federation 12
Saudi Arabia 2
Serbia 2
Singapore 1
Slovenia 4
South Africa 9
Spain 15
Sudan 4
Sweden 7
Switzerland 6
Taiwan 2
Thailand 2
Tunisia 3
Turkey 1
Ukraine 2
United Arab Emirates 2
United Kingdom 27
United States 97
Uruguay 2
Venezuela 5
Wallis and Futuna 1
Yemen 3

Regional/Country analysis

- Is this meaning there are some regions/countries with a higher degree of residential deployment?
  - APNIC (Australia, China, Japan, Malaysia, New Zealand). Missing responses from Korea.
  - ARIN (US, Canada)
  - LACNIC (Argentina, Brazil, Colombia, Guatemala, Paraguay, Peru, Venezuela). Missing responses from Ecuador and Mexico.
  - RIPE NCC (Belgium, Denmark, Finland, France, Germany, Greece, Luxembourg, Netherlands, Norway, Portugal, Romania, Russia, Slovenia, Spain, Sweden, Switzerland, UK)

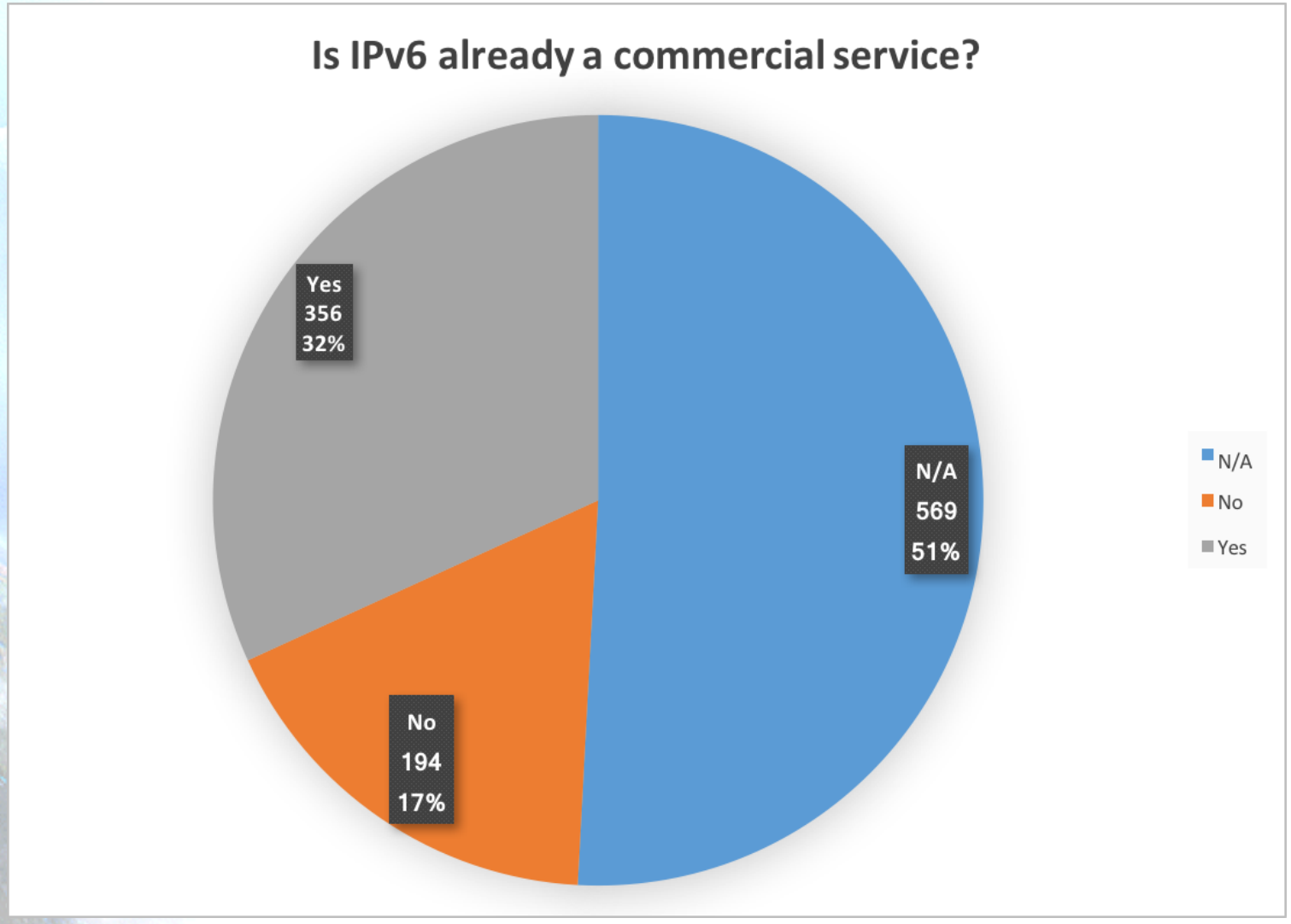
- Or instead regions/countries not doing it?
  - AfriNIC
  - LACNIC


Technology
2G/3G/4G with CPE
8
1%
Cable/DOCSIS
118
20%
FTTH
201
35%
Other
70
12%
Wireless (WiFi, LMDS, WiMax, ...)
55
9%
xDSL
131
23%
2G/3G/4G with CPE
Cable/DOCSIS
FTTH
Other
Wireless (WiFi, LMDS, WiMax, ...)
xDSL

Deployment differences by techology

- More deployment by “newer” technologies:
  - FTTH
  - xDSL
  - Cable/DOCSIS
  - Wireless (WiFi, LMDS, WiMax, …)
- → Avoids investing in replacing CPEs

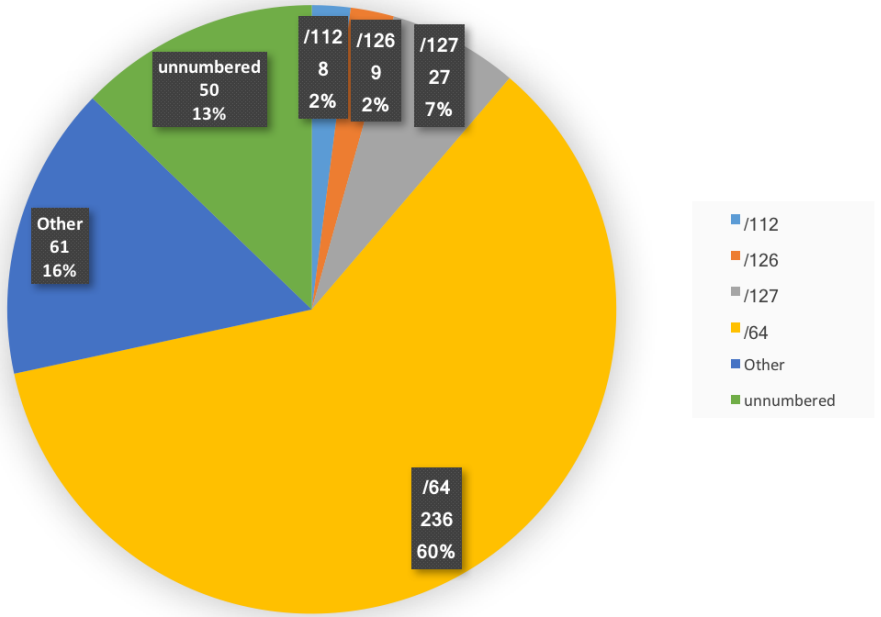
- Are there problems/dificulties with some specific access technologies?
  - According to the responses, I don’t think so …
- Vendor or transition technologies issues with some access technologies?
  - Nothing reported


Is IPv6 already a commercial service?
Yes
356
32%
N/A
569
51%
No
194
17%
N/A
No
Yes

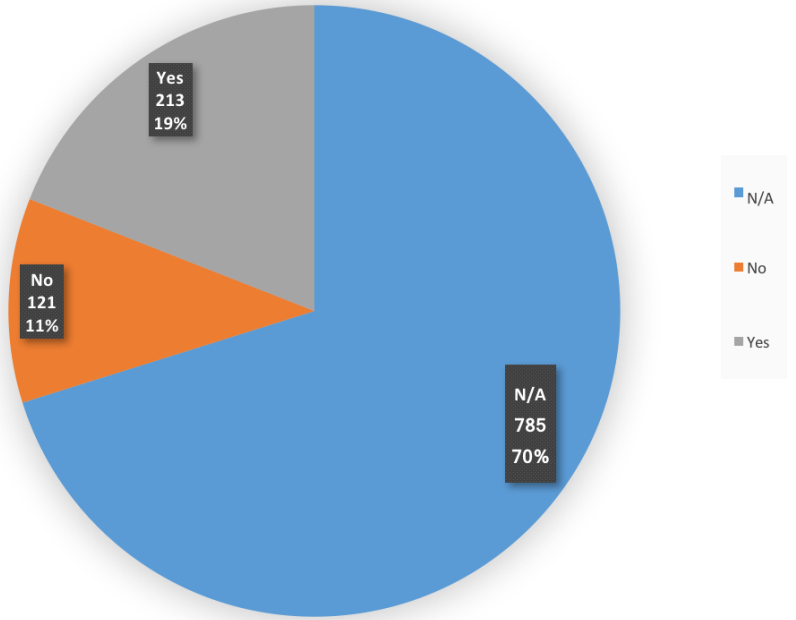
Why still not commercial?

- 51% responses –> No Answer, mainly customers or even employees of ISPs which really don't know.
- 32% Yes, already commercial
- 17% No commercial -> checked with some of the responders, they will go to commercial, typically it is a trial, but they plan to deploy (few months from now)

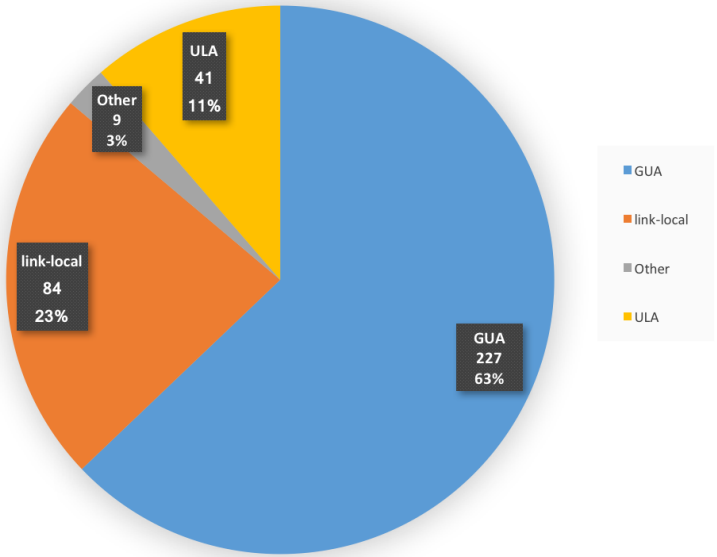
WAN Prefix Size



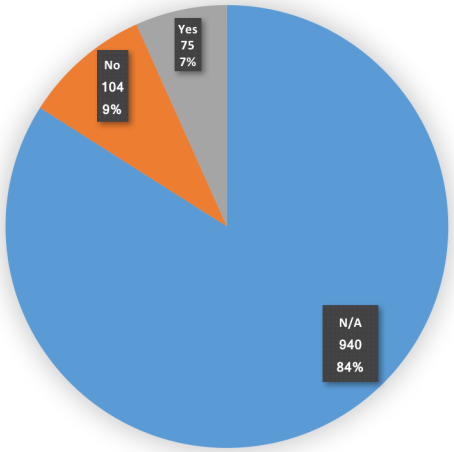
WAN Prefix Stable



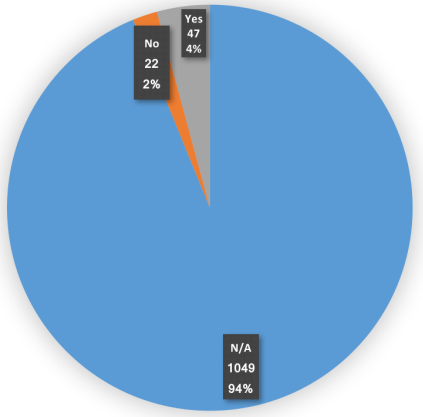
WAN Addressing Type



WAN from same pool as customer prefixes

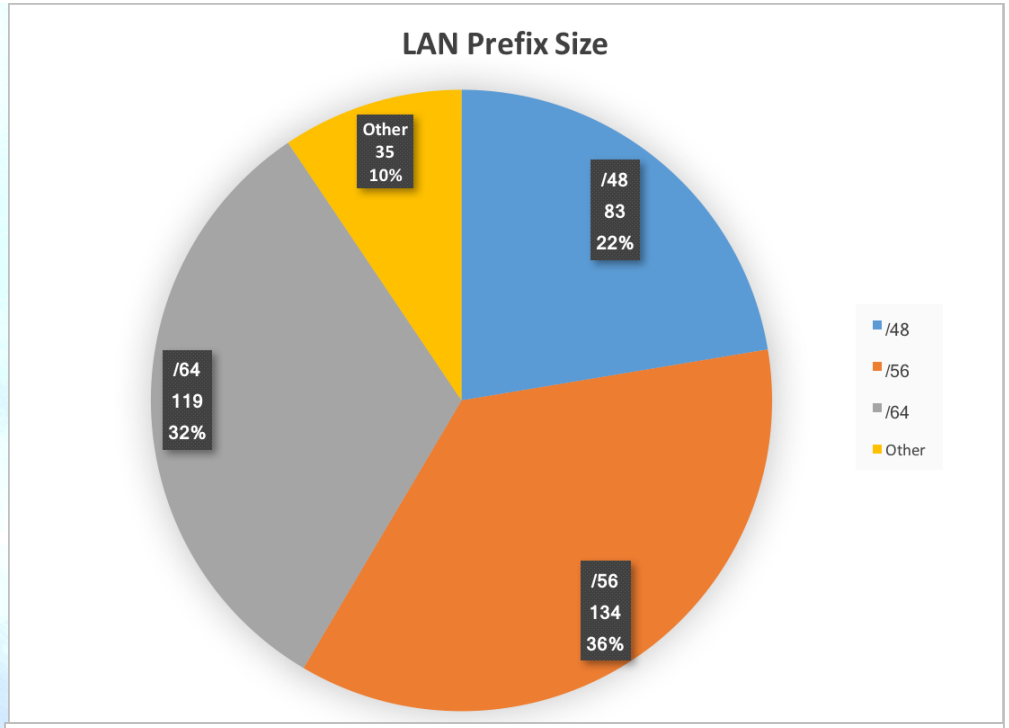


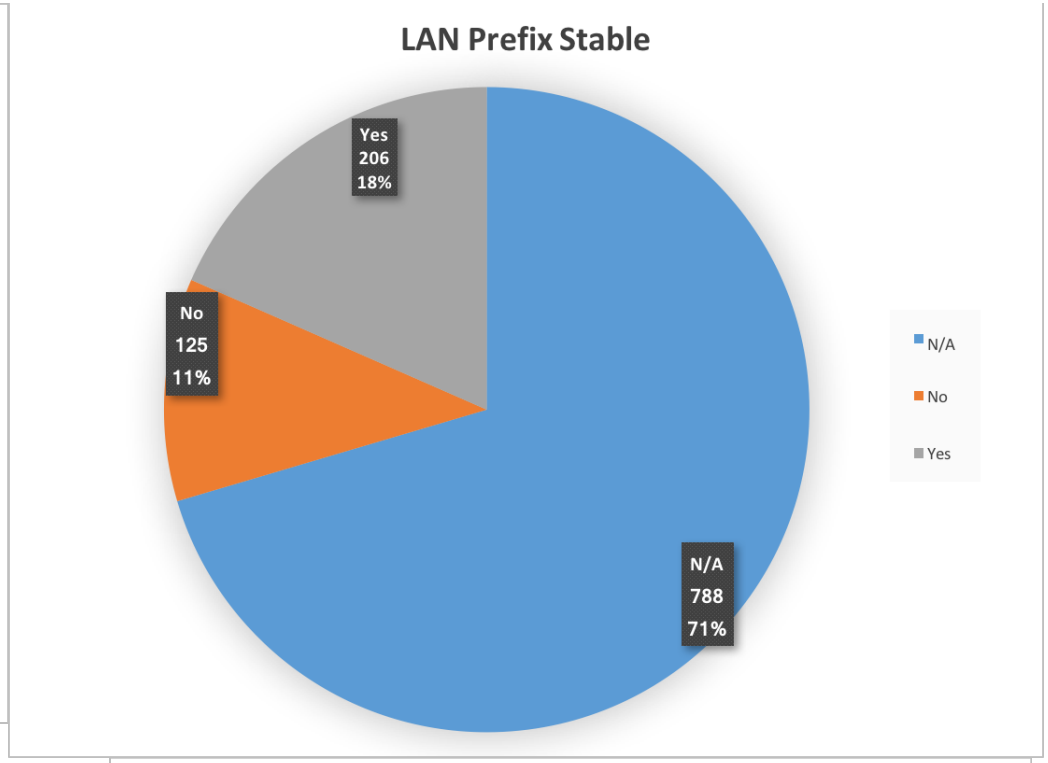
WAN /64 from customer prefix

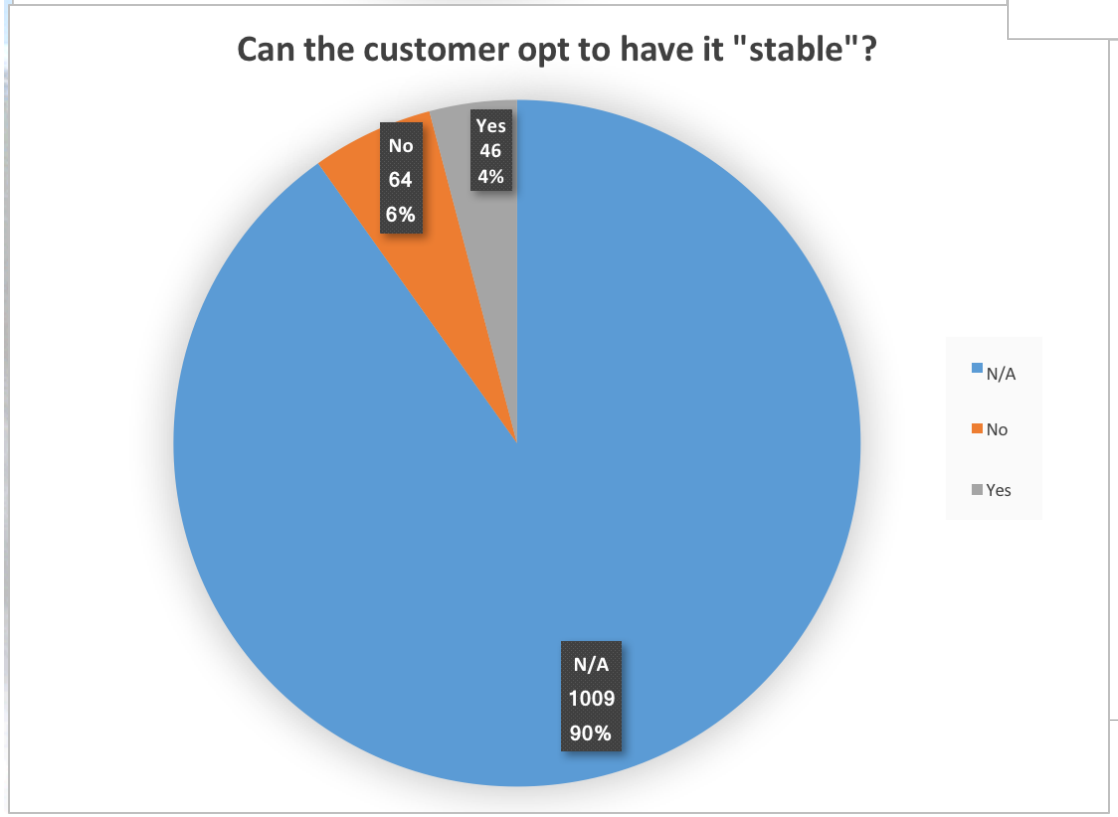


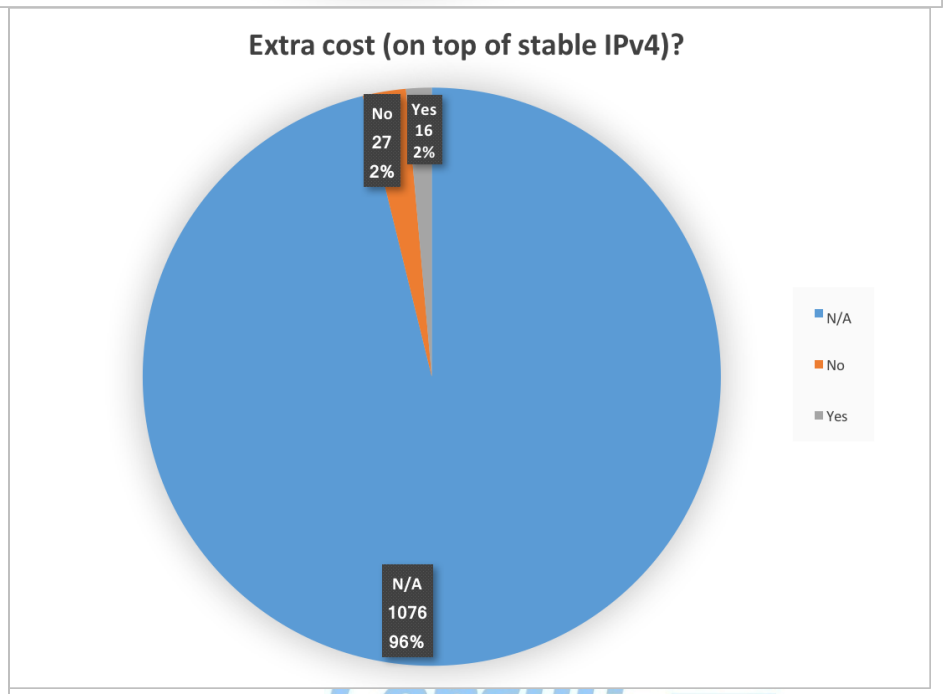
WAN prefix issues

- Remarkable -> /64 60%
- What means other?
  - /128, /62, /60, /56, /48, /32 ... No comments
- Why not stable (11%)? -> Note 70% no answer
  - Provisioning systems?
- 63% using GUA
- Interesting figures about using the /64 from the customer allocated prefix
- Distribution of those technical aspects not related to any specific country/region


LAN Prefix Size
Other
35
10%
/48
83
22%
/64
119
32%
/56
134
36%
/48
/56
/64
Other


LAN Prefix Stable
Yes
206
18%
No
125
11%
N/A
788
71%
N/A
No
Yes

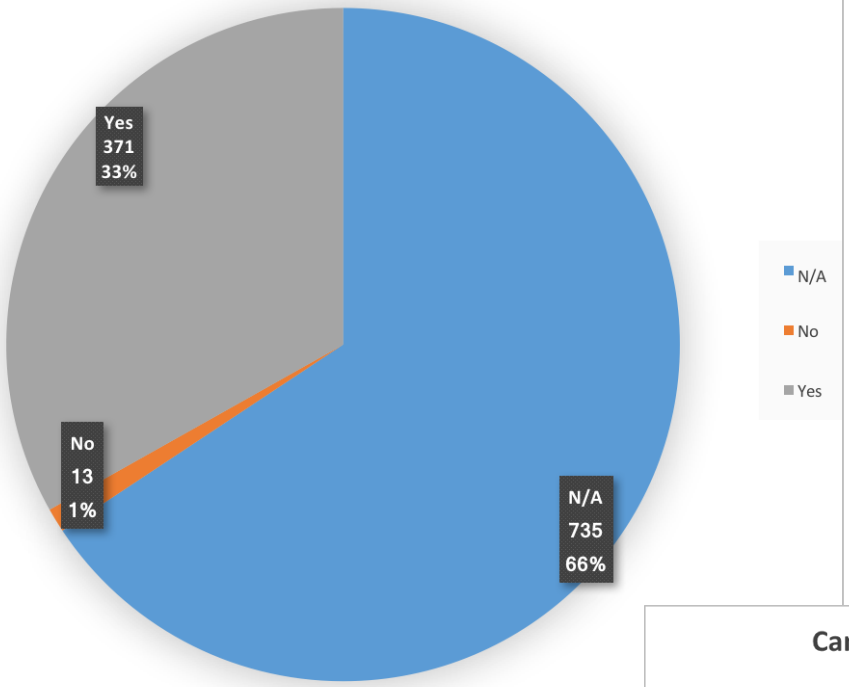

Can the customer opt to have it "stable"?
No
64
6%
Yes
46
4%
N/A
1009
90%
N/A
No
Yes


Extra cost (on top of stable IPv4)?
No
27
2%
Yes
16
2%
N/A
1076
96%
N/A
No
Yes

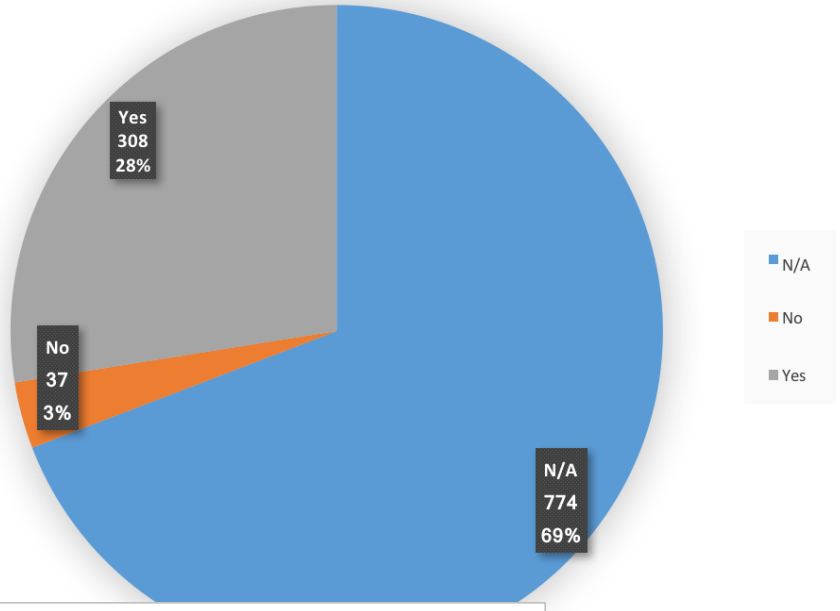
LAN prefix issues

- What are the “other" sizes?
  - A few /60 and /62 (others … /29, /44, /57, /127, /128)
  - Surprising (1) response -> shared /64
- Are we doing right/wrong? It is related to specific regions or countries?
  - 32% /64 mainly in LACNIC, some countries in APNIC
  - 36% /56 ARIN/RIPE NCC
  - 22% /48 mainly “more advanced” countries (Australia, New Zealand, Germany, Finland, Denmark, France, UK, China, Japan)
- Are we realizing that services work better with “stable” addressing?
  - AfriNIC, RIPE NCC and APNIC mainly stable
  - ARIN mainly not-stable
  - LACNIC half and half
- Why not allowing stable even as an “extra”?
  - Training issues? IPv4 mind-set?
  - Extra cost, very few

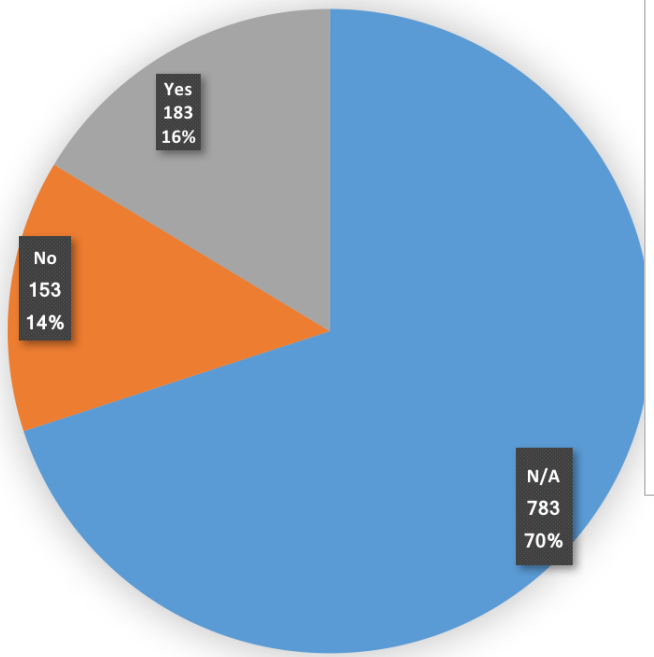
IPv4 service provided?



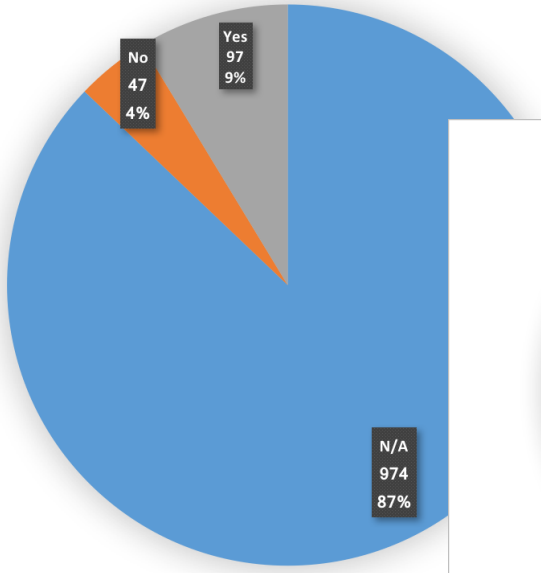
Public IPv4 address at CPE WAN?



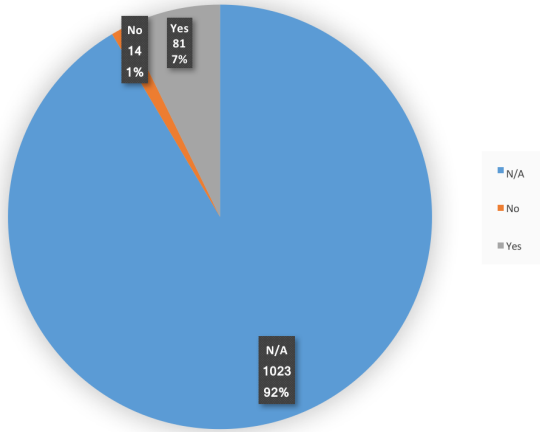
IPv4 address is "stable"?

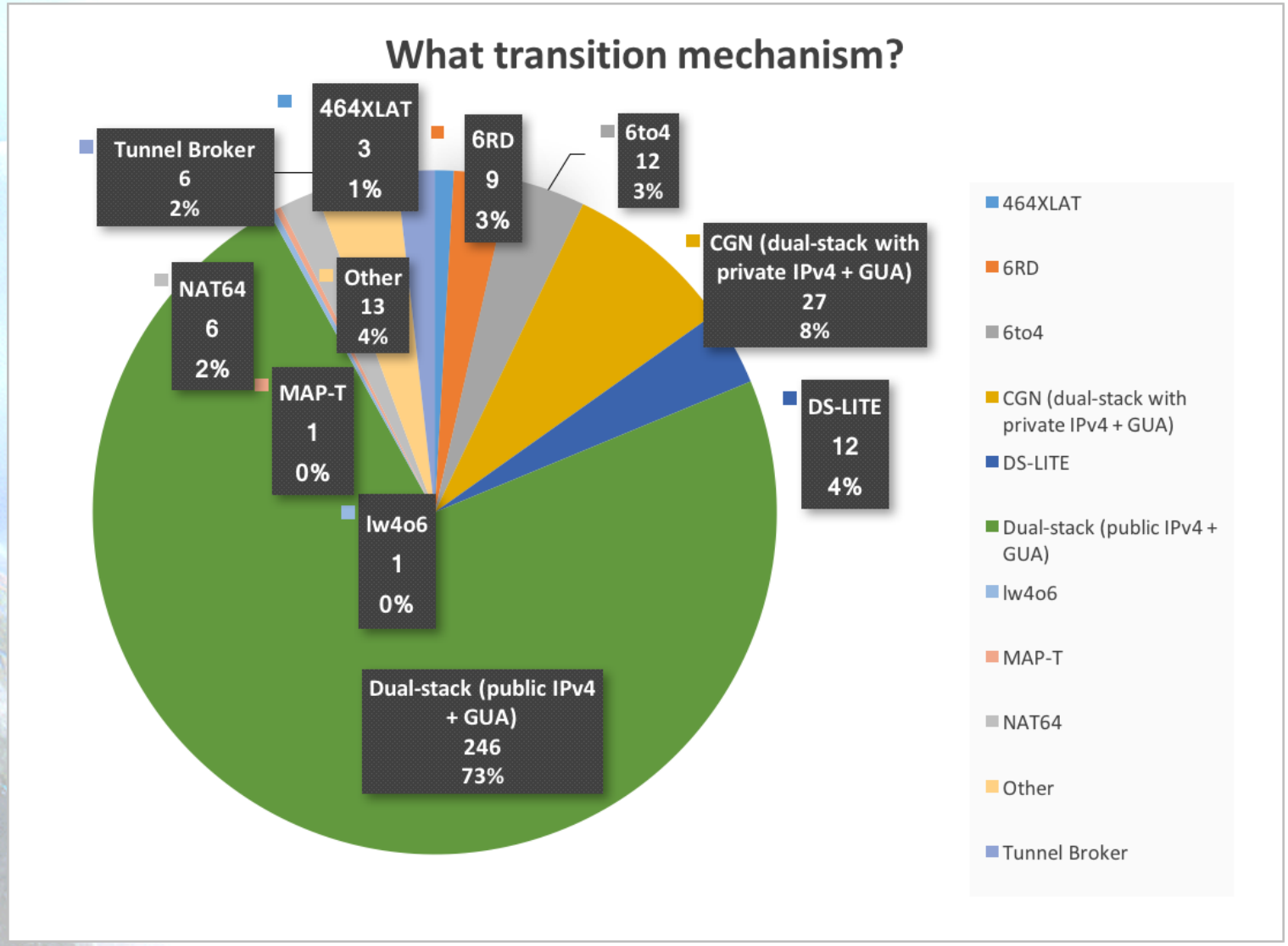


Can the customer opt to have IPv4 "stable"?



Extra cost for stable IPv4?

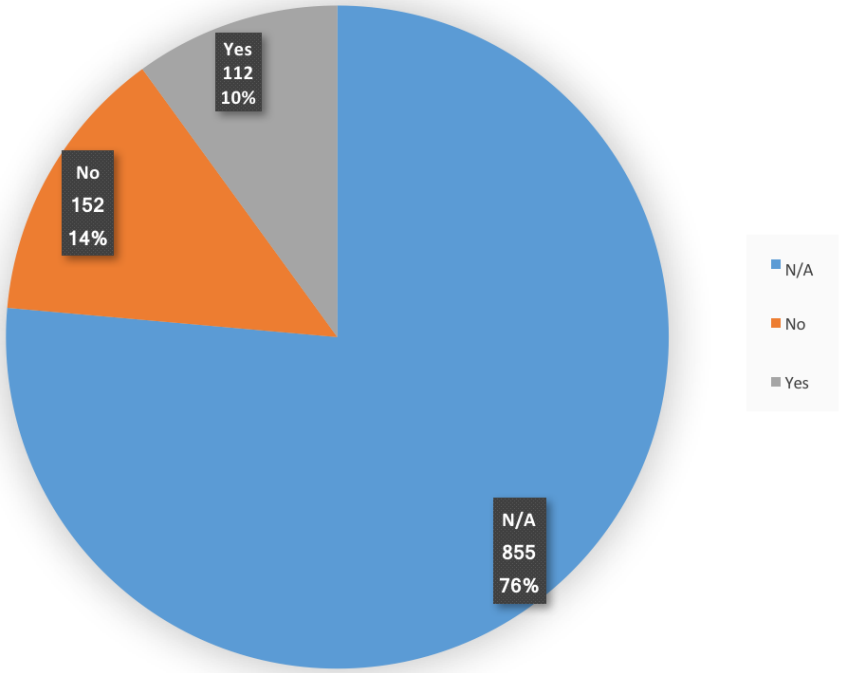



What transition mechanism?
464XLAT
3
1%
6RD
9
3%
6to4
12
3%
Tunnel Broker
6
2%
CGN (dual-stack with private IPv4 + GUA)
27
8%
NAT64
6
2%
Other
13
4%
DS-LITE
12
4%
MAP-T
1
0%
lw4o6
1
0%
Dual-stack (public IPv4 + GUA)
246
73%
464XLAT
6RD
6to4
CGN (dual-stack with private IPv4 + GUA)
DS-LITE
Dual-stack (public IPv4 + GUA)
lw4o6
MAP-T
NAT64
Other
Tunnel Broker

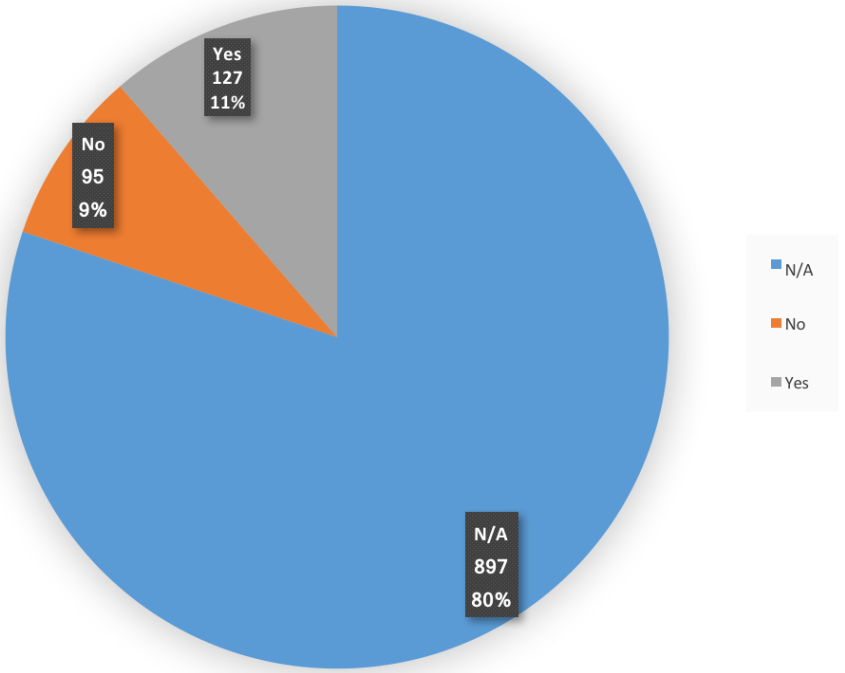
Transition and IPv4 issues

- It is a trend not providing IPv4 in the access?
  - It means some transition technologies being used which don't require IPv4 in the access.
- Not related to specific regions/countries
- What other "transition" technologies?
  - Actually none, just "bad answers"
- CGN deployment increasing?

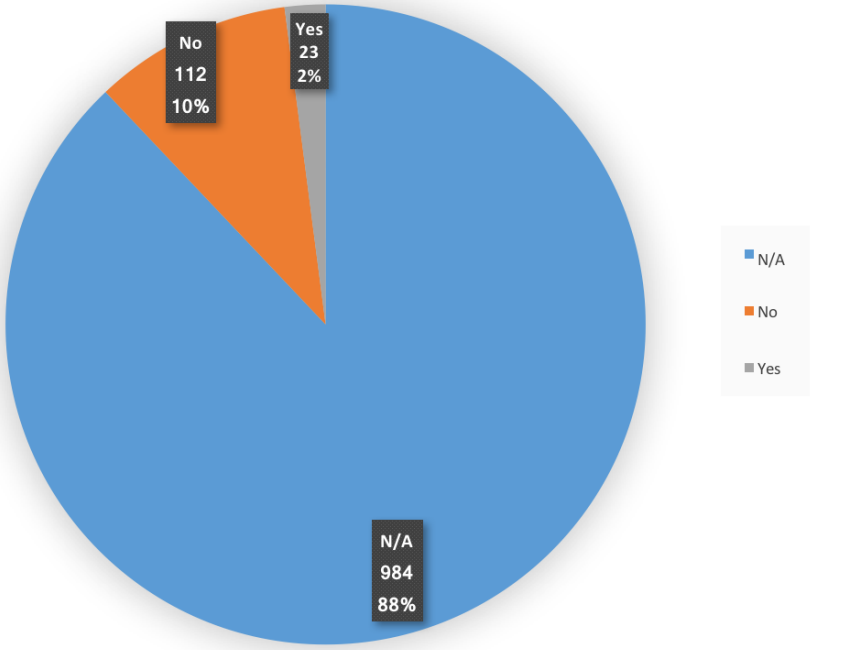
IPv6 reverse DNS?



NS Delegation for stable IPv6 prefix?



DNAME for non-stable IPv6 prefix for PTRs?



DNS

- Seems to follow “LAN IPv6 stable prefix”
- Reverse DNS as an extra service?

Conclusions

- In general “correct” deployment
  - Some exceptions
- Misunderstandings on IPv6 technology/marketing/other reason:
  - IPv6 prefix size
  - Stability of prefix
- More “advanced” countries seem to do it smartly, less ”misunderstandings”

Thanks !!

Survey link:

http://survey.consulintel.es/index.php/175122

Contact:

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