

Decorative blue geometric shapes in the top-left corner, consisting of several overlapping, angular lines in various shades of blue, creating a dynamic, abstract design.

IPv6 Deployment

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What is IPv6?

- Every single device connected to the Internet, whether it is a supercomputer, a smartphone, or a home cleaning robot, requires an Internet address (IP address).
- IPv4 was the original standard for the experimental Internet, which reached the maximum number of addressing.
- IPv6 is the new addressing plan that solves all the issues we had with IPv4 and is promising to be future-proof.

Is it working now?

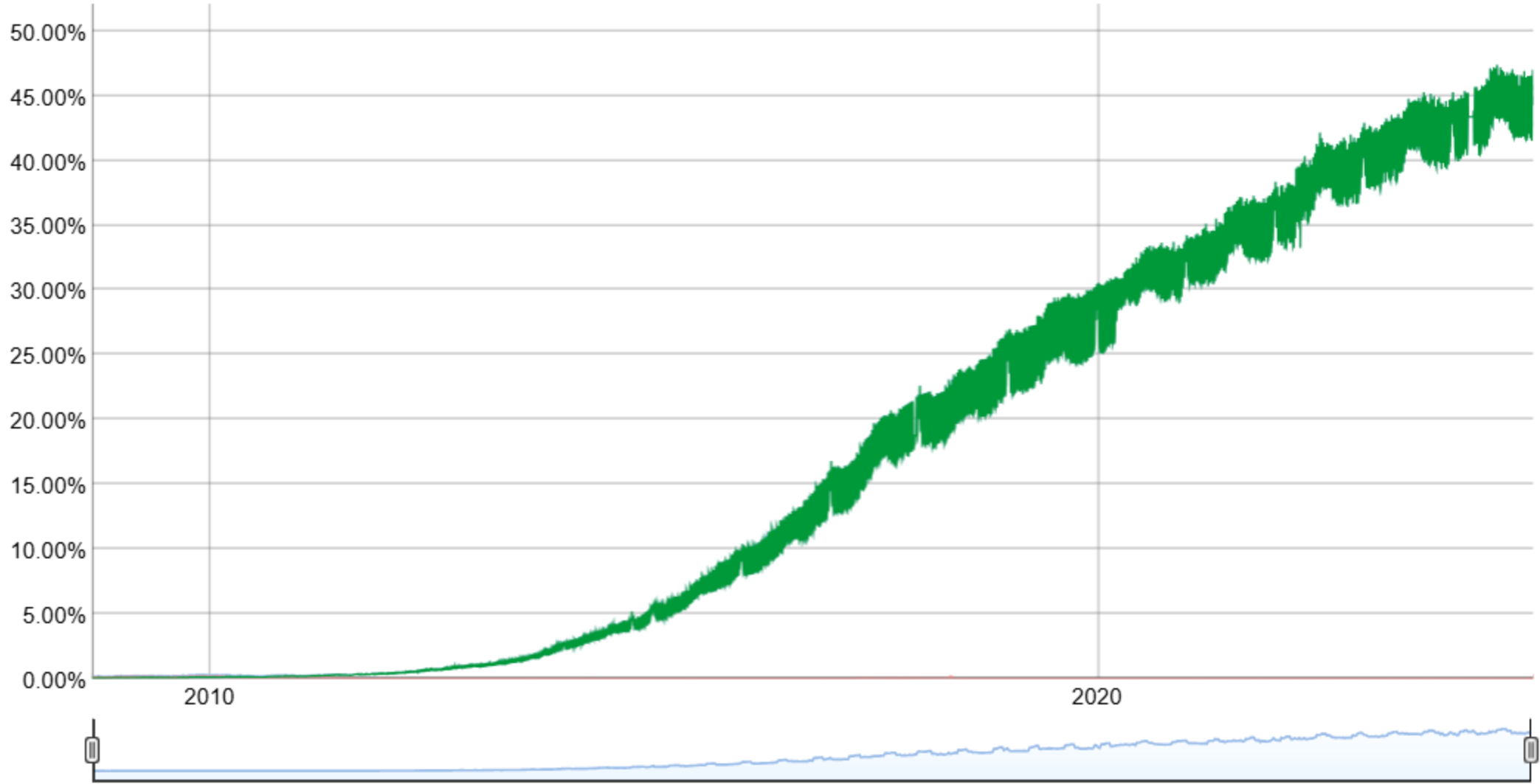
<https://www.google.com/intl/en/ipv6/statistics.html>



IPv6 Adoption

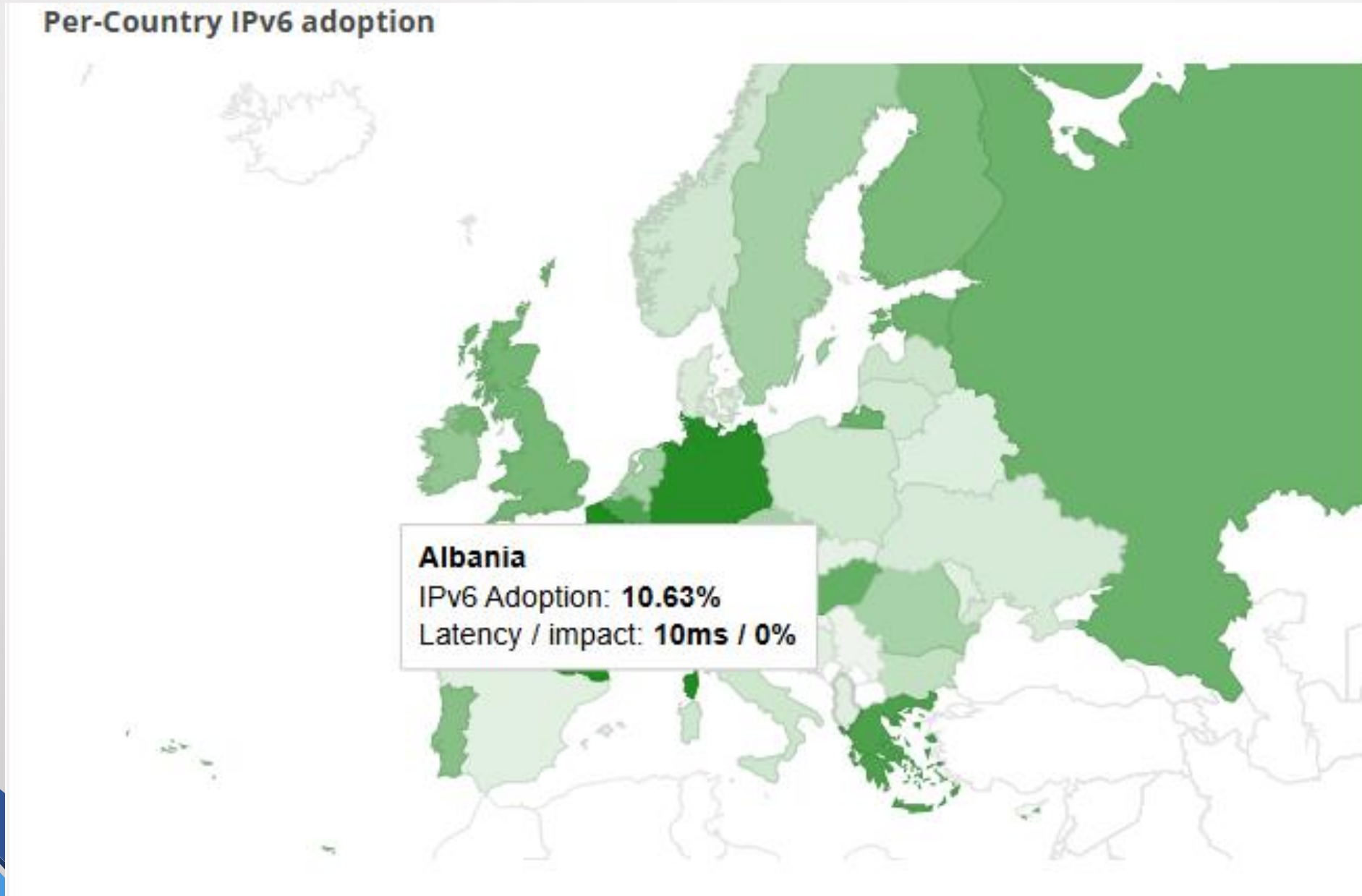
We are continuously measuring the availability of IPv6 connectivity among Google users. The graph shows the percentage of users that access Google over IPv6.

Native: 44.62% 6to4/Teredo: 0.00% Total IPv6: 44.62% | Nov 17, 2024



Where are we?

Per-Country IPv6 adoption



Who is using IPv6 for Subscribers?



<https://stats.labs.apnic.net/ipv6/al>

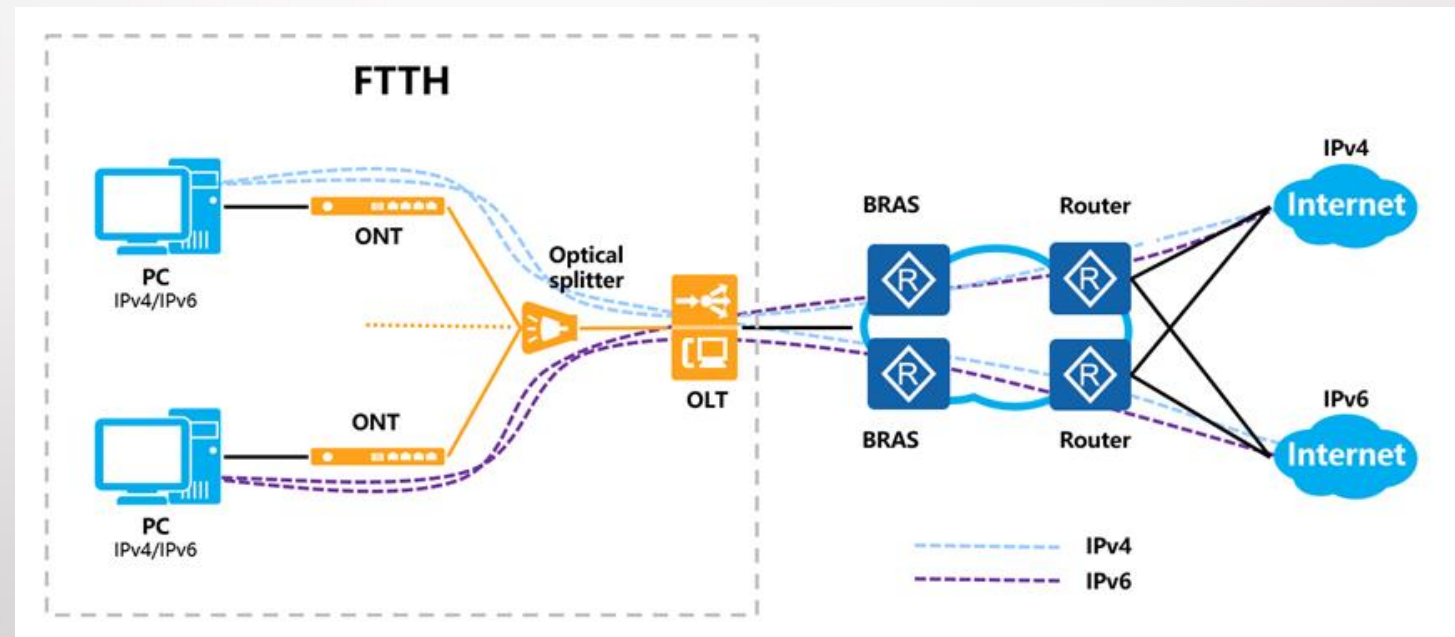
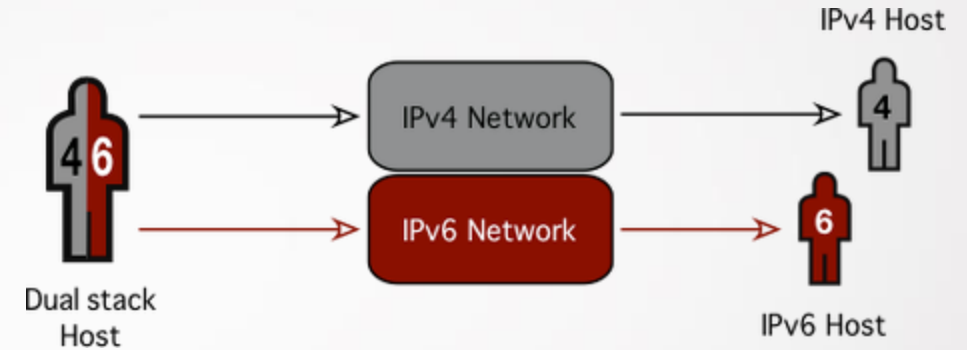
ASN	AS Name	IPv6 Capable	IPv6 Preferred ▼	Samples ▲
AS13335	CLOUDFLARENET	99.35%	98.87%	14,291
AS211147	INTERFIBER	79.95%	79.33%	1,127
AS212637	LIGHTNET	71.55%	71.10%	4,432
AS57388	IBC-AS	55.46%	55.28%	44,290
AS205278	NETCOM	50.44%	50.08%	1,949
AS212766	NETSYSCOM	49.93%	49.79%	3,533
AS211210	KORABI-NET	42.19%	41.87%	2,529
AS21246	IPKO-AS	54.43%	40.34%	562,289
AS14593	SPACEX-STARLINK	30.58%	30.58%	121
AS210125	PRIAMNET	20.53%	20.36%	2,323
AS212986	MENOCOM	18.21%	18.05%	604
AS60304	STARNET	4.27%	4.27%	961
AS197706	KEMINET	3.79%	3.26%	1,136
AS211458	IH-NET	2.80%	2.63%	1,748
AS48014	ALBHOST AlbHost SH.P.K.	14.53%	1.64%	2,195
AS5576	AKSHI	0.35%	0.35%	285
AS207502	SPEED-LINE	0.22%	0.22%	2,269
AS204816	VANI	0.14%	0.14%	1,474
AS209302	SHIMAJ-NET-AS	0.12%	0.12%	1,601
AS204894	STYLENET	0.08%	0.08%	1,322
AS8661	PTK PTK IPMPLS Network	0.11%	0.07%	150,923

Issues for using IPv6

NONE

Deployment strategy.

- Do nothing. ← You already are
- Dual-stack ← Way to go
- *464XLAT*
- *DS-Lite*
- *Lw4o6*
- *MAP-E*
- *MAP-T*
- *etc.*



Do nothing only if



- Your uplink is only on Cogent or Hurricane Electric.

If you have both of them is somehow OK.

Or peer with another provider for **IPv6** that has direct or indirect connection with these two.



Dual Stack. What do you need?



- IPv6 Providers
- IPv6 subnet from RIPE.
- Dual Stack configuration in your Border Router
- Dual Stack configuration in your BNG
- Dual Stack enable / configuration in CPE
- Dual Stack DNS Resolvers.
- RFC 8415: Dynamic Host Configuration Protocol for IPv6 (DHCPv6)

Basic Information

Enable WAN:

Encapsulation Mode: IPoE PPPoE

Protocol Type: IPv4/IPv6

WAN Mode: Route WAN

Service Type: INTERNET

Enable VLAN:

VLAN ID: 1001 *(1-4094)

802.1p Policy: Use the specified va

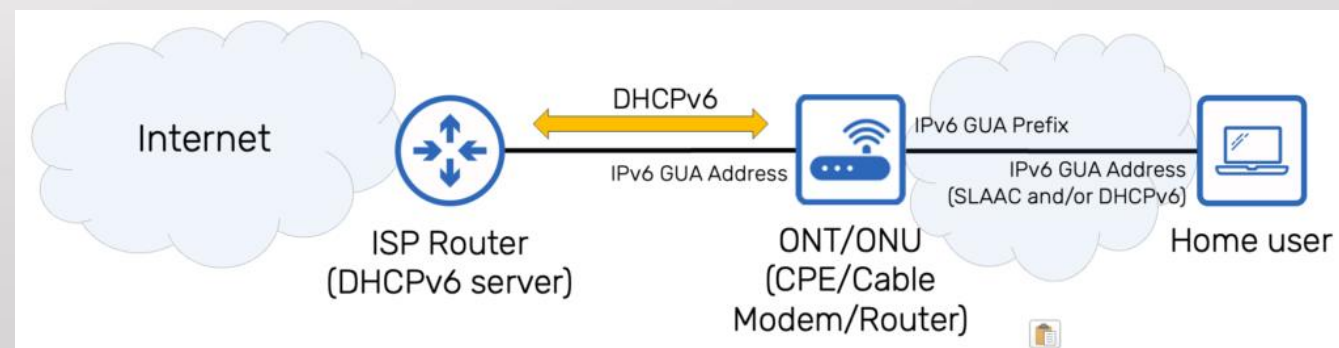
802.1p: 0

MRU: (1280-1540)

User Name: iadtest@pppoe

Password:

Enable LCP Detection:



Government and law enforcement



- The subnet that the customer will use needs to be linked/logged.
- Radius attribute: "**Delegated-IPv6-Prefix**" RFC 4818.
This Attribute must be supported/added to your system.
If not, we have the **NSCRAD** system for ISP-s that fully supports IPv6.
- Kea DHCPv6 developed by ics.org used with kea-hooks libraries.

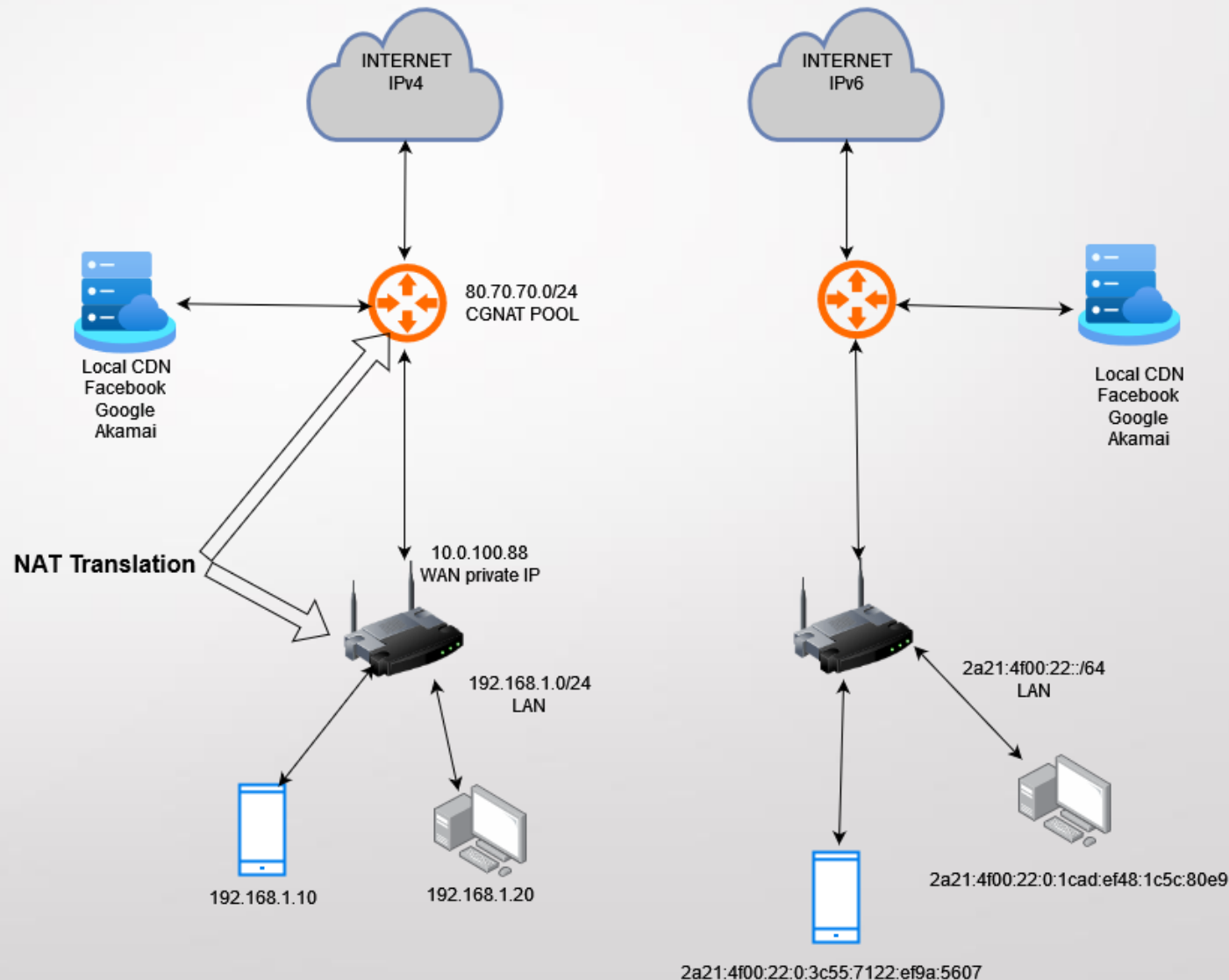
```
interface Virtual-Template1
  ipv6 unnumbered Loopback6
  ipv6 mtu 1492
  ipv6 nd managed-config-flag
  ipv6 nd other-config-flag
  ipv6 dhcp relay destination 2a0b:96c0:a03::66
end
```

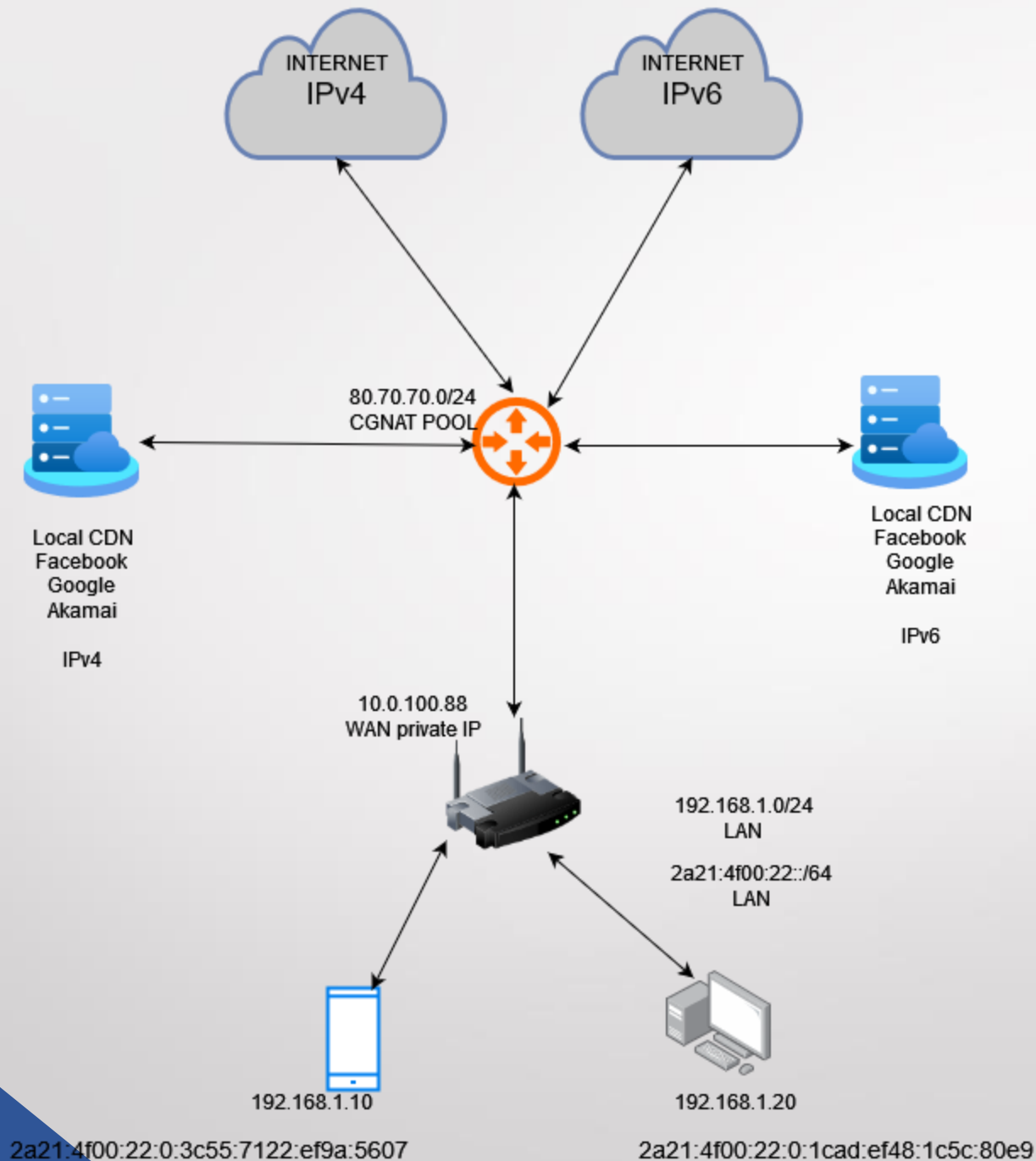
```
"subnet6": [
  {
    "pools": [ { "pool": "2a0b:96c7:ff0f::/64" } ],
    "subnet": "2a0b:96c7:ff00::/40",
    "pd-pools": [
      {
        "prefix": "2a0b:96c7:ff80::",
        "prefix-len": 41,
        "delegated-len": 56
      }
    ]
  }
]
```

Benefits after deploying IPv6



- You will receive better feedback from customers about: Online gaming, Social media and webpage responsiveness.
- Your BNG CGNAT will have up to 70% less nat-translations.
- Because of a less used CGNAT. You will free IPv4 subnets to use them for other business purposes.





```
[C:\~]$ nslookup anix.al
Non-authoritative answer:
Server:  one.one.one.one
Address:  2606:4700:4700::1111
```

```
Name:  anix.al
Address:  212.35.202.92
```

```
[C:\~]$ nslookup google.com
Non-authoritative answer:
Server:  one.one.one.one
Address:  2606:4700:4700::1111
```

```
Name:  google.com
Addresses:  2a00:1450:4017:813::200e
           142.251.140.14
```

More security.

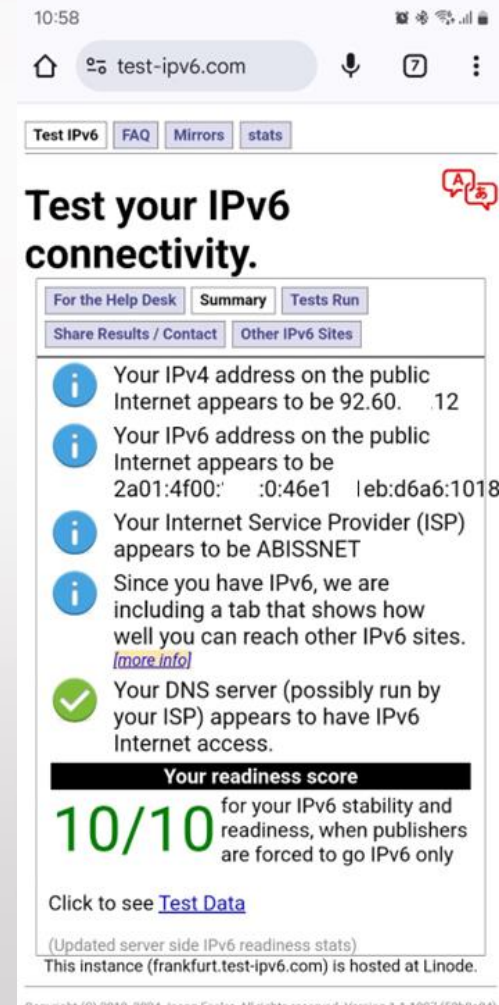
- IPv6 by design is more secure than IPv4.
- Very hard to do port-scanning and subscriber discovery because of the massive number of IPv6. A single /64 subnet has 18,446,744,073,709,551,616 usable host addresses. And an /29 that you receive from RIPE has 633,825,300,114,114,700,748,351,602,688 or 34 millions of /64 subnets,
- ACL filtering works the same style as IPv4.
- According to statistics, the DDoS attacks to IPv6 happens only 8% of cases.
"Arbor Networks WISR #13 report"
- RTBH or FlowSpec for Anti DDoS works the same as IPv4 if you don't have AntiDDoS protection

we have **NSCFLOW AntiDDoS** system that handles both IPv4 and IPv6.

Our success stories.

"The +5%"

- I.B.C - Telecom AS57388
- NETCOM AS205278
- PRIAM-NET AS210125
- KORABI-NET AS211210
- IH-NETWORK AS211458
- INTERFIBER AS211147
- NETSYSCOM AS212766
- VANI AS204816
- Others soon...



10:58 test-ipv6.com

Test IPv6 FAQ Mirrors stats

Test your IPv6 connectivity.

For the Help Desk Summary Tests Run

Share Results / Contact Other IPv6 Sites

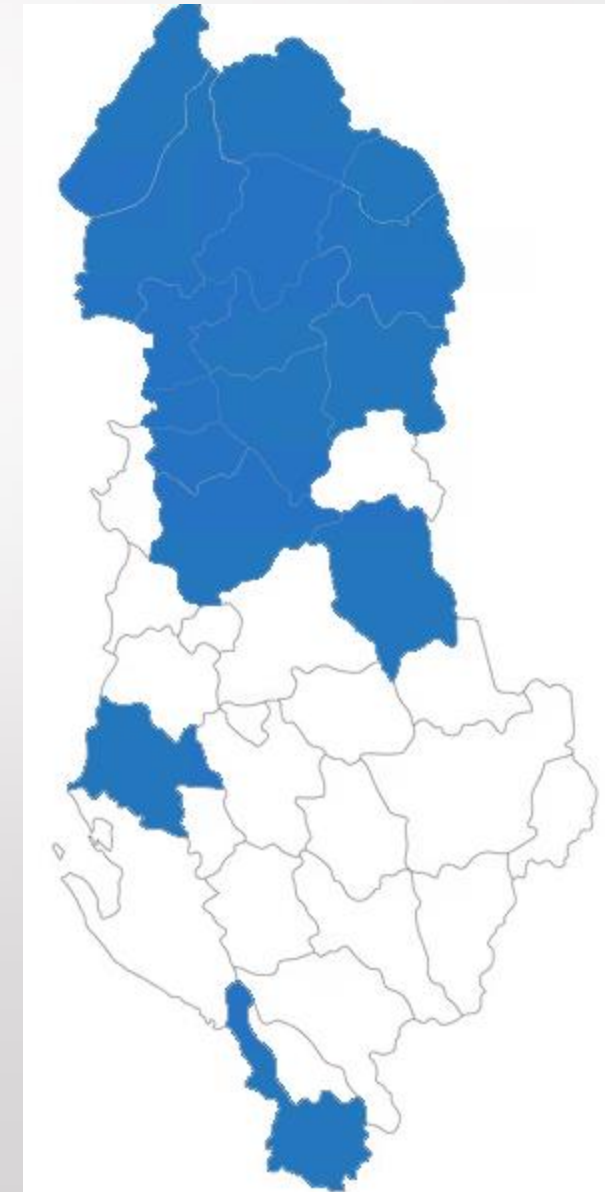
- Your IPv4 address on the public Internet appears to be 92.60. 12
- Your IPv6 address on the public Internet appears to be 2a01:4f00: :0:46e1 1eb:d6a6:1018
- Your Internet Service Provider (ISP) appears to be ABISSNET
- Since you have IPv6, we are including a tab that shows how well you can reach other IPv6 sites. [\[more info\]](#)
- Your DNS server (possibly run by your ISP) appears to have IPv6 Internet access.

Your readiness score

10/10 for your IPv6 stability and readiness, when publishers are forced to go IPv6 only

Click to see [Test Data](#)

(Updated server side IPv6 readiness stats)
This instance (frankfurt.test-ipv6.com) is hosted at Linode.



Q&A

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- www.nsc.al
- <https://www.linkedin.com/in/mirditor/>