A First Look at NAT64 Deployment In-The-Wild

Amanda Hsu, Frank Li, Paul Pearce, Oliver Gasser

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Background: IPv6 Adoption

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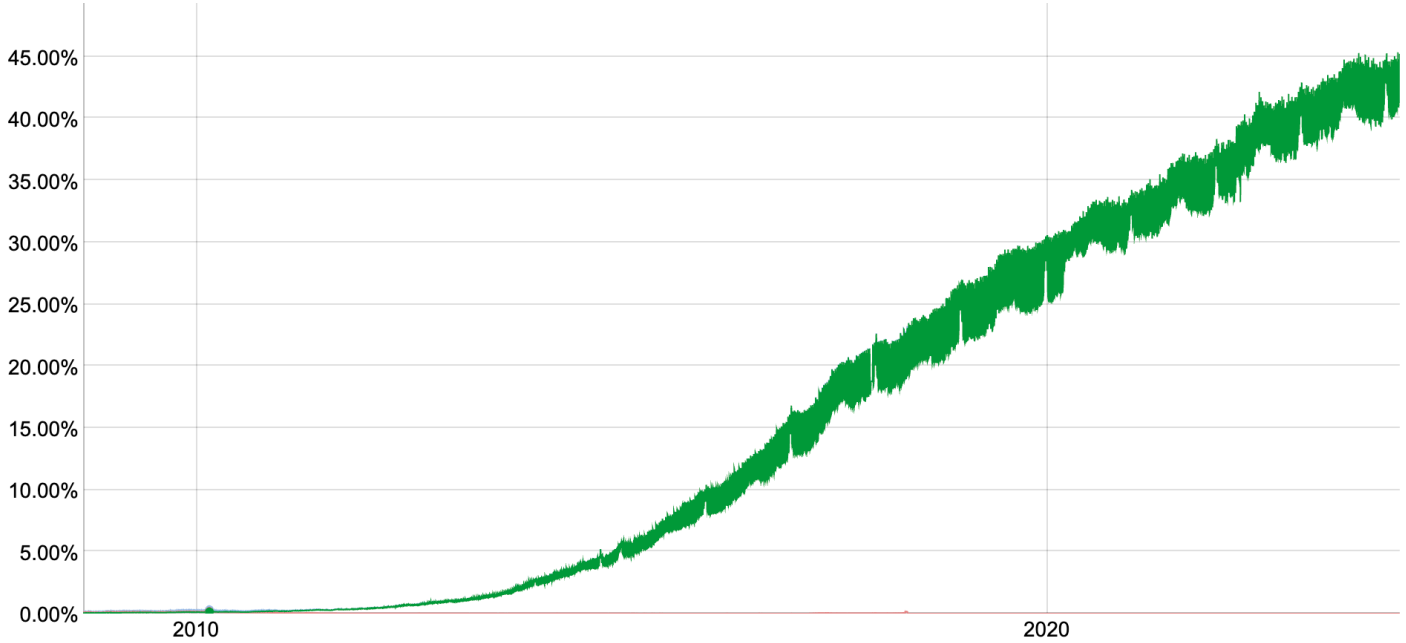

Source: https://www.google.com/intl/en/ipv6/statistics.html

Today, IPv6 is almost 45% of traffic to Google.

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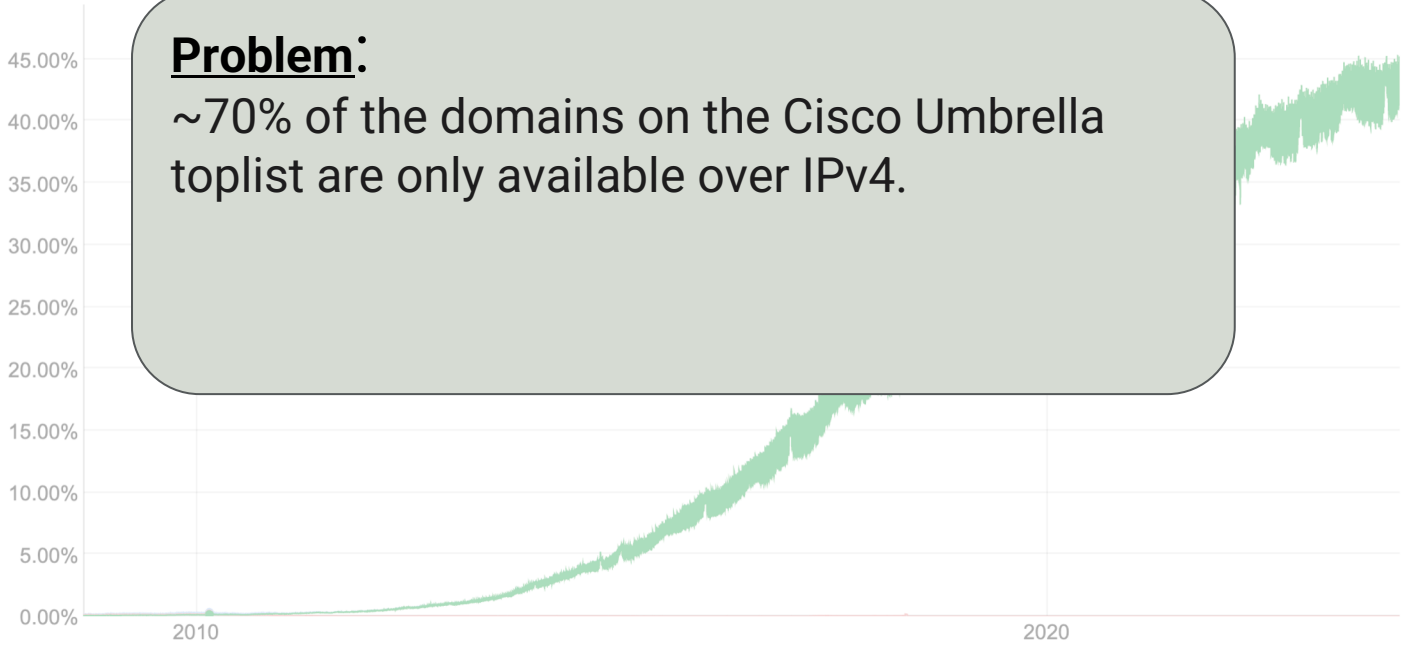

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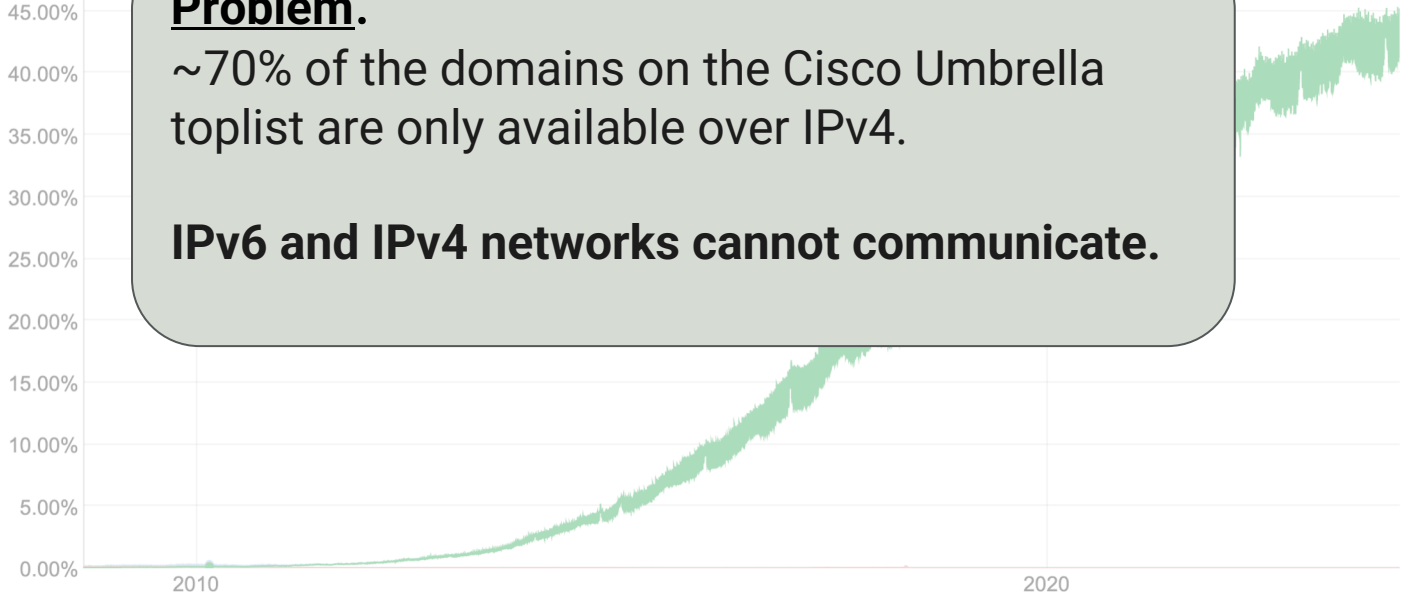

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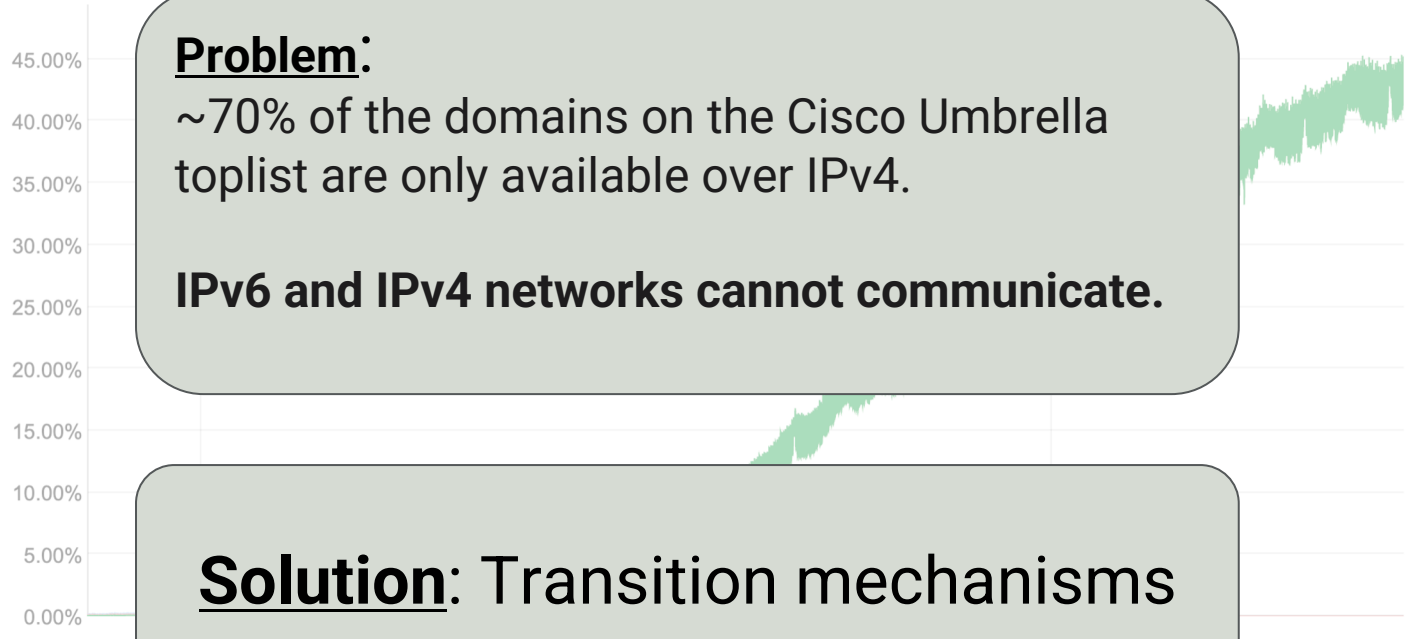

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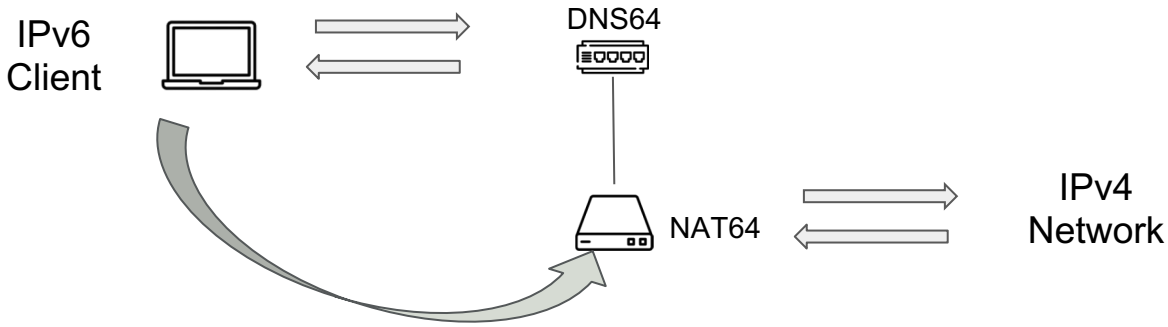
Transition Mechanisms: NAT64



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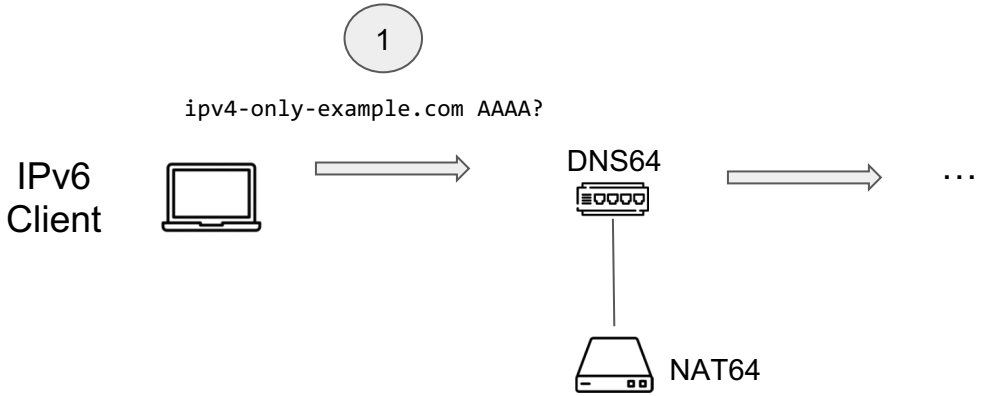

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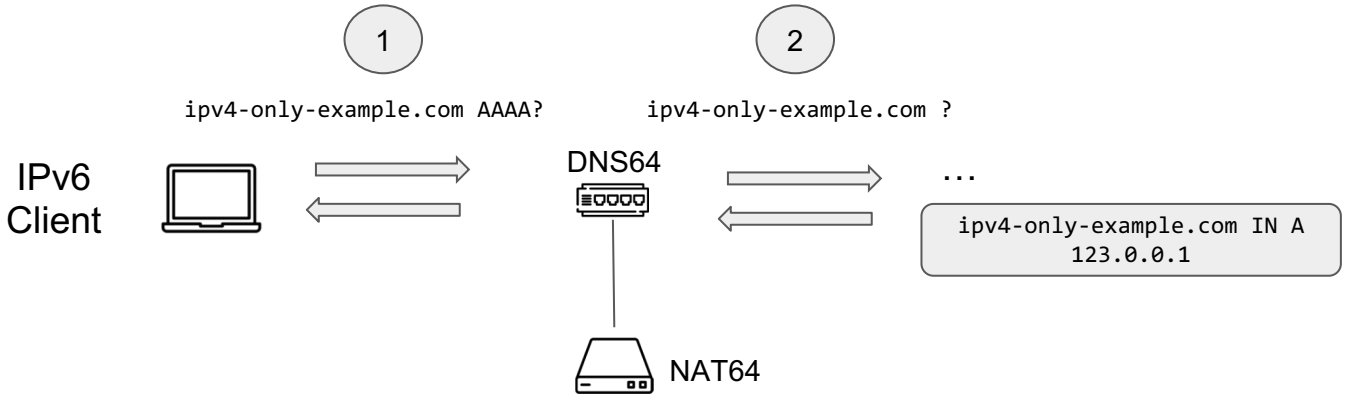

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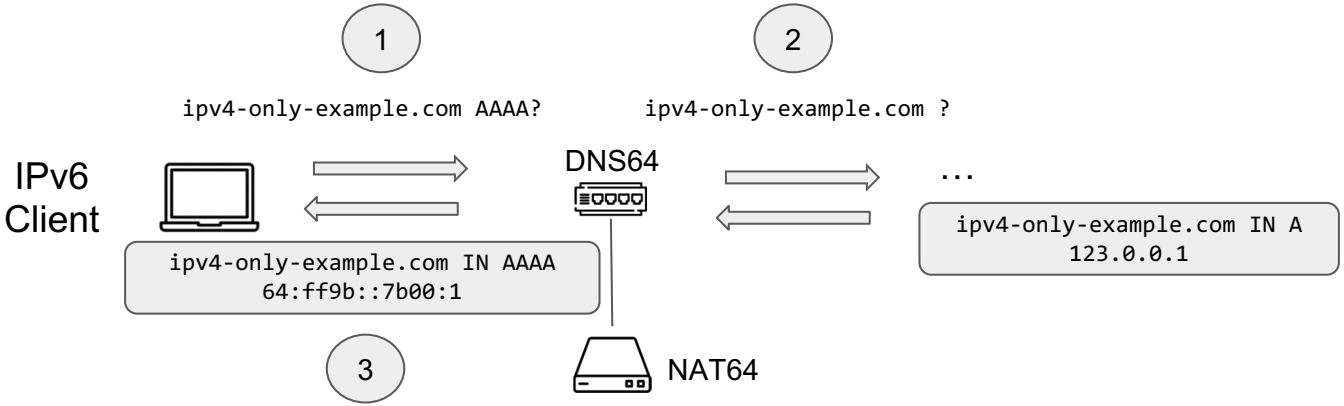

DNS64 maps IPv4 address to an IPv6 address

- IPv6 address can be globally unique, or from the special use prefix **64:ff9b::/96**
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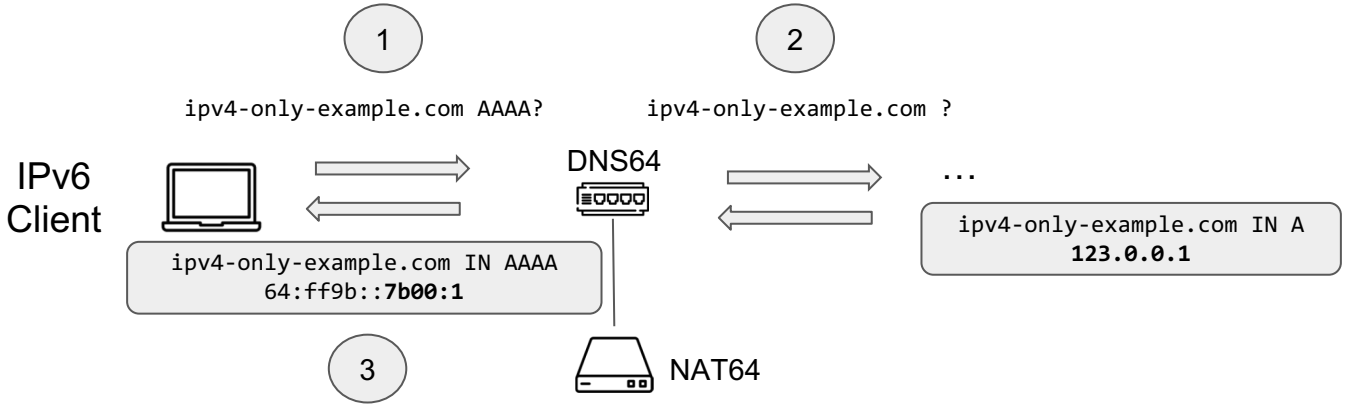

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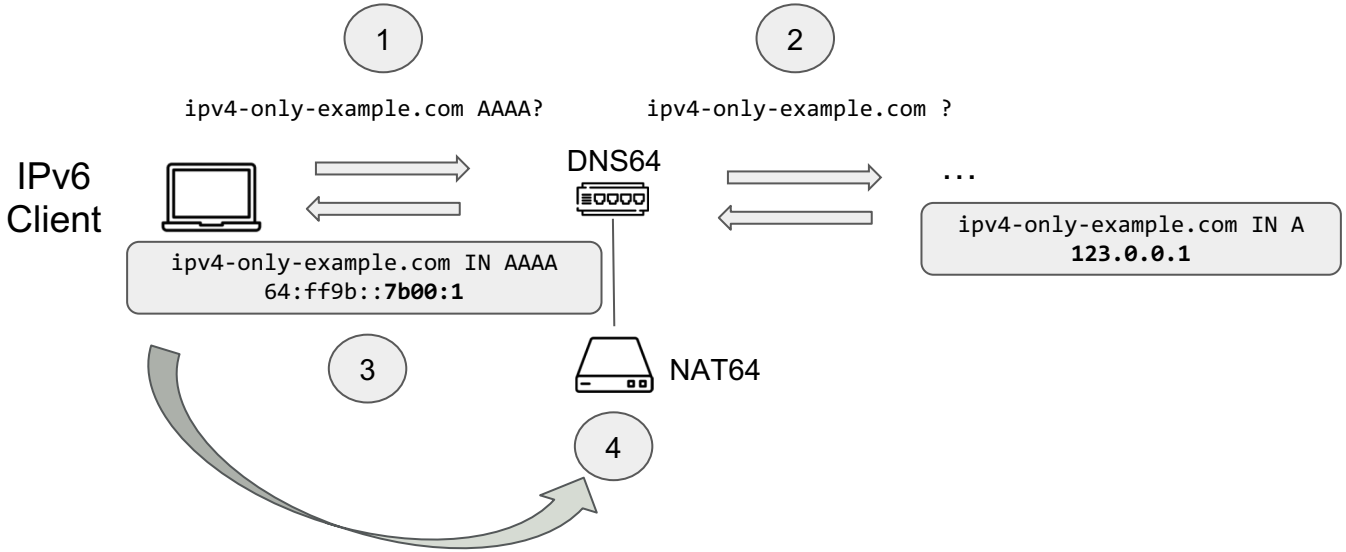

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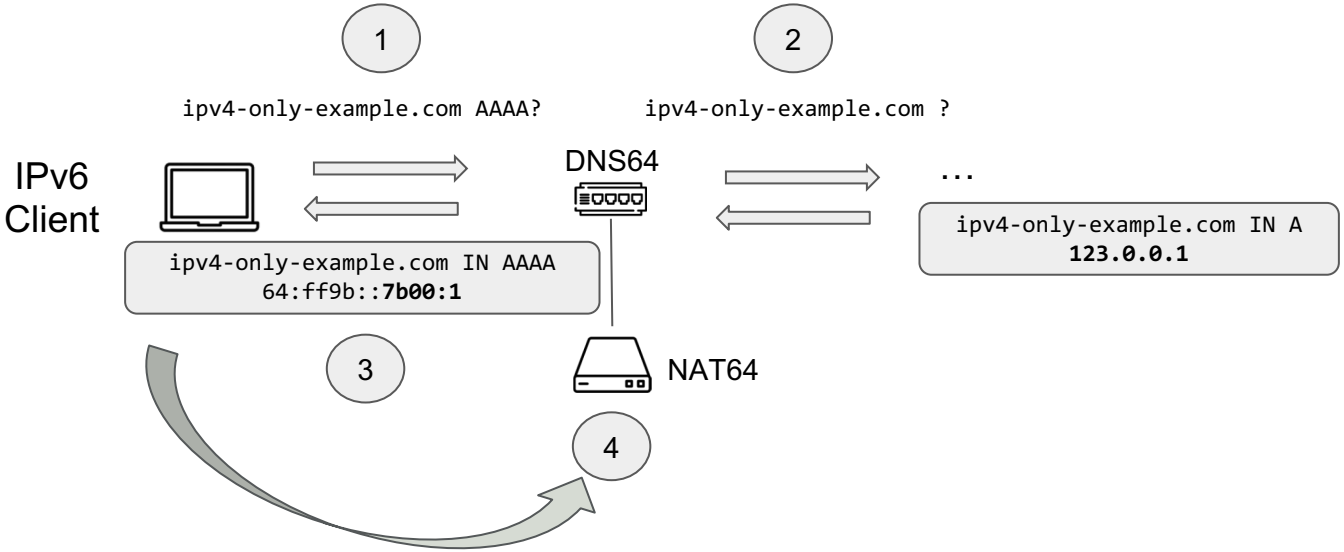

We request an AAAA record for IPv4-only domain from resolvers.

If they respond with a AAAA record, the resolver is potentially using DNS64.

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Research Questions

Deployment and demographics

What is the prevalence of NAT64? Where is NAT64 deployed?

Configuration

How are NAT64 gateways configured?

Security

Are NAT64 gateways publicly accessible?

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3. Clients -> Our Webserver

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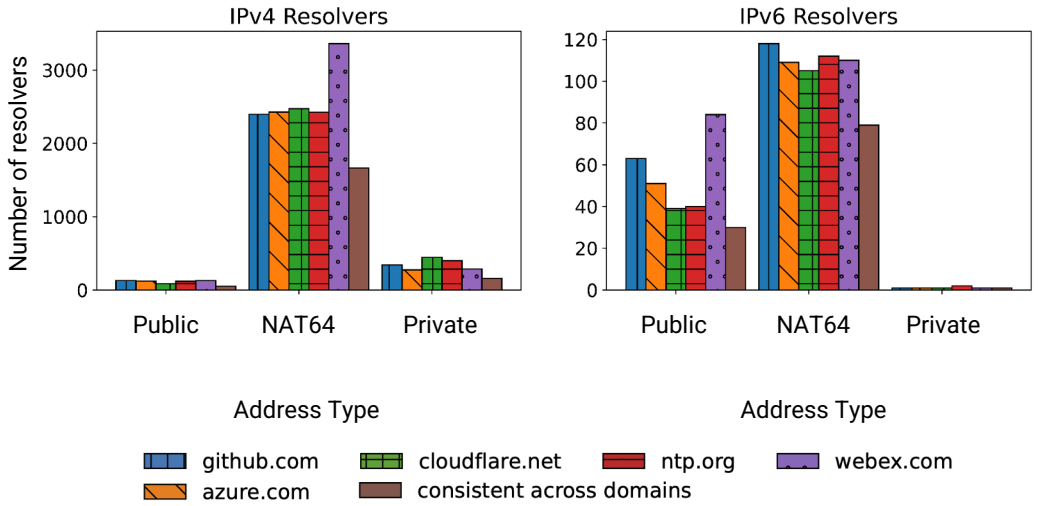

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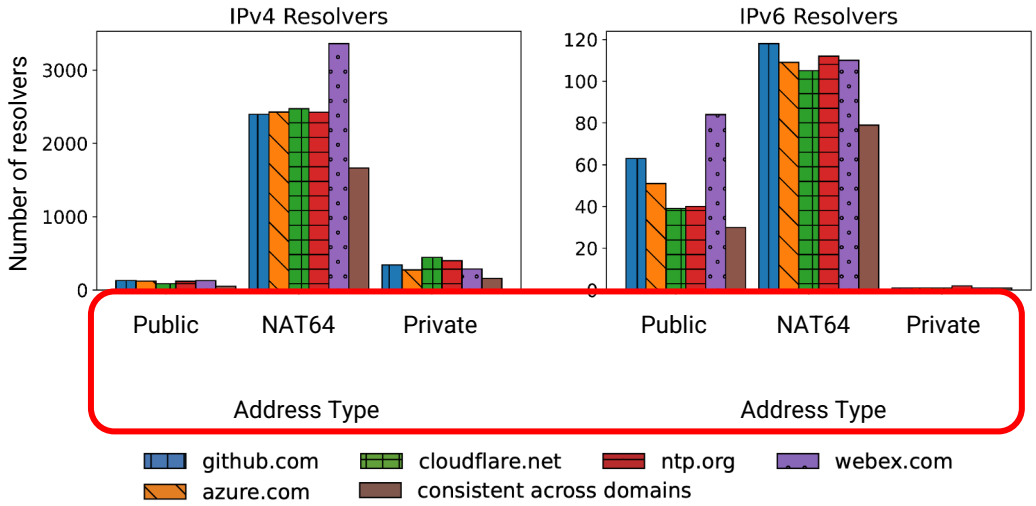

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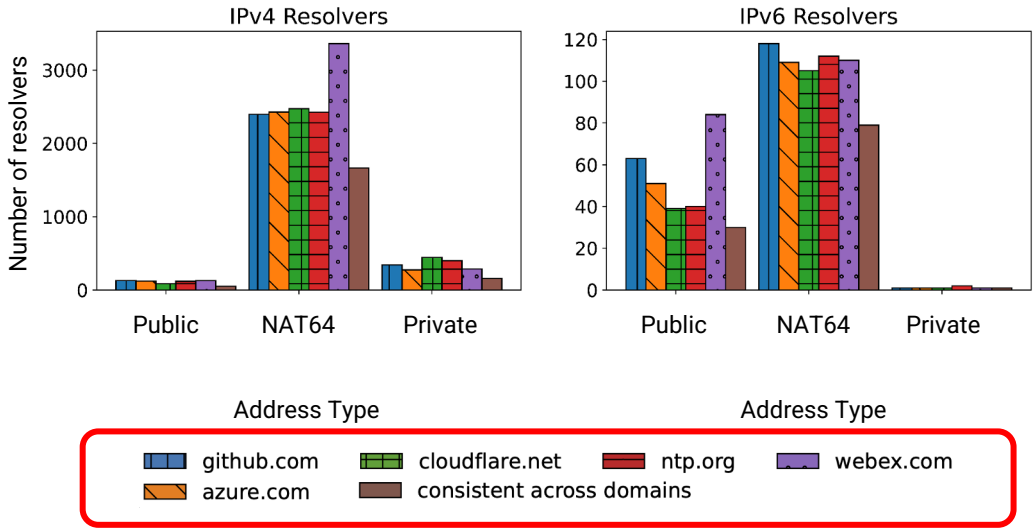

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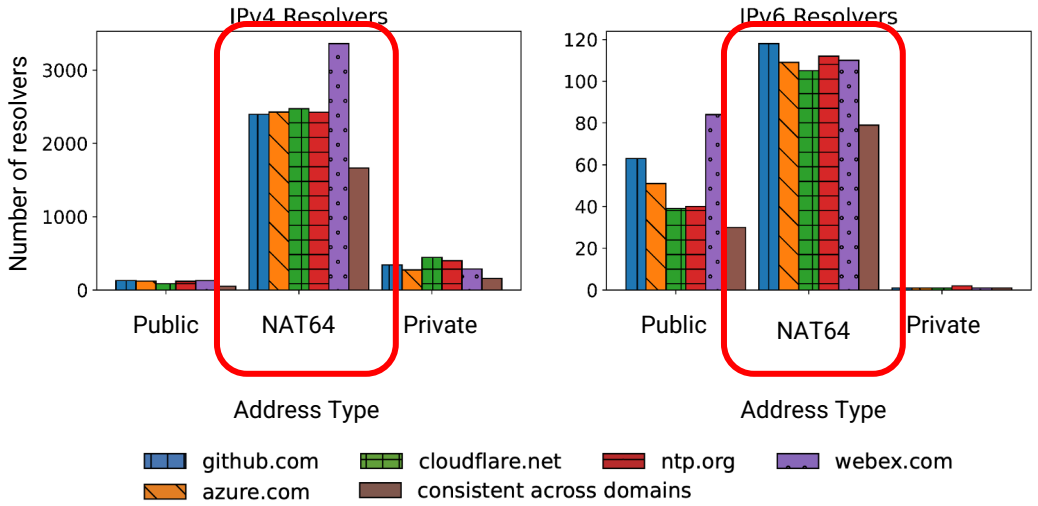

Across all public resolvers, most NAT64 deployments leverage the special-use prefix.

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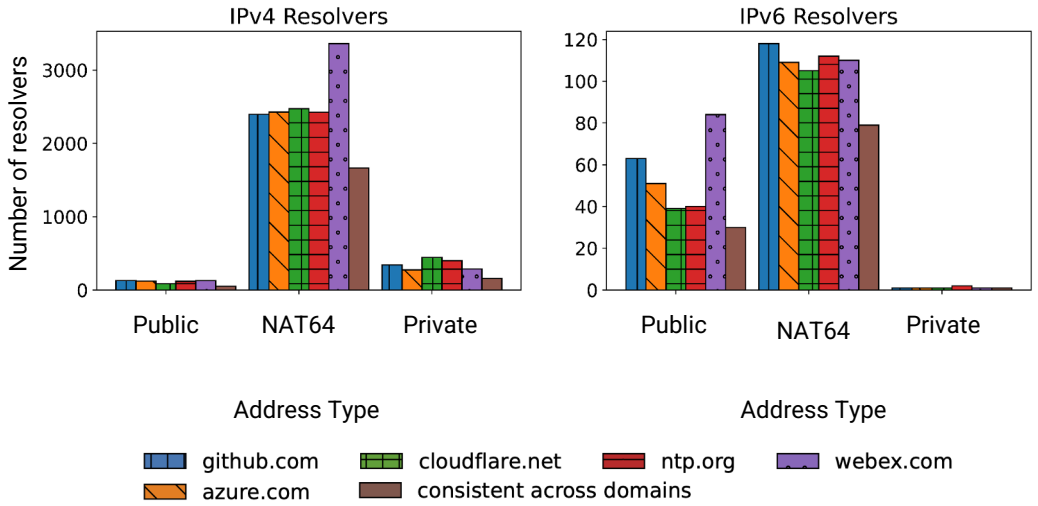

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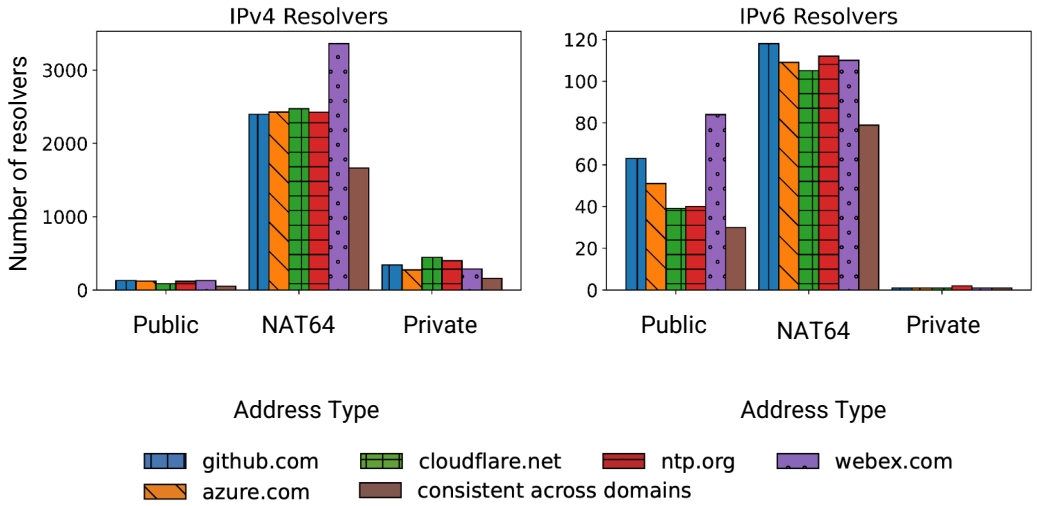

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DNS64 is not deployed widely across public resolvers.

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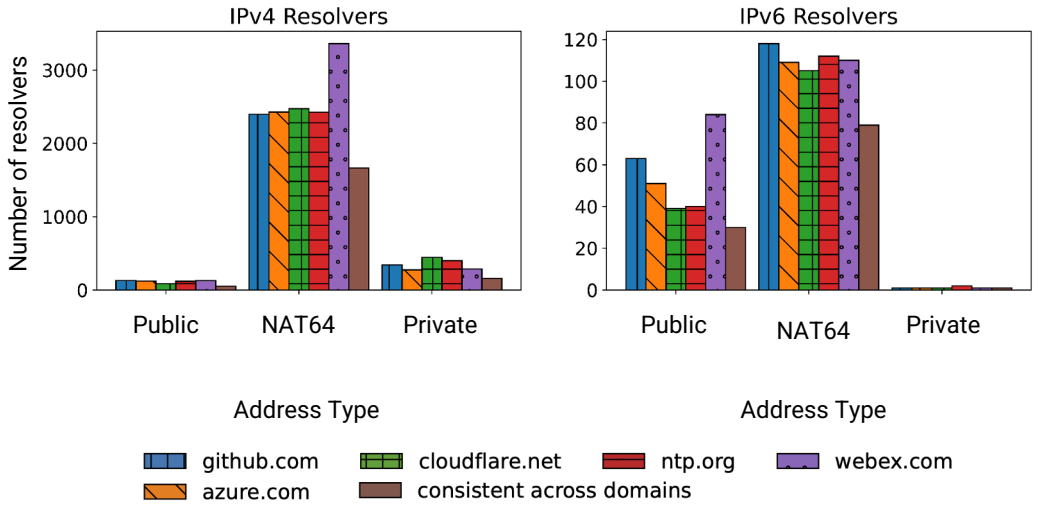

Top Resolver ASes:

IPv4: Meditelecom, Tata Teleservices, China Telecom, Yettel Hungary

IPv6: China Telecom, Hurricane Electric, Akamai, Cergnet, Giginet

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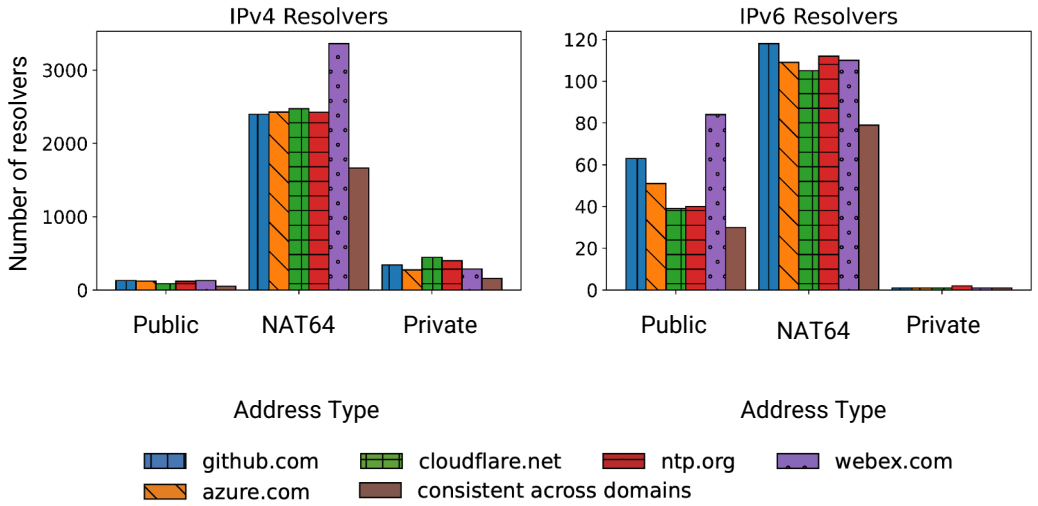

DNS64 resolvers are concentrated in mobile networks, network service providers, and Chinese networks.

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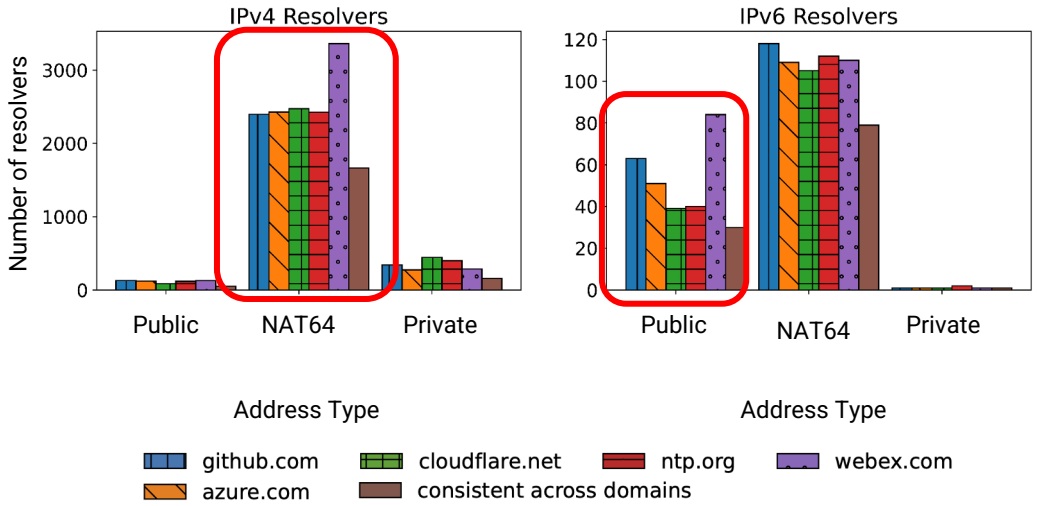

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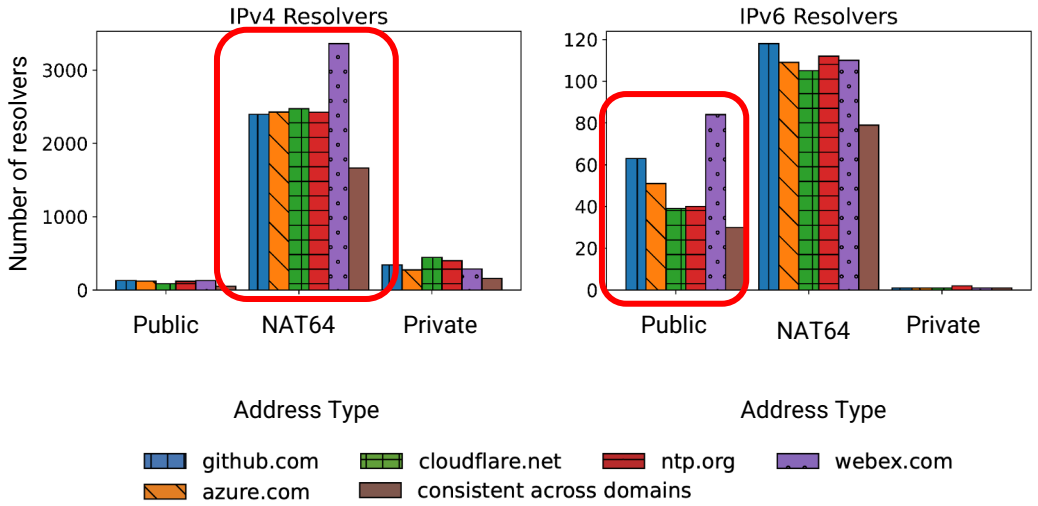

Resolvers respond inconsistently across requests for different domains.

Resolvers in **China Education Network (AS 4538)** are more likely to respond to requests for **webex.com** than other domains.

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  - All resolver measurements significantly vary by the domain requested.
- Measurable clients do not largely use NAT64 for IPv4-connectivity.
  - Although, RIPE Atlas probes may not be representative of the Internet.

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  - All resolver measurements significantly vary by the domain requested.
- Measurable clients do not largely use NAT64 for IPv4-connectivity.
  - Although, RIPE Atlas probes may not be representative of the Internet.
- **Largely, DNS64 resolvers embed A records correctly.**
- **Several open NAT64 gateways exist.**

Questions?

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