IPv6 on Xbox One

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Overview

- Current state of IPv6 on Xbox One and Windows 10 Xbox App
- Health trends for IPv4 NAT traversal
- Preparing for IPv6 P2P multiplayer on Xbox One

Current State of IPv6

Current state of IPv6 on Xbox One

- Native dual stack support has been present since launch with support for both stateless and stateful IPv6 address acquisition.
- Primary drivers of IPv6 traffic today from Xbox One consoles are CDN downloads: digital game purchases, system updates, app/game updates, and media streaming apps.
- The number of Xbox One consoles with IPv6 connectivity continues to increase. Over 1/3rd of consoles have IPv6 connectivity, on pace to have doubled over a 12 month period.
- P2P multiplayer leverages IPv6 and IPsec via Teredo encapsulation for network security, and NAT traversal over IPv4 networks.

Teredo for party chat and multiplayer

- Windows 10 uses Teredo for Party Chat in the Xbox App (cross platform) and multiplayer for titles like Killer Instinct, #IDARB, and Gears of War:UE online co-op.
- Xbox One uses Teredo for P2P multiplayer, some Azure-hosted multiplayer, and Party Chat.
- Xbox Teredo traffic does not use Teredo relay servers.
  - Teredo servers are used for NAT detection, address generation, and initial P2P connection process.
  - Consoles and PCs perform encapsulation and de-encapsulation of IPv6 packets themselves.

IPv4 NAT Health Trends

Increasing challenges for IPv4 NAT traversal

- Double NAT scenarios are more and more common.
  - CPE gateway deployments influence this trend, as compared to modem-only CPE.
  - Manual intervention and/or customer support often required to obtain an “Open” or cone NAT when two routers are present, since UPnP can only issue port mapping requests to the first NAT.
- IPv4 address depletion is leading to more Carrier Grade/Large Scale NAT deployments.
  - Customers can find themselves behind non-Open NATs as a result, making P2P multiplayer more challenging.
- High-quality IPv6 access is needed sooner, rather than later.

Operator Preparation for Xbox IPv6 Multiplayer

Access layer IPv6

- Multiplayer gaming requires low latency, and seamless connectivity.
  - Testing across a broad section of CPE we've found several devices with substantially lower throughput and higher latency for IPv6 traffic when compared to IPv4.
  - IPv6 firewalls that block inbound IPsec traffic can be problematic for P2P gaming.
  - CPE should follow RFC 6092 recommendations for IPsec traffic.
    - Enable unsolicited, inbound IKE and ESP traffic to prevent blocking P2P IPsec.
  - Many retail CPE devices have IPv6 functionality disabled by default.

Core and edge IPv6

- Latency, latency, latency.
- Suboptimal IPv6 deployments could result in multiplayer traffic having to decide between a lower latency IPv4 path with P2P connectivity issues, or a higher latency IPv6 path without P2P connectivity issues.
- Transitional technologies using relays can impact latency between peer networks, making multiplayer via IPv6 a less preferable path.
- Core gaming audience is acutely aware of latency performance and P2P connection issues.