6to4 Provider Managed Tunnels
draft-kuarsingh-v6ops-6to4-provider-managed-tunnel-00

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Problem Space

- Operators will have multiple types of endpoints / equipment types to support following IPv4 run out and during IPv6 transition
    - 1. Provider Controlled CPE on access network able to support IPv6 Native (Network Side)
        - Options include Dual Stack (with or without NAT444, DS-Lite etc)
    - 2. Provider Controlled CPE on access network which cannot support Native IPv6 (Network Side)
        - Options include tunneling option like 6RD
    - 3. Uncontrolled CPEs on Access Network which cannot support Native IPv6 to CPE
        - **FOCUS of DRAFT**

Device / End Point Classifications

▸ **Target of 6to4-PMT is the "Unmanaged, IPv4-Only Addressed endpoints"**

  ▸ Many devices support IPv6 on LAN but not WAN
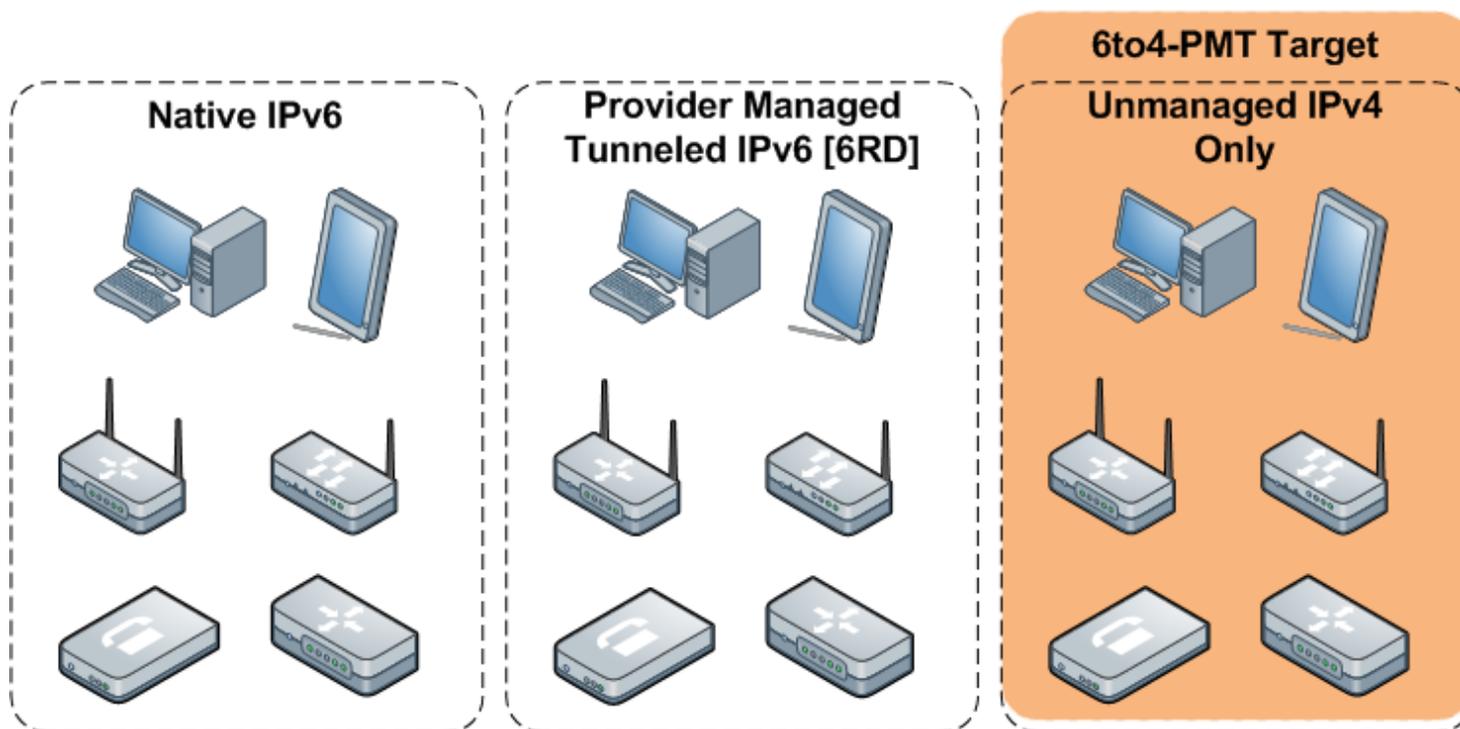
6to4 – PMT Overview

- Goal is to make forward/return path deterministic and reduce latency and removes dependency on remote networks (Fully controlled by ISP Routing)

- Option considered since advertisement of longer then 2002::/16s were considered not viable (lack of support)

- Combines 6to4 (with anycast operation) with NAT66 (Prefix Translation)

- This is __NOT__ designed as "the" transition option, but just one tool (as part of bigger plan)

- Addresses a small but real portion of the customer base which would otherwise be a serious support issue

Considerations

- **Problems**
    - Removes e2e transparency (Debatable since the IP is deterministic and only the source house is unaware of IP be default)
    - May break (like any NAT) some protocol operation
    - Many people dislike NAT (for valid reasons)

- **Positives**
    - 6to4 is Widely deployed (actually viable right now!)
    - Requires little to no effort on upgraded existing field equipment
    - Can mitigate issue with auto-6to4 operation and use of non-RFC1918 address space
    - Stateless operation based on PT66/NAT66 (IP path can be determined)

Let's Talk

▸ Operators need to address this segment of the user base

▸ Ignoring them is not an option

▸ Telling an operation to "just upgrade to IPv6" is not an option (as explained – uncontrolled)

▸ Other options must deal with a few key issues

  ▸ Any option which requires new CPE gear/functionality or upgrades/updates to consumer OSs will take time

  ▸ Operators must deal with reality (if it's not in the network, it does not exist as a deployable option)