NAT444 Impacts

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Test Goals

- NAT444 was tested in three labs with two LSN products, four ISPs, and multiple home gateways/CPE equipment
  - Results were combined so as not to single out vendor implementations
- The goals of the testing were as follows
  - Characterize NAT444 operation on broadband technology
  - Understand impacts of the technology on average users, operators, and content providers
  - Understand limitations
- Did not attempt to enable NAT traversal/develop workarounds
- Did not attempt to test DS-Lite or other service multiplexing architectures
  - We expect that many share similar issues
Sample Topology

- CGN Box
- Internet
- Provisioning Server
- Switch
- CMTS
- Cable Modem
- Gateway
- Clients
- Internet
NAT444 Findings

- NAT444 provides basic IPv4 connectivity
- Several areas of concern (not necessarily unique to NAT444)
  - Performance often differs from vendor to vendor and from environment to environment (your mileage will vary; difficult to predict)
  - Many more advanced tasks will fail outright or be subject to severe service degradation (e.g. Online Gaming, Internet Video, Peer to Peer Operations, FTP, 6to4/transition technologies)
  - Source addresses/ports will change, impacting geolocation, lawful intercept, abuse response
  - Challenging to troubleshoot
NAT444 Conclusion

- Operators **will be forced to enable NAT444** or other address sharing mechanisms for IPv4 after exhaustion
  - Breaking IPv4 is not an option

- Address sharing will subject the customer to **new failure modes**, **decrease performance** and will deliver an **inconsistent experience** to the end user
  - Issues we identified not necessarily unique to NAT444
  - Other address sharing mechanisms not tested

- Issues related to NAT444 will be **somewhat uncontrollable** from the operator and/or content provider point of view

- The optimal solution to IPv4 exhaustion is **migration to IPv6**