IPv4 to IPv6 Transition

Transitional non-conflicting reusable IPv4 address block

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Introduction

- IPv6 is being introduced globally, however the entire IP ecosystem will not have transitioned to IPv6 before the exhaustion of the global IPv4 address pool
- During the transition, IPV4 connectivity will still be required for customers with IPv4-only devices, IPv4-only operating systems and for accessing remaining IPv4-only content and applications
- To facilitate a smooth transition to IPv6 for customers and transit providers an address block is required that will not conflict with existing RFC 1918 addresses (used extensively within customer networks and in management of IP infrastructure)

Key Characteristics (1)

- Transitional
  - The address block is not proposed as a permanent solution, rather it is intended to aid the transition from IPv4 to IPv6
  - It is recommended that a time horizon of 2020 be set for retirement of this address block
  - This will provide sufficient time for the successful lifecycle transition of the customer environment from IPv4 to IPv6 (given support from device vendors)
- Non-conflicting
  - The address block must not conflict with existing RFC 1918 addresses which are used extensively within customer networks and by transit providers in the management of IP infrastructure
  - This address block must not be used as a default range in any CPE equipment.
- Re-usable
  - It is proposed that the address block can be re-used by any transit provider
  - The address block must not be used in global routing on the public Internet

Key Characteristics (2)

- Address Range
  - A suitable address range for this purpose should be selected and reserved by IANA from the unallocated IPv4 address pool. This address could be from previously reclaimed space, or space reclaimed for this purpose.
  - Although in principle an address block from the reserved 240/4 range could be used for this purpose, the actual use of this range is prevented within the implementation of many current IPv4 protocol stacks. Any proposed use of 240/4 would therefore appear to require major changes to deployed equipment, which would be impractical.
- Size of Address Block
  - An address block with a /10 CIDR mask should be reserved for this purpose.
  - The size of the reserved address block is not associated with any specific network architectures, but it is intended to accommodate the potential requirements of different network designs used by individual providers.
  - In particular, this address block is sized to the minimal level expected for the addressing needs of a major provider offering services to a large broadband domain such as a single large city.
  - It is believed that a block smaller than /10 would require duplicate use of the same address space within such a domain, which could force the provider to use an inefficient network design and could introduce significant complexity in network operations such as service identity management.

Key Characteristics (3)

- Global Routing Table
  - The address block must be considered a bogon in the global routing table, and filtered as the RFC1918 address space is currently in the public Internet.
- Reverse DNS
  - Reverse DNS queries for addresses in this block must not be forwarded to the global DNS infrastructure.
  - Any provider using this address block should provide reverse DNS infrastructure for this block, or the portions of it that they utilize.
  - The in-addr.arpa root servers must return NXDOMAIN for this address block, if queried.
- Traffic Filters
  - Any provider utilizing this address block must filter traffic with source or destination addresses within this block at their external borders
  - All networks should apply the same filters.

Details

- The transit provider would assign an address from the address block to customer equipment
- The transit provider will translate addresses from the address block to a globally routable IPv4 address at the border of the transit provider
- The address block can be re-used by any transit provider as they are not routed on the public Internet
- Customer equipment vendors must not use the address block in customer equipment as this could cause address conflicts for the customer resulting in routing issues (the very problem the address block is designed to prevent)
- IANA could record the allocation of the IPv4 global unicast address as 'Transitional IPv4 to IPv6 address block' in the IPv4 address registry

Conclusion

- Allocating a transitional non-conflicting reusable IPv4 address block will not significantly alter the IPv4 run-out date, yet will provide many transit providers and customers with a smoother transition from IPv4 to IPv6

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