NAT64

6.7.1

NAT for IPv6?

Because many networks use both IPv4 and IPv6, there needs to be a way to use IPv6 with NAT. This topic discusses how IPv6 can be integrated with NAT. IPv6, with a 128-bit address, provides 340 undecillion addresses. Therefore, address space is not an issue. IPv6 was developed with the intention of making NAT for IPv4 with translation between public and private IPv4 addresses unnecessary. However, IPv6 does include its own IPv6 private address space, unique local addresses (ULAs).

IPv6 unique local addresses (ULA) are similar to RFC 1918 private addresses in IPv4 but have a different purpose. ULA addresses are meant for only local communications within a site. ULA addresses are not meant to provide additional IPv6 address space, nor to provide a level of security.

IPv6 does provide for protocol translation between IPv4 and IPv6 known as NAT64.

6.7.2

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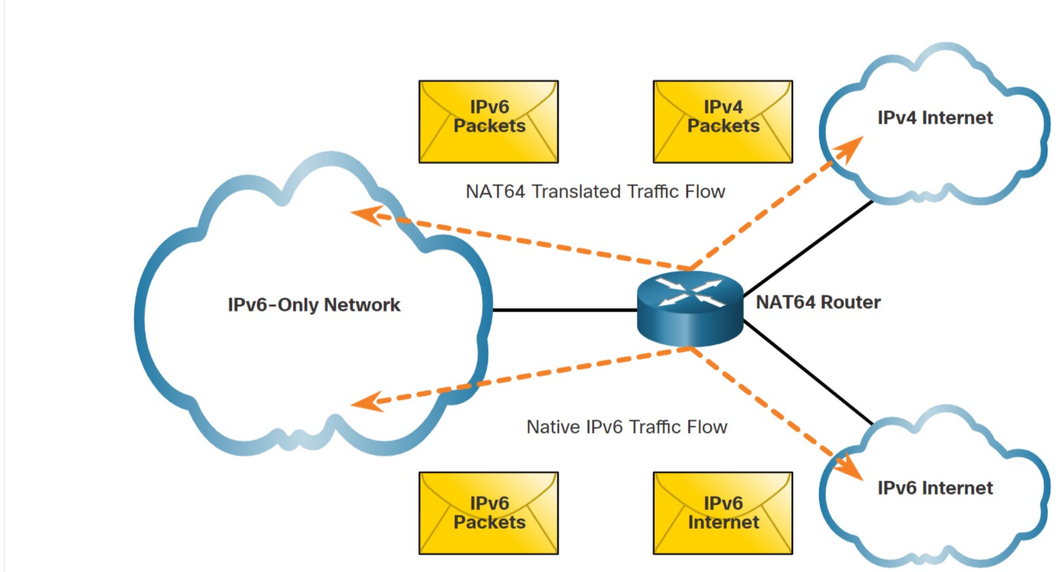
NAT for IPv6 is used in a much different context than NAT for IPv4. The varieties of NAT for IPv6 are used to transparently provide access between IPv6-only and IPv4-only networks, as shown in the figure. It is not used as a form of private IPv6 to global IPv6 translation.



Ideally, IPv6 should be run natively wherever possible. This means IPv6 devices communicating with each other over IPv6 networks. However, to aid in the move from IPv4 to IPv6, the IETF has developed several transition techniques to accommodate a variety of IPv4-to-IPv6 scenarios, including dual-stack, tunneling, and translation.

Dual-stack is when the devices are running protocols associated with both IPv4 and IPv6. Tunneling for IPV6 is the process of encapsulating an IPv6 packet inside an IPv4 packet. This allows the IPv6 packet to be transmitted over an IPv4-only network.

NAT for IPv6 should not be used as a long-term strategy, but as a temporary mechanism to assist in the migration from IPv4 to IPv6. Over the years, there have been several types of NAT for IPv6 including Network Address Translation-Protocol Translation (NAT-PT). NAT-PT has been deprecated by IETF in favor of its replacement, NAT64. NAT64 is beyond the scope of this curriculum.