# NAT64

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**1. Introduction to NAT for IPv6**

**NAT for IPv6?**

* **IPv6 and NAT:** IPv6, with its vast address space, was designed to eliminate the need for NAT as in IPv4. However, NAT64 allows for IPv6 to IPv4 translation.
* **IPv6 Address Space:** IPv6 provides 340 undecillion addresses, which means address space is no longer a concern.
* **Unique Local Addresses (ULAs):** IPv6 has its version of private addresses, called Unique Local Addresses (ULAs). ULAs are similar to IPv4’s private addresses but are intended for local site communication only. They do not provide extra address space or security layers.
* **NAT64:** This is the protocol translation between IPv4 and IPv6.

**2. NAT64 Explanation**

**NAT64 Functionality**

* **Context of Use:** Unlike IPv4 NAT, IPv6 NAT is used to enable communication between IPv6-only networks and IPv4-only networks.
* **No IPv6-to-IPv6 Translation:** NAT64 is not used for translating private IPv6 addresses to global IPv6 addresses.
* **Traffic Flow:** NAT64 translates IPv6 traffic to IPv4 and vice versa, allowing devices on an IPv6-only network to access IPv4 resources.

**Transition Techniques from IPv4 to IPv6**

* **Dual-Stack:** Devices run both IPv4 and IPv6 protocols simultaneously. This allows them to communicate over both IPv4 and IPv6 networks.
* **Tunneling:** Encapsulates IPv6 packets within IPv4 packets to send over IPv4-only networks.
* **Translation:** NAT64 translates IPv6 traffic for communication with IPv4-only devices.

**NAT64 as a Temporary Solution**

* **Temporary Mechanism:** NAT64 should not be a long-term solution but rather a temporary method to aid in the transition from IPv4 to IPv6.
* **NAT-PT:** The older NAT-PT method has been deprecated by IETF in favor of NAT64.