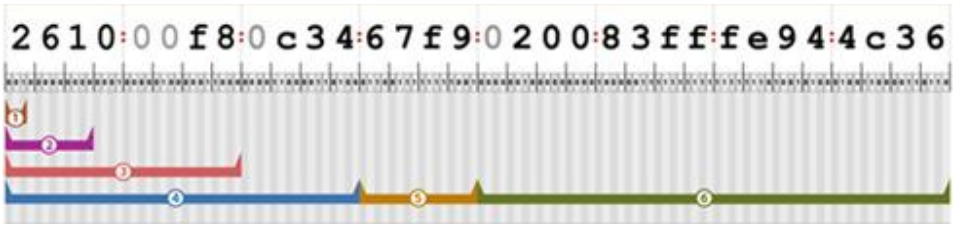
Anatomy of an IPv6 Address

Given the proliferation of wireless and mobile devices, each attached to a unique IP address, the current IPv4 system's inventory of IP addresses; some four billion unique addresses; is quickly being exhausted.

IPv6, on the other hand, supports 340 trillion trillion trillion unique addresses. IPv4 was designed in the 1970's with no way of anticipating the demands of today's Internet. IPv6, designed in the past 10 years, corrects many of IPv4's shortcomings in areas such as security, privacy, convergence, and more.

Anatomy of an IPv6 Unicast Address



1. "2000::/3", The current IPv6 address space for unicast allocations is 1/8 of the total address space.

2. "IANA Allocation to Registries (Varies)", IANA makes assignments to regional registries. New allocations are /12 bits, previous assignment have varied. For example: “2a01:0000::/16” was assigned by IANA to RIPE NCC (the European and Middle East registry) in December 2005.

3. "ISP Allocations", Regional registries make assignments to local ISPs. A typical assignment is /32 bits, but more space may be assigned. For example: RIPE NCC assigned “2a01:c000::/19 to France Telecom in December 2005.

4. "End-Site Allocations", ISPs make assignments to their customers. The amount of address space varies, but a /48 bit allocation is common. Organizations can get larger assignments, based on need (Command Information has a /32 allocation), smaller organizations may get less space (for small companies a /56 is common).

5. "Subnet Assignments", Organizations make assignment to individual subnets, where the most common size is /64. With 16 bits subnetting bits available, an organization can deploy as many as 65,536 subnets.

6. "Interface ID", Interfaces must have a unique identifier on the subnet – often created by embedding the underlying 48-bit (L2) MAC address. Theoretically then, a single subnet could support 2^64 active hosts – clearly far beyond the practical limit.