IP version 6

Friday, 1 October 2021 5:55 PM

IPv6 addren is represented as 8 groups of 4 Hexa-Decimal digits, each group represents 16-bits (2-Bytes / 2-Octets) called hextet. Each group is separated by a colon (:).

For example: In one IPV6 add. there are 128-bits.

2001:0db8:85a3:0000:0000:82ae:0370:7334

Full representation of 8 four digits groups may be simplified. This is done using several techniques.

* Zero Compresions:

- Leading zeros in each 16-bit group are suppressed,
- But each group must retain at least one digit in case of all zeros.
- Longest sequence of consewtive all-zeros fields (groups) is replaced with double colon (::).
- If the addren contains multiple runs of all-zeros fields then leftmost is compresed only.

Full: 2001:0db8:85a3:0000:0000:0001:003a:0000
Compresed: 2001:db8:85a3:0:0:1:3a:0
2001:db8:85a3::1:3a:0

2001:db8:0:0:1:0:0:1
2001:db8::1:0:0:1

* Transition of existing IPV4 addreses to IPV6 addreses:

- IPV6 will have to be phased in gradually, because now majority of IP addreses over the Internet are IPV4. So nowadays IPV6 and IPV4 co-exist and ultimately IPV6 will takeover. It is a long term transition. So, for time being IPV6 provides a way to accomodate IPV4 addreses within its addren space.

- One technique used to accomodate IPV4 in IPV6 is called "IPV4-mapped IPV6 addren". This becomes a hybrid addren that contains 80 "0" bits, followed by 16 "1" bits, followed by the original 32-bit IPV4 addren.
"FFFF"

For example:

IPV4 addren: 125.200.10.150
Maps to IPV6 add: 0000:0000:0000:0000:0000:FFFF:7DC8:0A96
Hextet ⟶ ::FFFF:7DC8:A96
OR
dot-decimal ⟶ ::FFFF:125.200.10.150