



**POLITECNICO
DI TORINO**

Recap Computer network technologies and services (01OTWOV)

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Acknowledgments

Questo breve riepilogo non ha alcuno scopo se non quello di agevolare lo studio di me stesso, se vi fosse di aiuto siete liberi di usarlo.

Le fonti su cui mi sono basato sono quelle relative al corso offerto (**Computer network technologies and services (01OTWOV)**) dal Politecnico di Torino durante l'anno accademico 2017/2018.

Non mi assumo nessuna responsabilità in merito ad errori o qualsiasi altra cosa. Fatene buon uso!

1 IPv6

1.1 Why we need another version?

The main problem of the previous version of IP haven't enough address space for our society. There are other motivations:

- More efficient on LANs: You need to use ARP to know the host.
- Multicast and unicast
- Security
- Policy Routing
- Plug and Play: IPv4 wasn't created with DHCP.
- Traffic Differentiation
- Mobility: The position of a mobile device change often.
- QoS

The great number of these characteristics are achieved with the older version with less efficiency, the real motivation is actually the address space. The transition isn't too easy and an interim solution is needed and it's why the IPv6 isn't already used by everyone like the 4 version.

Lack of IPs the 32bit address can provide 4 billion of address but not all are available for the CLASS division and only 3.5 billion are still usable. The problem is that when the IPs are assigned an entire class of IP is assigned, in the case of Politecnico the authority give a B class (130.192.xxx.xxx) that it means 65.025 IP address but the reality is that we not need to much IPs and the not used ones are wasted. When the IP started to be used the auth give without paying to much attention at the numbers of wasted address. A similar problem coming from the wasted IP that must have the same prefix to be on the same network, if you have 100 host you will need at least a network of $2^7 = 128$ available IPs but you will wasted the remaining 28 IPs. This is caused because the IPs are used Hierarchically, divided in more part, increasing the hierarchically will means an increase of waste.

Interim solution during the period of transition between the two versions we need a continuity, the main solution adopted were:

1. Tailored Assignment
2. Private Address
3. Network Address Translator (NAT)

4. Application Level Gateway (ALG)

The authority in charge of distributing the IP address is the IANA that distributes the adr to the regional agencies, if you look at the figure you can see the distribution of the IPs between the different region. The yellow correspond to not already assigned IP addresses, the purple blue segmente rappresente the äctiveIPs but the purple part rappresent addresses that aren't available between the router all around the world, this part is really big and it represents all the addresses wasted that we have mentioned before.