



## Private Addressing

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## IP Addressing

- Each IP address must be unique
  - If two hosts had the same address, which one would receive a packet sent to that address?
- Centralized Assignment
  - IANA: Internet Assigned Numbers Authority
  - Delegation to *registries*
    - APNIC (Asia-Pacific Network Information Center)
    - ARIN (American Registry for Internet Numbers)
    - RIPE NCC (Réseaux IP Européens)
  - Delegation to ISPs (Internet Service Providers)
  - Delegation to IT department

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## Private Addresses

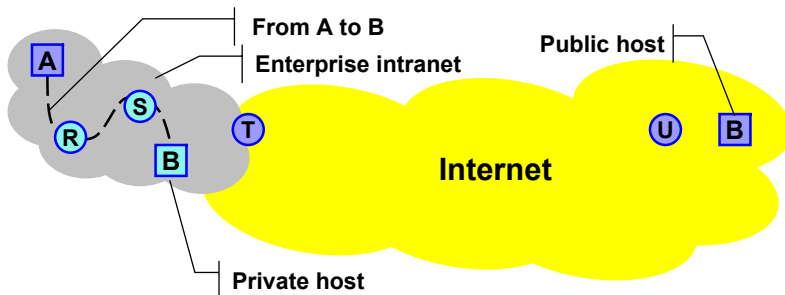
- 10.0.0.0/8
  - 1 class A prefix
- 172.16.0.0/16 - 172.31.0.0/16
  - 16 class B prefixes
- 192.168.0.0/24 - 192.168.255.0/24
  - 256 class C prefixes
- Not assigned to any public network
- Cannot be used to communicate with Internet nodes
  - Uniqueness is not guaranteed
  - Can be used within private networks

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## Obscuration of a Destination

- Private hosts with public addresses
- Destinations with addresses given to private hosts cannot be reached
  - Routers forward packets along the shortest path

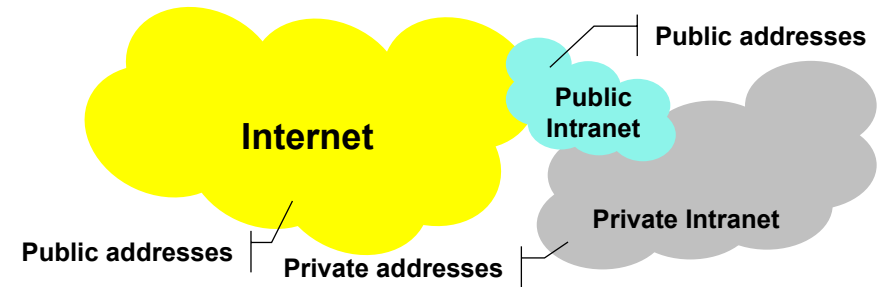


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## Private (IP) Networks

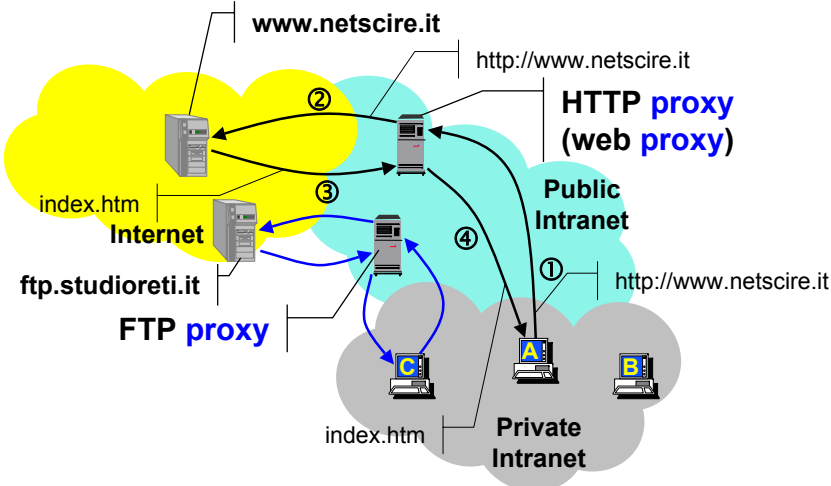
- A network not connected to the Internet can use any addresses
- A private network connected to the Internet: *Intranet*
  - Private hosts + public hosts
  - Private hosts use private addresses



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## Internet Access with Private Addressing: Proxy Server

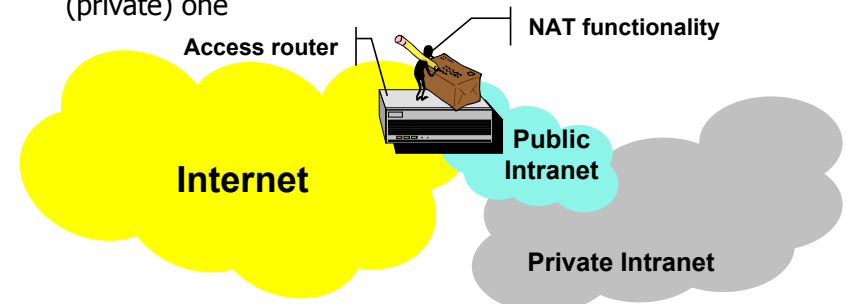


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## Internet Access with Private Addressing: NAT

- Network Address Translation
- Outbound packets
  - Substitute private IP source address with a public one
- Inbound packets
  - Substitute the public IP destination address with the original (private) one



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## References

- Y. Rekhter, B. Moskowitz, D. Karrenberg, G. J. de Groot, E. Lear., "Address Allocation for Private Internets," RFC 1918, February 1996.