

 *Gosier, La Guadeloupe - March 2007* IPv6DISSemination and Exploitation



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Agenda

- Historical facts
- IPv4 address space status
- From Emergency measures ...
- ... to IPv6



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Historical facts

- 1983 : Research network for ~ 100 computers
- 1992 : Commercial activity
- Exponential growth
- 1993 : Exhaustion of the class B address space
- Forecast of network collapse for 1994!

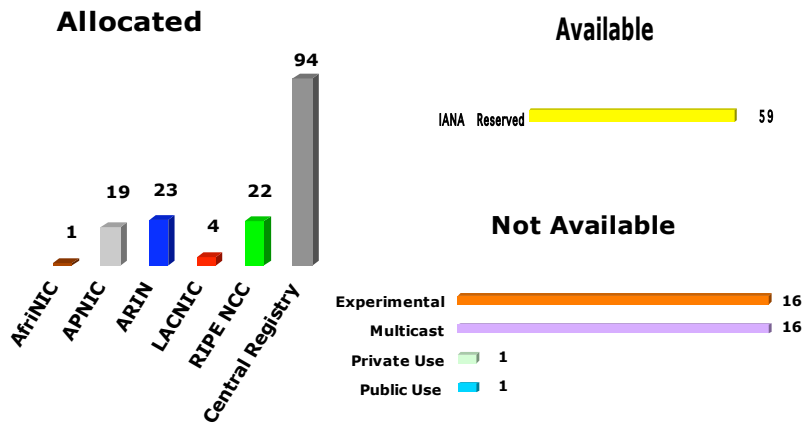


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IPv4 /8s Address Space Status (sep. 2006)

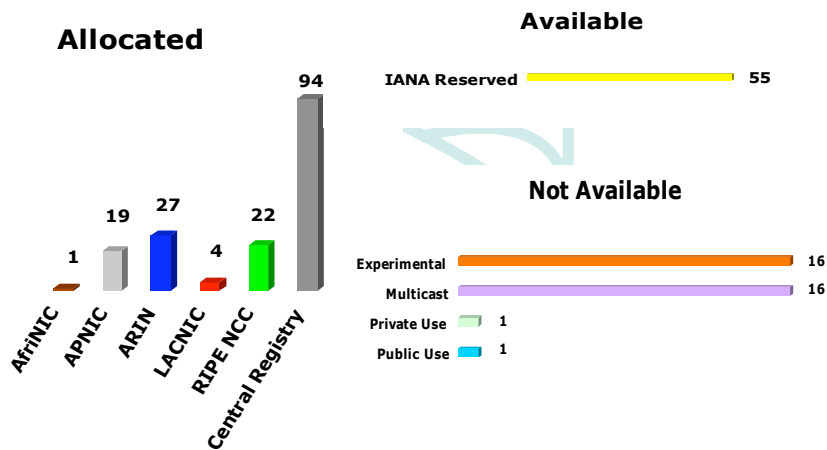


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IPv4 /8s Address Space Status (dec. 2006)

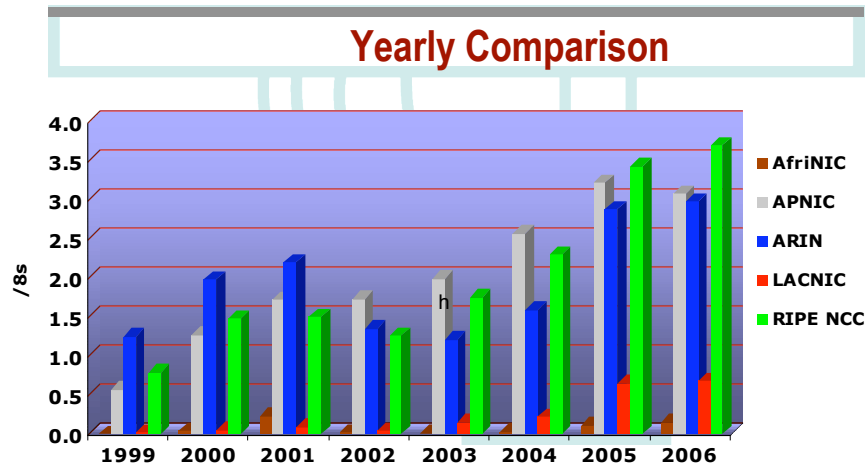


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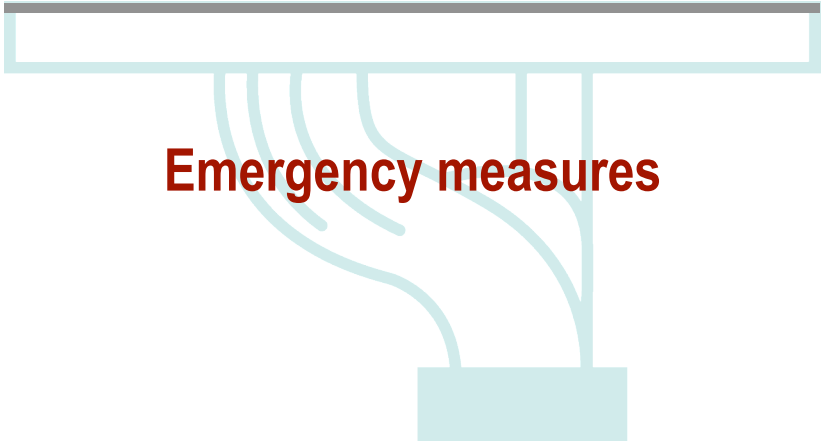
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IPv4 Allocations RIRs to LIRs/ISPs



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CIDR ...

- Allocate exceptionally class B addresses
- Re-use class C address space
- CIDR (*Classless Internet Domain Routing*)
 - RFC 1519 (PS)
 - network address = prefix/prefix length
 - Classes abandon = less address waste
 - allows aggregation (reduces routing table size)



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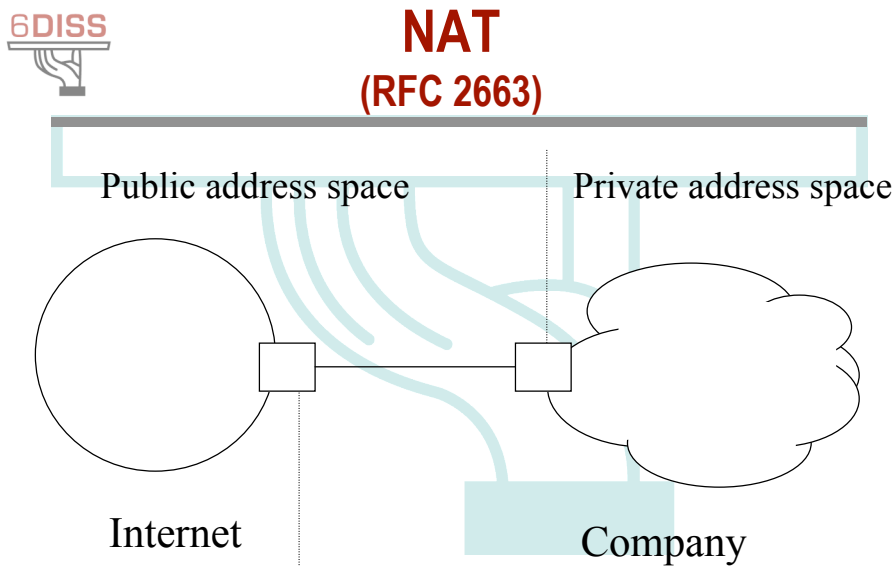
Private Addresses (RFC 1918 BCP)

- Allow private addressing plans
- Addresses are used internally
- Similar to security architecture with firewall
- Use of proxies or NAT to go outside
 - RFC 1631, 2663 and 2993
- NAT-PT is the most commonly used of NAT variations

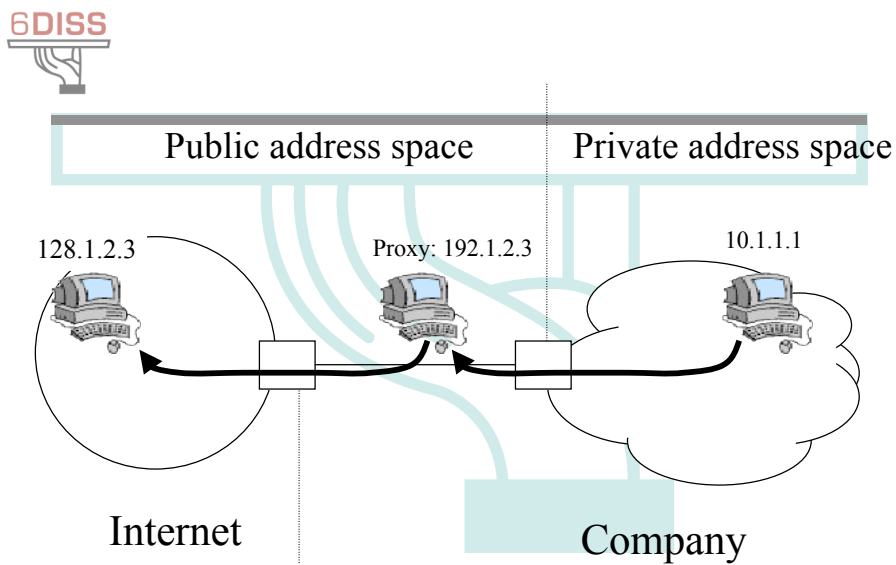


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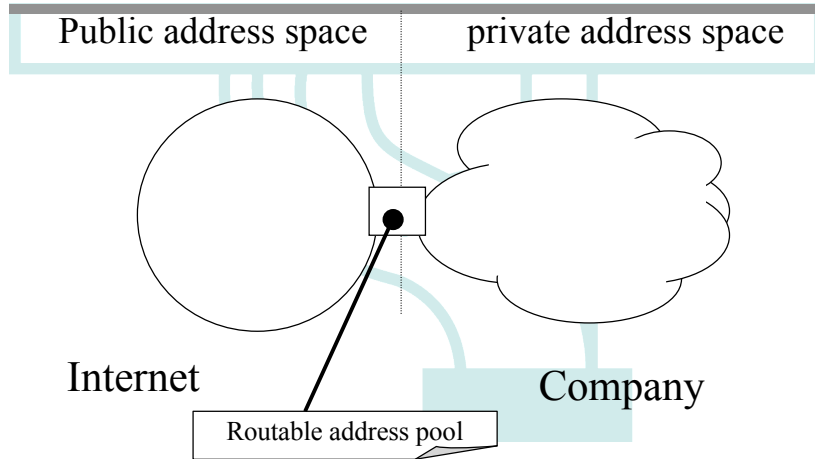


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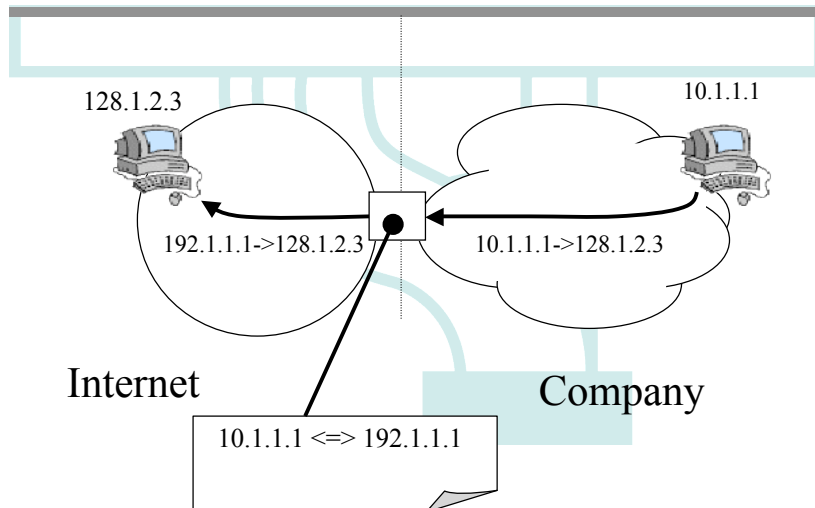


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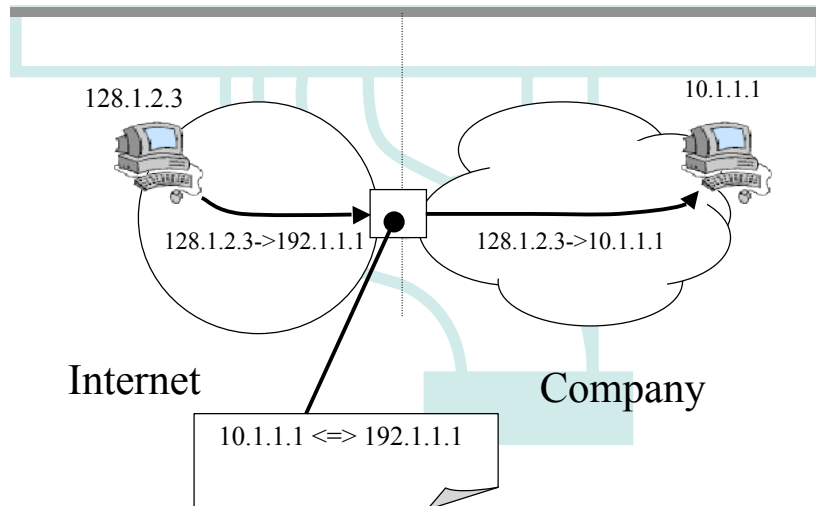
Network Address Translation



NAT (continued)



6DISS NAT (continued)



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NAT (continued)

- **Advantages:**
 - Reduce the need of official addresses
 - Ease the internal addressing plan
 - Transparent to some applications
 - "Security"
 - Netadmins/sysadmin
- **Disadvantages:**
 - Translation sometime complex (e.g. FTP)
 - Apps using dynamic ports
 - Does not scale
 - Introduce states inside the network:
 - Multihomed networks
 - Breaks the end-to-end paradigm
 - Security with IPsec

=> Should be reserved for small sites in Client/Server mode



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Emergency Measures

- These emergency measures gave time to develop a **new version** of IP, named IPv6
- IPv6 keeps principles that have made the success of IP
- Corrects what was wrong with the current version (v4)
- **BUT** are emergency measures enough?



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From emergency to IPv6

- IPv6 is already on the road
 - Internet v6 is there today :
 - NRENs in EU, North America, Asia ... are interconnected in IPv6
 - Lots of IXP are offering IPv6 connectivity
 - ISPs and Telcos exchange IPv6 routes
- Then the question is not “if” but “when” and “how” ...



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