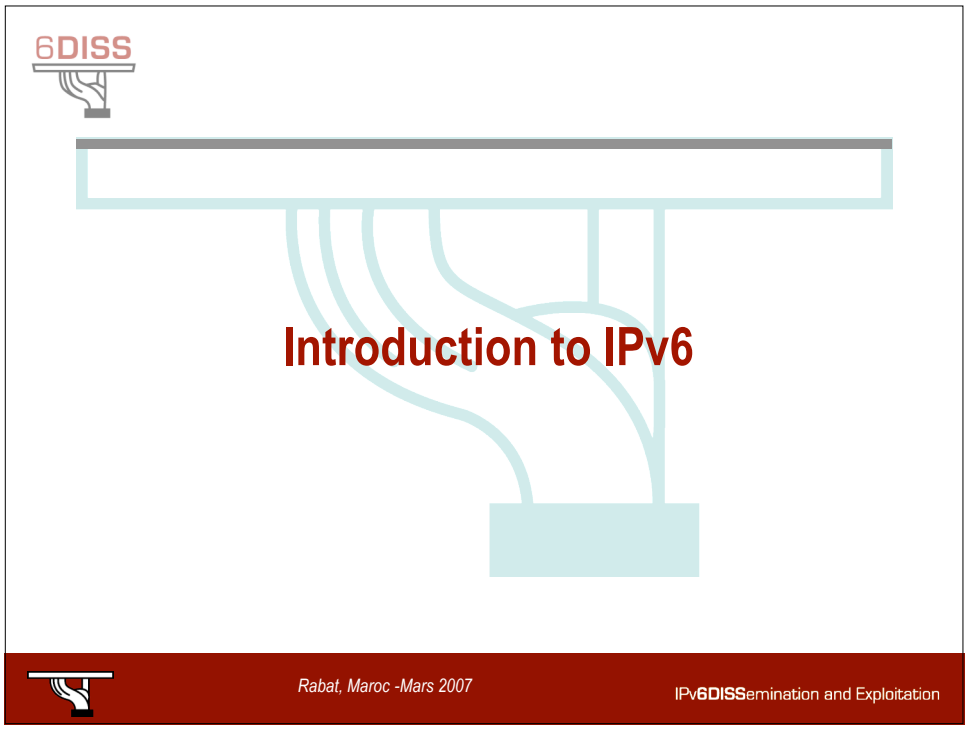
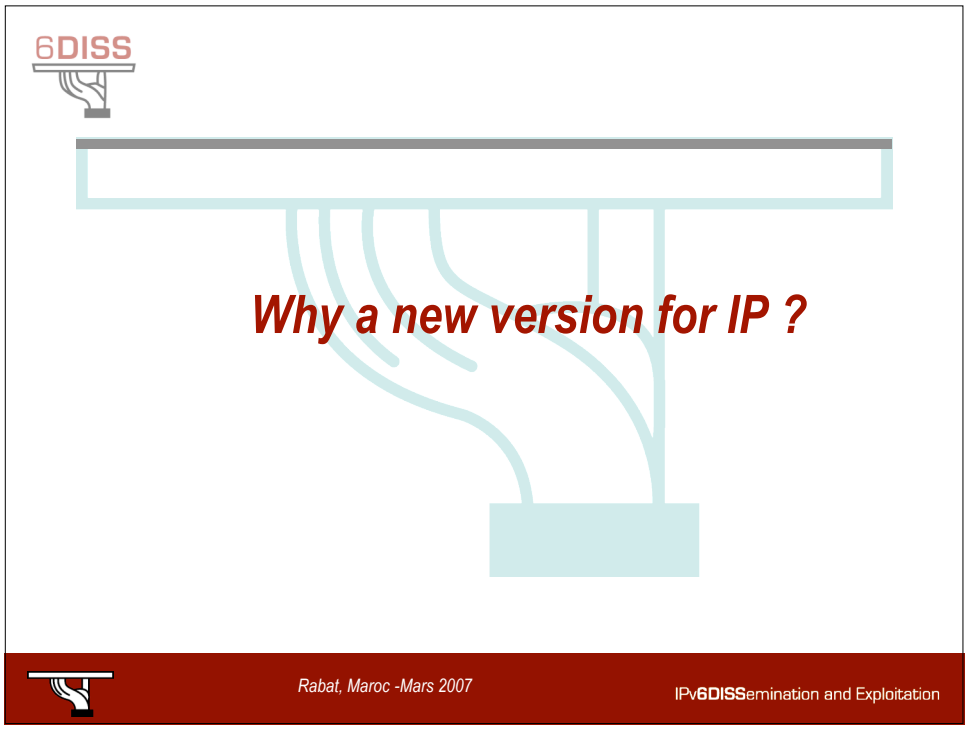
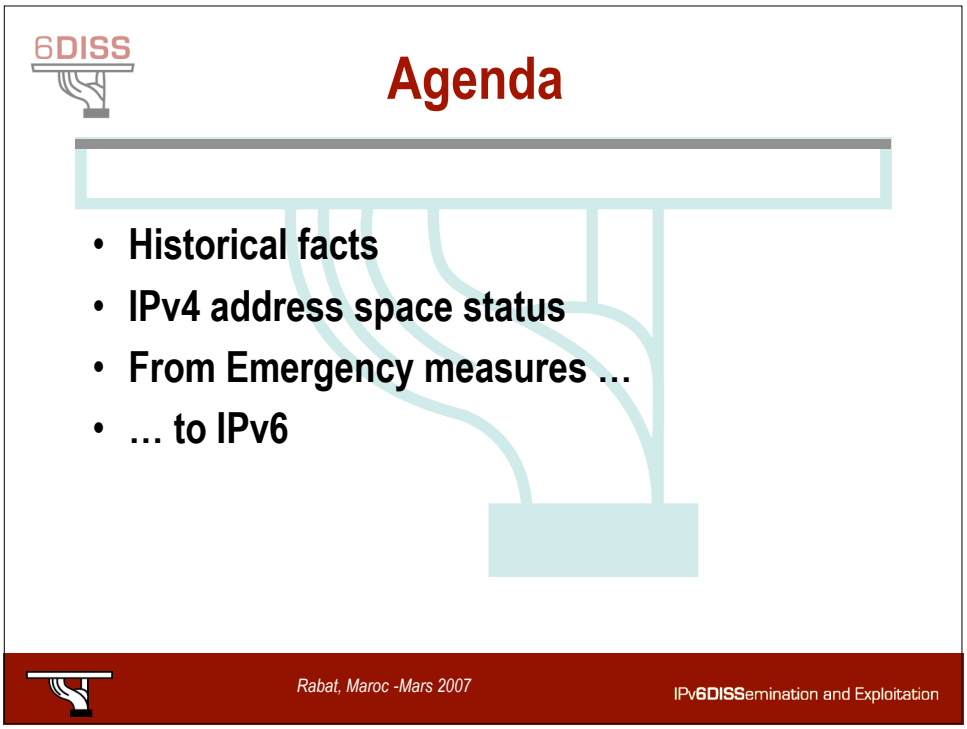
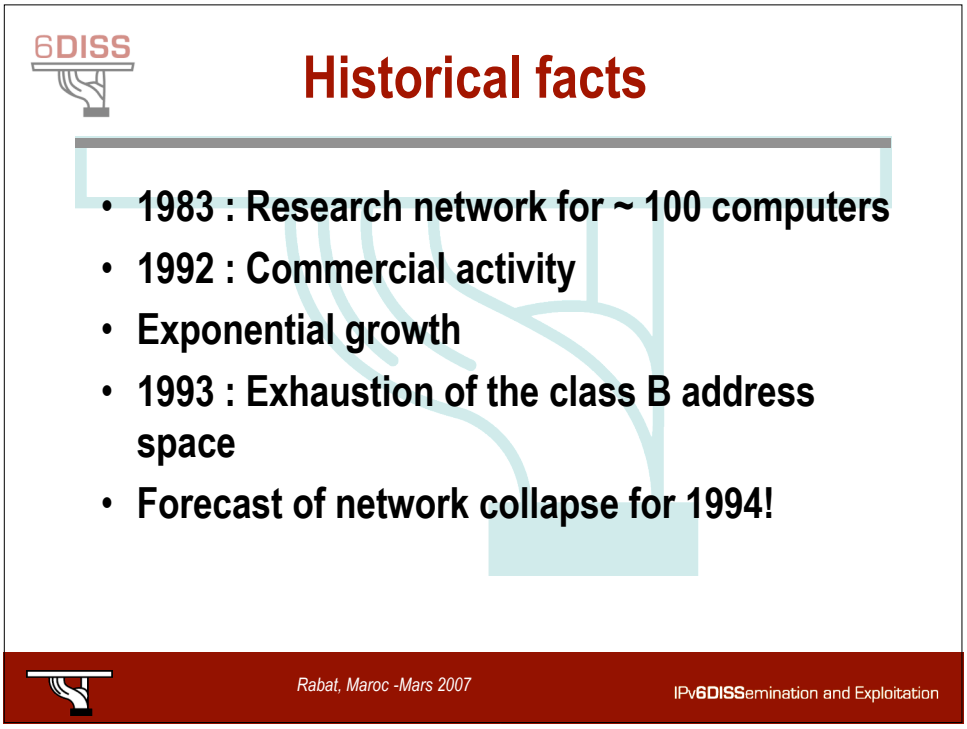
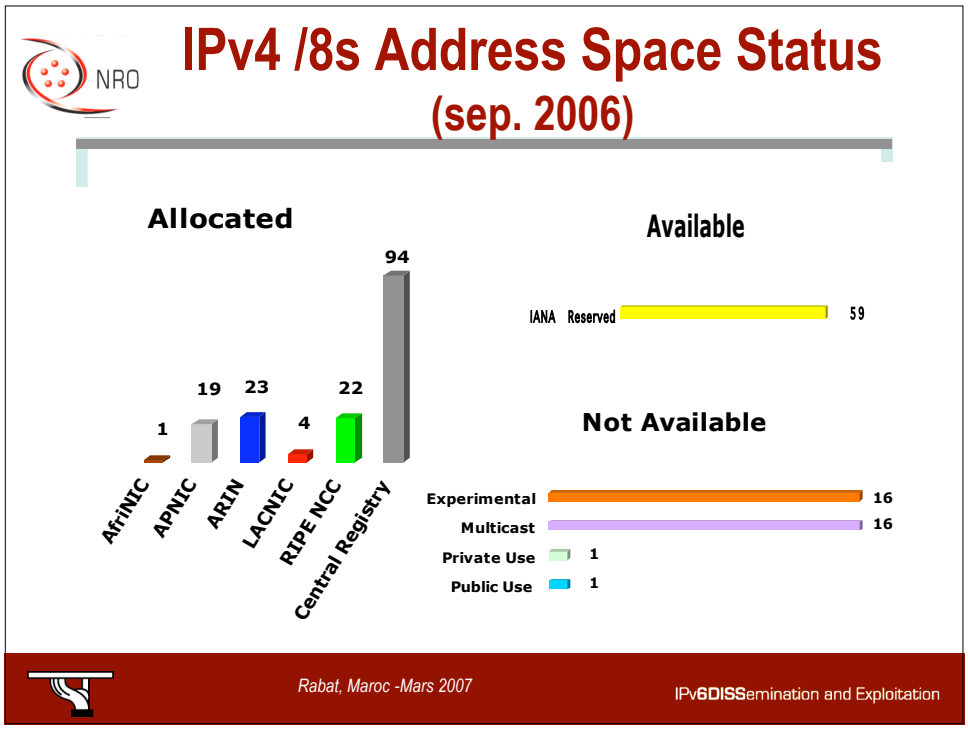
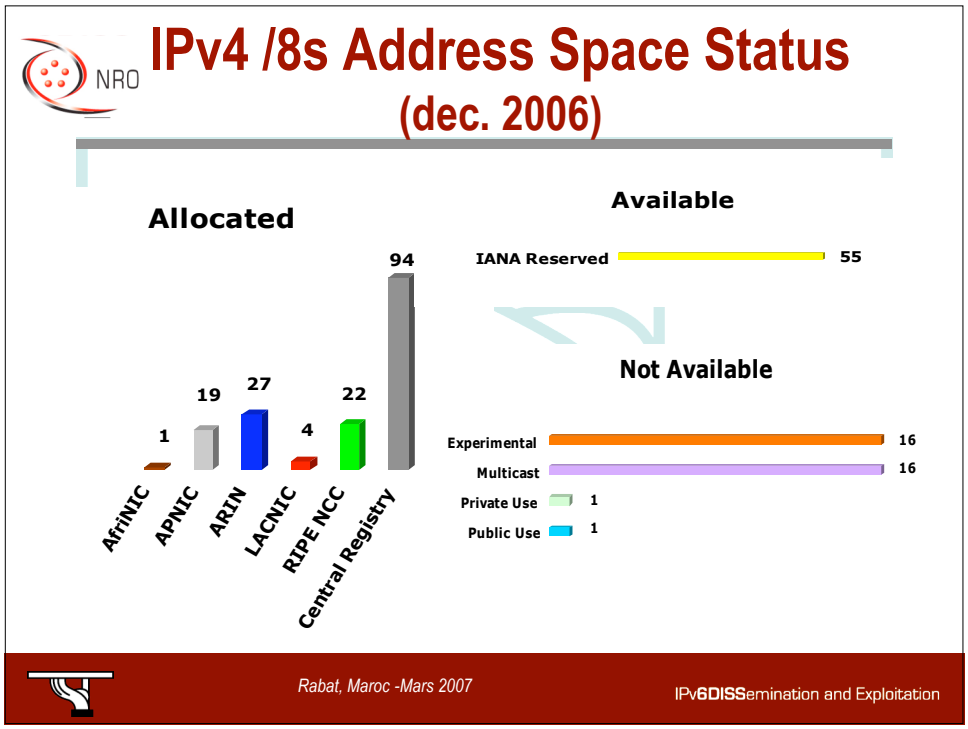

6DISS
Introduction to IPv6
Rabat, Maroc -Mars 2007
IPv6DISSemination and Exploitation


6DISS
Why a new version for IP ?
Rabat, Maroc -Mars 2007
IPv6DISSemination and Exploitation


6DISS
Agenda
• Historical facts
• IPv4 address space status
• From Emergency measures …
• … to IPv6
Rabat, Maroc -Mars 2007
IPv6DISSemination and Exploitation


6DISS
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!
Rabat, Maroc -Mars 2007
IPv6DISSemination and Exploitation

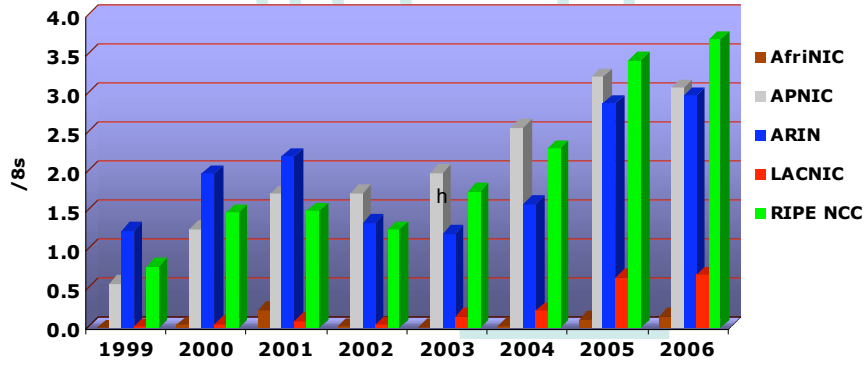

IPv4 /8s Address Space Status
(sep. 2006)
Allocated
Available
94
19
23
22
4
1
AfriNIC
APNIC
ARIN
LACNIC
RIPE NCC
Central Registry
IANA Reserved
59
Not Available
Experimental
16
Multicast
16
Private Use
1
Public Use
1
Rabat, Maroc -Mars 2007
IPv6DISSemination and Exploitation


IPv4 /8s Address Space Status
(dec. 2006)
Allocated
Available
94
19
27
22
4
1
AfriNIC
APNIC
ARIN
LACNIC
RIPE NCC
Central Registry
IANA Reserved
55
Not Available
Experimental
16
Multicast
16
Private Use
1
Public Use
1
Rabat, Maroc -Mars 2007
IPv6DISSemination and Exploitation

IPv4 Allocations

RIRs to LIRs/ISPs

Yearly Comparison



6DISS

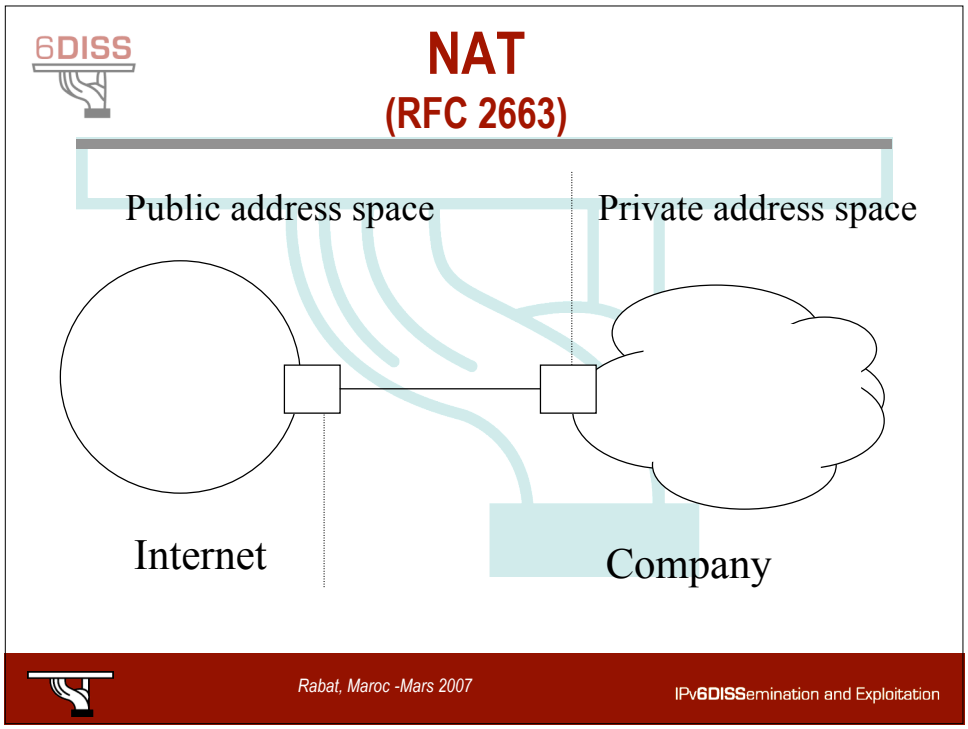
Emergency measures

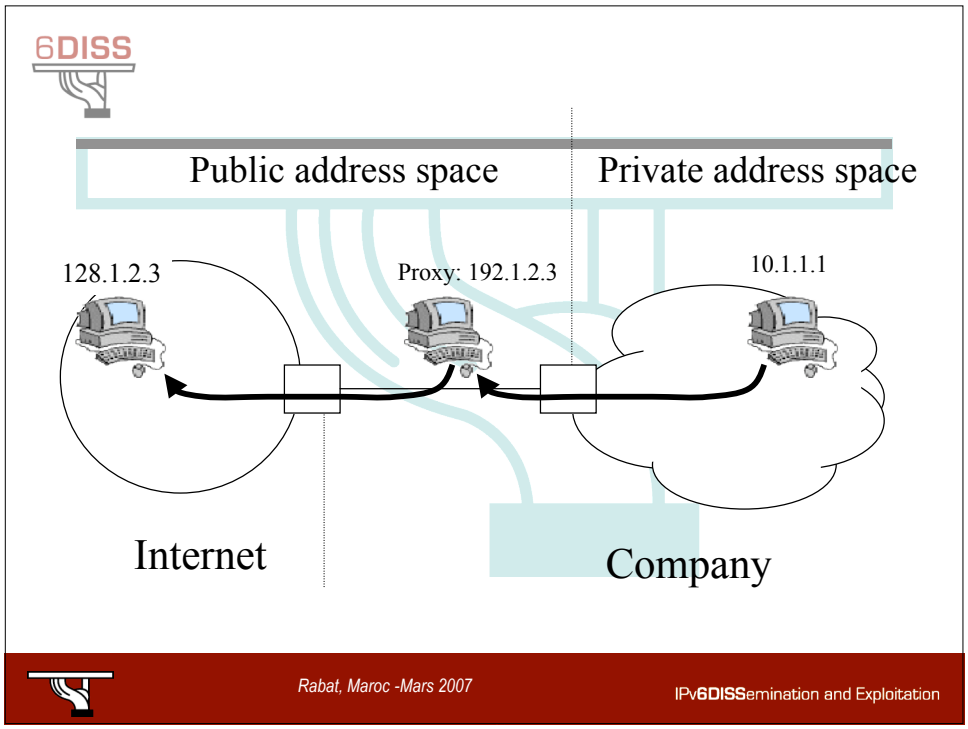
CIDR …

- 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)

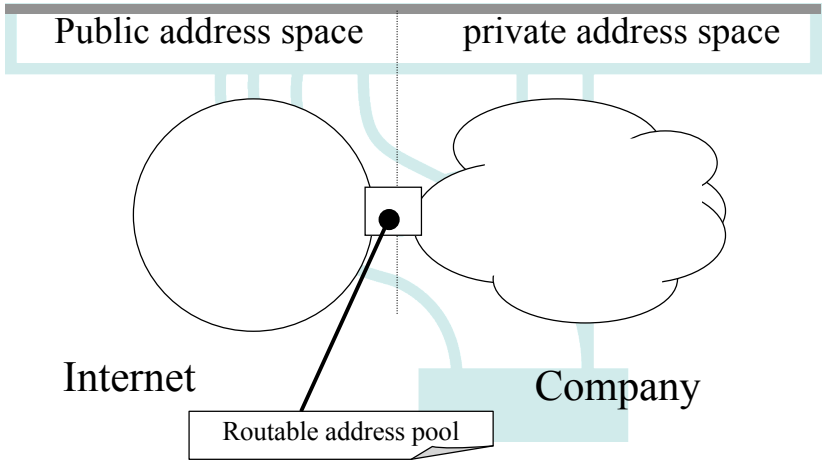
Private Addresses (RFC 1918 BCP)

- 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

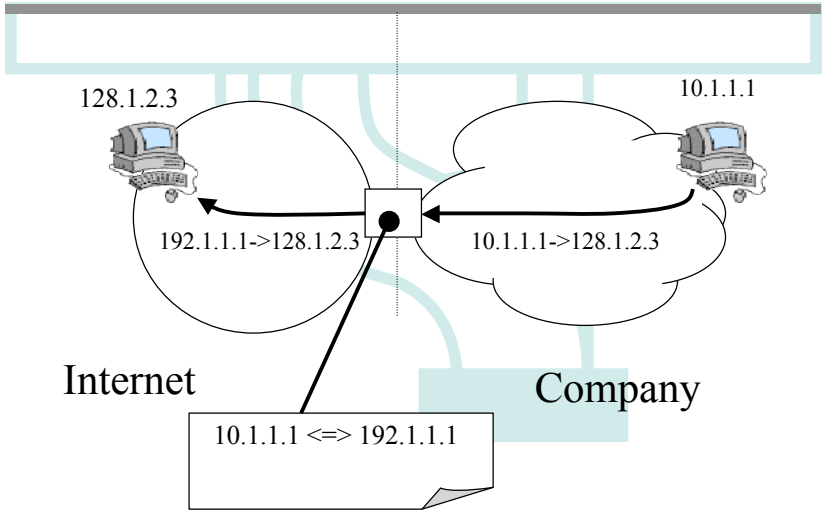

6DISS
NAT
(RFC 2663)
Public address space
Private address space
Internet
Company
Rabat, Maroc -Mars 2007
IPv6DISSemination and Exploitation


6DISS
Public address space
Private address space
128.1.2.3
Proxy: 192.1.2.3
10.1.1.1
Internet
Company
Rabat, Maroc -Mars 2007
IPv6DISSemination and Exploitation

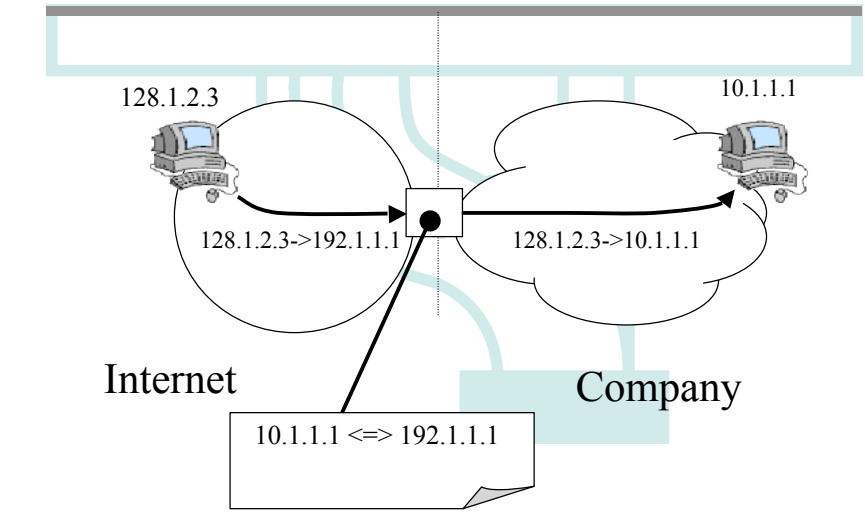
Network Address Translation



NAT (continued)



NAT (continued)



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

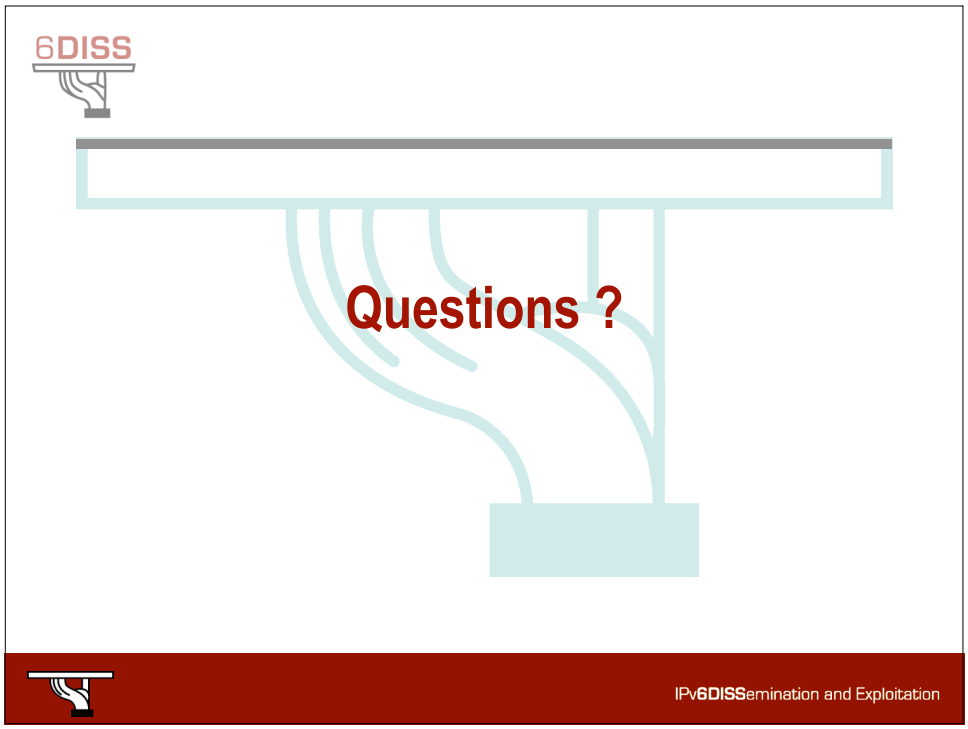
=> Should be reserved for small sites in Client/Server mode

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?

From emergency to IPv6

- IPv6 is already there …
  - 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” …


6DISS
Questions ?
IPv6DISSemination and Exploitation