

GARR

IPv6

“state of the art”

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The logo for GARR, featuring the word "GARR" in a bold, yellow, sans-serif font with a slight 3D effect, set against a dark blue, textured, curved background that resembles a globe or a network map.

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*Italian participation
in*

6net

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GARR in 6NET

- ▶ A complex participation:
GARR coordinates 12 local partners
- ▶ We are involved in many activities in the project.
- ▶ A native network using ATM pvc
- ▶ Users connected in native mode using dedicated pvc, sometimes dual-stack in users side.

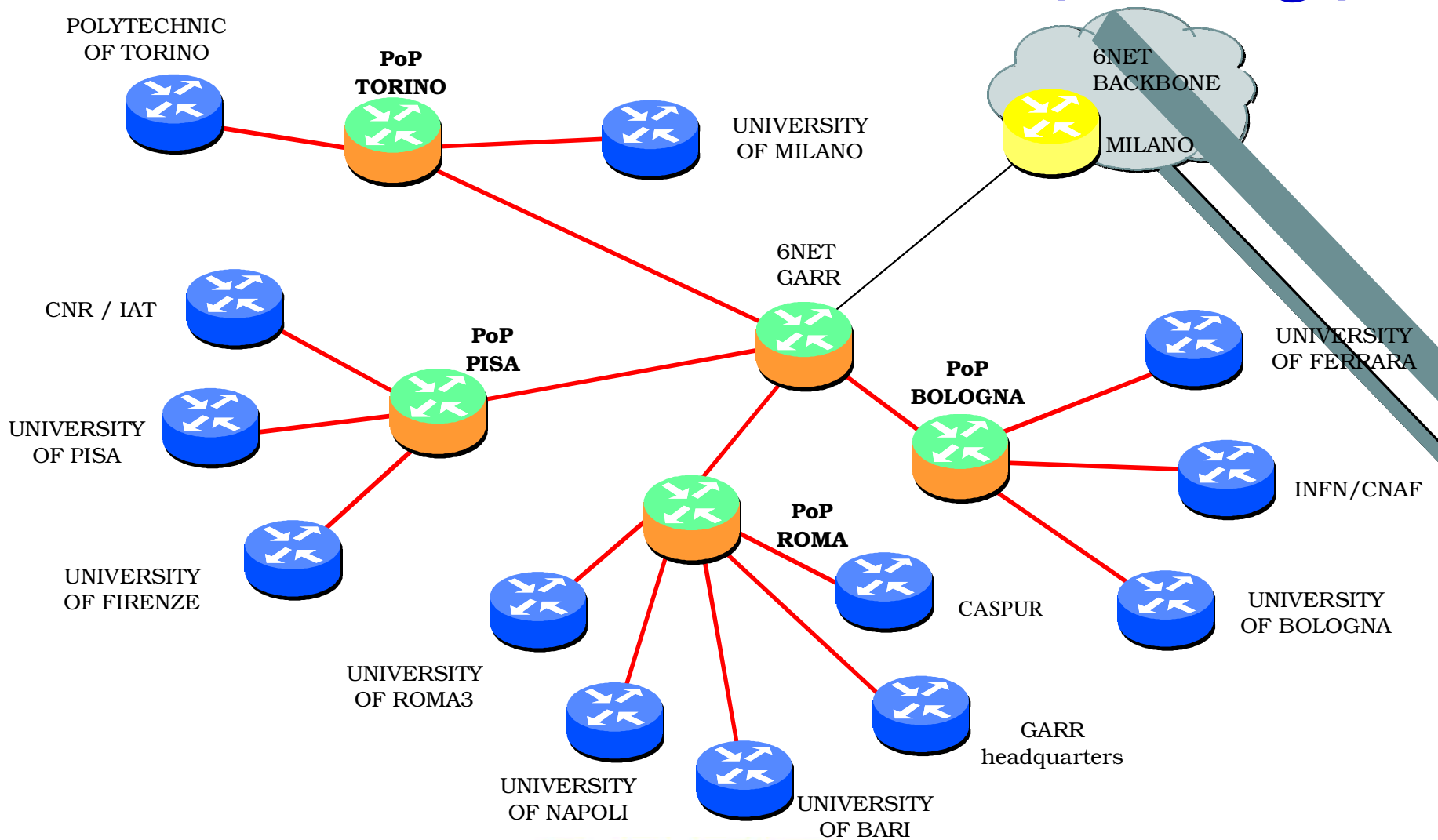
Universities and research institutes involved in 6net with GARR

- ▶ Bologna
 - ▶ INFN CNAF
 - ▶ Università di Bologna
- ▶ Milan
 - ▶ Università di Milano
- ▶ Turin
 - ▶ Politecnico di Torino
- ▶ Pisa
 - ▶ CNR IIT
 - ▶ Università di Pisa
- ▶ Ferrara
 - ▶ Università di Ferrara
- ▶ Florence
 - ▶ Università di Firenze
- ▶ Rome
 - ▶ Università di Roma III
 - ▶ INFN Roma1
 - ▶ CASPUR
- ▶ Naples
 - ▶ Università di Napoli
- ▶ Bari
 - ▶ Università di Bari

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Current Italian 6NET topology



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Info @ ...

► <http://www.6net.garr.it>

The screenshot shows a web browser window with the address bar containing "http://www.6net.garr.it/". The page title is "Un testbed per sperimentare IPv6 nativo per gli utenti della Rete GARR". The main content area features the "GARR 6NET" logo and a navigation menu on the left with items: "Progetto", "Documenti", "Link Utili", "News", "IETF, RIPE e altro", and "Area Privata". The main text describes the Italian 6NET project, its participation in the European 6NET project, and lists motivations for IPv6: a larger number of addresses, more efficient and extensible IP headers, and inherent characteristics like security, mobility, multicast, and QoS support. Logos for "6net" and "ist information society technologies" are also present. A footer note states: "Ultima modifica web: 16.05.2002 - INDIETRO - HOMEPAGE - Il WEB del GARR - This page is maintained by webmaster."

The GARR dual-stack Pilot

The logo for GARR, consisting of the letters 'GARR' in a bold, yellow, sans-serif font with a slight 3D effect, positioned above a dark blue, textured, semi-circular shape that resembles a globe or a network map.

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Going towards an Ipv6 production network

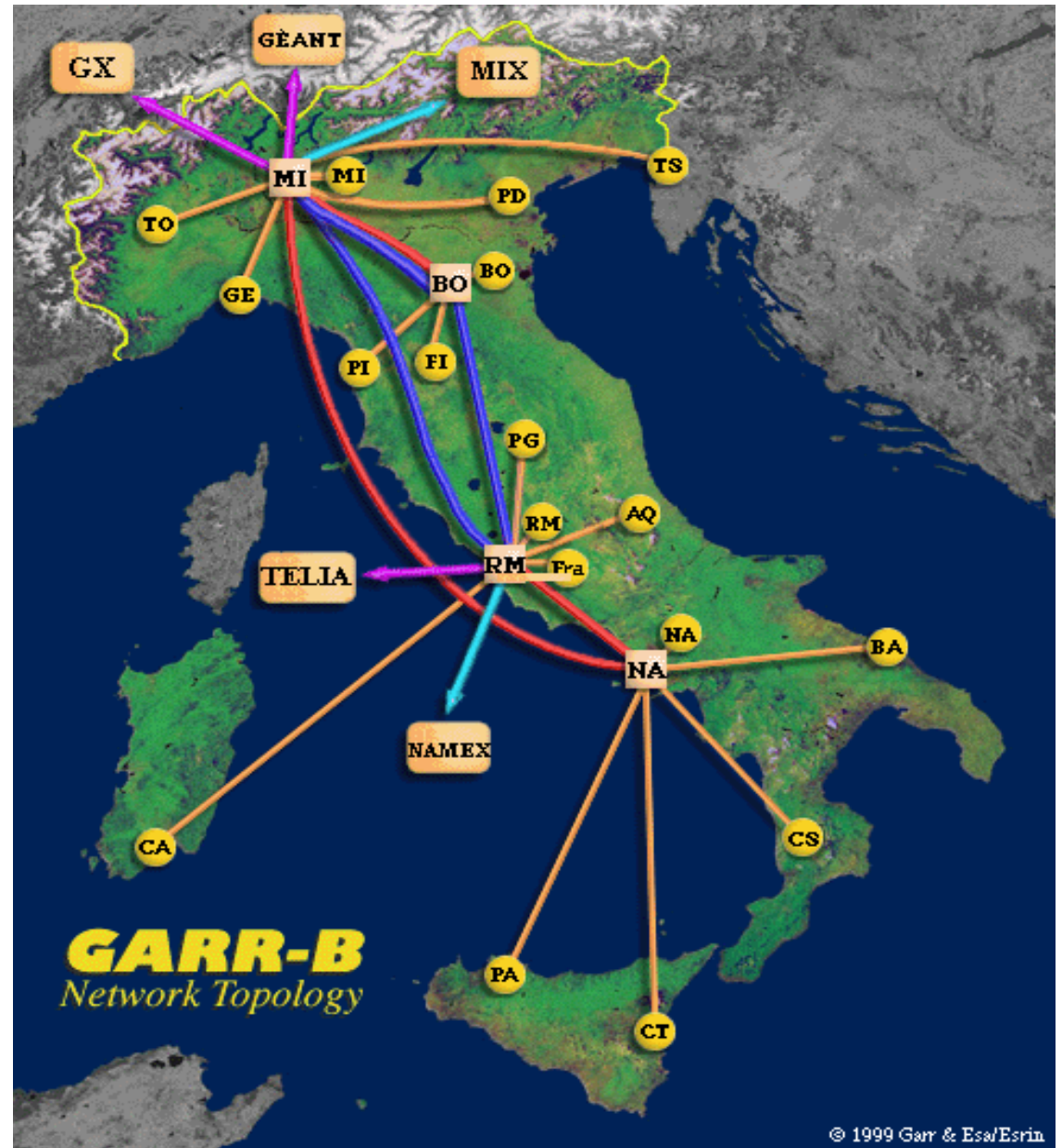
- ▶ We are involved in the Geant Ipv6 TaskForce, following the Geant roadmap
- ▶ Our Pilot plan is in 3 stages:
 - ▶ 1st stage: the Network
 - ▶ 2nd stage: the Routing
 - ▶ 3rd stage: the Users

1st Stage: Step by step

1st Step (now)

- ▶ Turn on dual-stack on the Ipv4 production network
- ▶ Core routers are involved
- ▶ Cisco 12XXX and Juniper M20
- ▶ No Users, test with dedicated machines

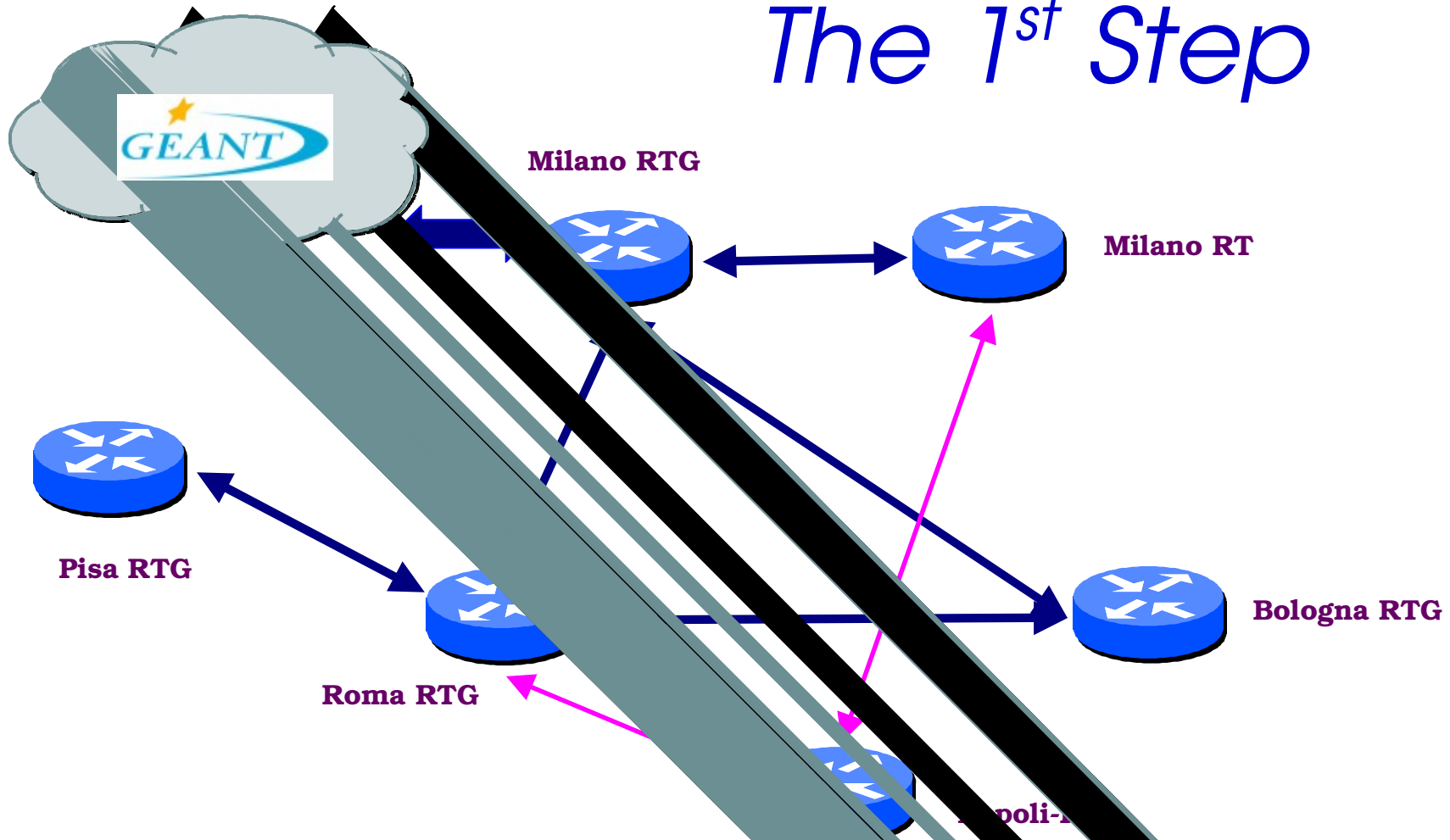
GARR-B Ipv4 Network



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The 1st Step



Legenda:

- ↔ 2.5 Gbps
- ↔ 155 Mbps

1st Stage: Step by step

2nd Step (feb 2003)

- ▶ Core 6net circuits will be replaced
- ▶ Geant pilot connection

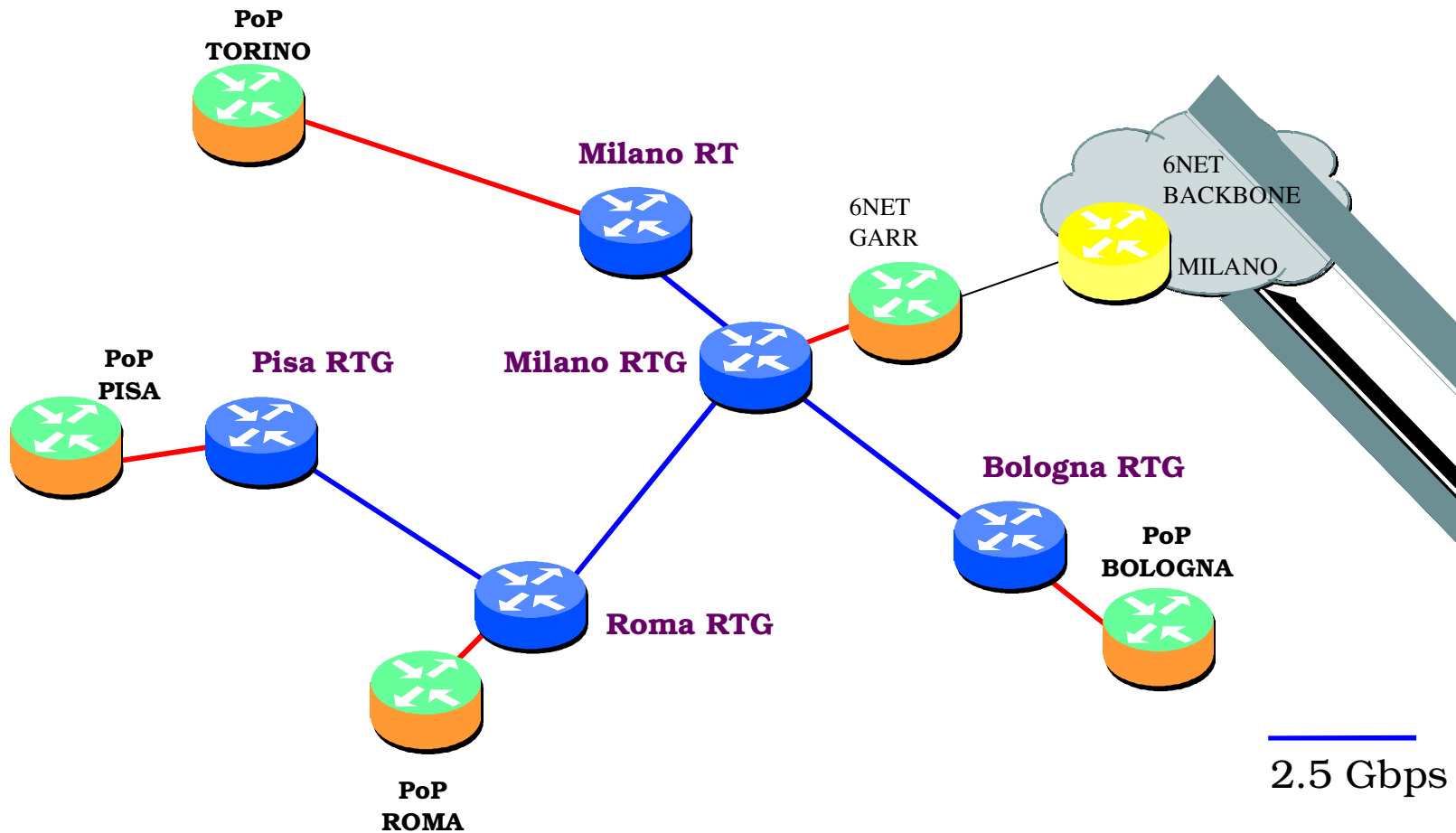
3rd Step (Starting from the 2 quarter 2003)

- ▶ The whole network will be involved
- ▶ The risk: Cisco 75XX access routers with high traffic

6NET: A peaceful coexistence

- ▶ Some 155Mbps ATM circuits will be replaced
- ▶ 2.5 Gbps circuits will be used
- ▶ Static routing

Coexistence



Avoiding the waste

2001:760:FFFF::/48 dedicated to routers addressing

- ▶ PoP **/56**
- ▶ Router **/64**
- ▶ Point-to-point **/126**
- ▶ Loopback **/128**
- ▶ Management LAN **/64**

Backbone point-to-point addressing

2001:0760:FFFF:FFFF::/64

The logo for GARR (The Italian Academic and Research Network) is displayed in a bold, yellow, sans-serif font. The letters are slightly shadowed, giving it a 3D appearance. It is positioned above a dark blue, curved graphic element that resembles the horizon of a globe.

Avoiding the waste

▶ PoP:

Roma	2001:760:FFFF::/56
Milano	2001:760:FFFF:0100::/56
Bologna	2001:760:FFFF:0200::/56
Napoli	2001:760:FFFF:0300::/56
Pisa	2001:760:FFFF:0400::/56

▶ Addressing examples:

Roma RTG

2001:760:FFFF::/64

2001:760:FFFF:: /128 Loopback

from: 2001:760:FFFF::10/126 point-to-point

Roma-Pisa

2001:760:FFFF:FFFF::0/126

In OSPF we trust

- ▶ OSPFv2 stable and reliable in our IPv4 network
- ▶ Testing of OSPFv3
- ▶ Static routing during the first steps
- ▶ Waiting for a stable Cisco IOS version with OSPFv3 (12.0.(24)S ???)

BGP

- ▶ Change of BGP command format :
moving to 'address-family' style
- ▶ BGP v6 should follow BGP v4 topology:
Core full-mesh and route-reflector-
client structure
- ▶ Late in the pilot

Users & Applications

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Dear students, we want you!

- ▶ Bologna University switched all students' Computer Science labs to Ipv6; Roma3 is doing the same.
- ▶ We are arranging Ipv6 tutorials inside Universities and Research institutes:
 - ▶ Turin, Rome, Florence: done (~100 attending each one of them)
 - ▶ Bari, Milan: in February and March



Is Quake the 'Killer application'?

- ▶ No!
- ▶ Need of users' presence
- ▶ No sensible traffic
- ▶ Old version of Quake available for free, no good WAN performance



Looking for a 'killer application'

- ▶ Network Storage environment should be it
- ▶ We have started a collaboration with the University of Tennessee (Logistical Networking Project)
- ▶ We are building an Ipv6 Logistical infrastructure on our current 6net topology.

How to 'kill'

- ▶ Generating IPv6 traffic without users' presence.
- ▶ Involving IPv4 users with an underlying IPv6 infrastructure. (a web page on a dual-stack server)
- ▶ Building an IPv6 platform for content delivering that it provides an easy service with coherency and replica consistency.



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