# GARR
# Italian Academic and Research Community IPv6
# "state of the art"

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# *At the beginning...*

# *At the beginning*

- Italian research community in 6bone: a loose presence
- Ipv6 research only in the labs
- A  fundamental experience
- GARR gathered the researchers' efforts in the 6NET project
- A magic evolution during the last 2 years

# *Italian participation in*

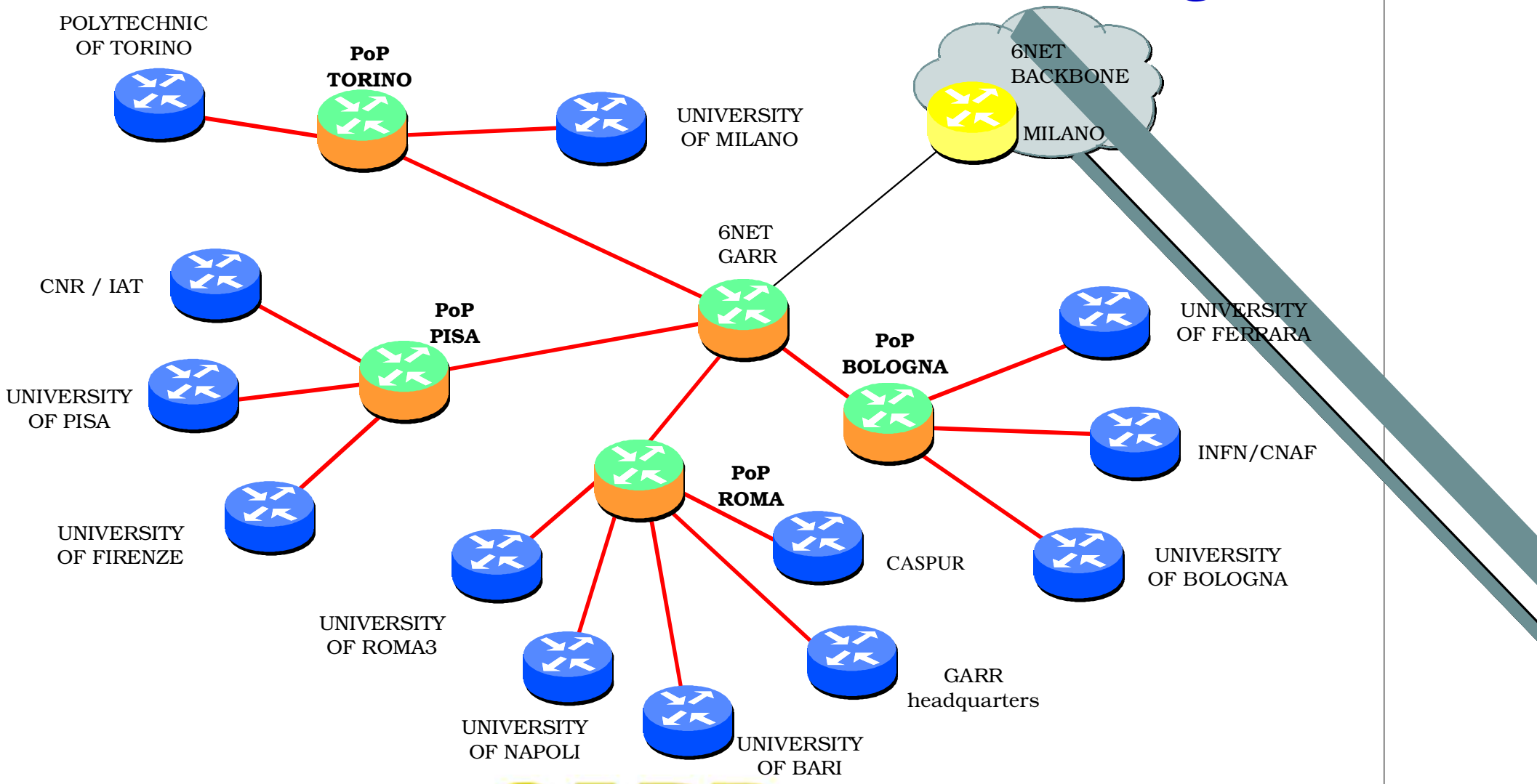

# GARR in 6NET

- A complex participation:
  GARR coordinates 12 local partners
- We are partecipate 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

# Current Italian 6NET topology



# Naming and addressing

**6net.garr.it** (IPv4 and IPv6) 6net services (web, mailing)

**6net.garr.net** (IPv4 and IPv6) BackBone P2P, loopbacks

**ip6.arpa reverse resolution**

**Example of User naming:**

| | | | |
|---|---|---|---|
| cnr.6net.garr.it | CNR / IIT | primary dns CNR | secondary GARR |
| caspur.6net.garr.it | CASPUR | primary dns CASPUR | secondary GARR |
| cnaf.6net.garr.it | INFN CNAF | primary dns CNAF | secondary GARR |

...

**GARR allocation: 2001:760::/32**

**2001:760::/35 is used for 6NET**

**Example of User Address space allocation:**

| | |
|---|---|
| **ROMA PoP** | 2001:760::/40 |
| GARR | 2001:760::/48 |
| CASPUR | 2001:760:2::/48 |
| University of Roma Tre | 2001:760:4::/48 |
| University of Napoli | 2001:760:6::/48 |
| University of Bari | 2001:760:8::/48 |

# Info @ ...

- http://www.6net.garr.it

# The GARR dual-stack Pilot

# *Going towards an Ipv6 production network*

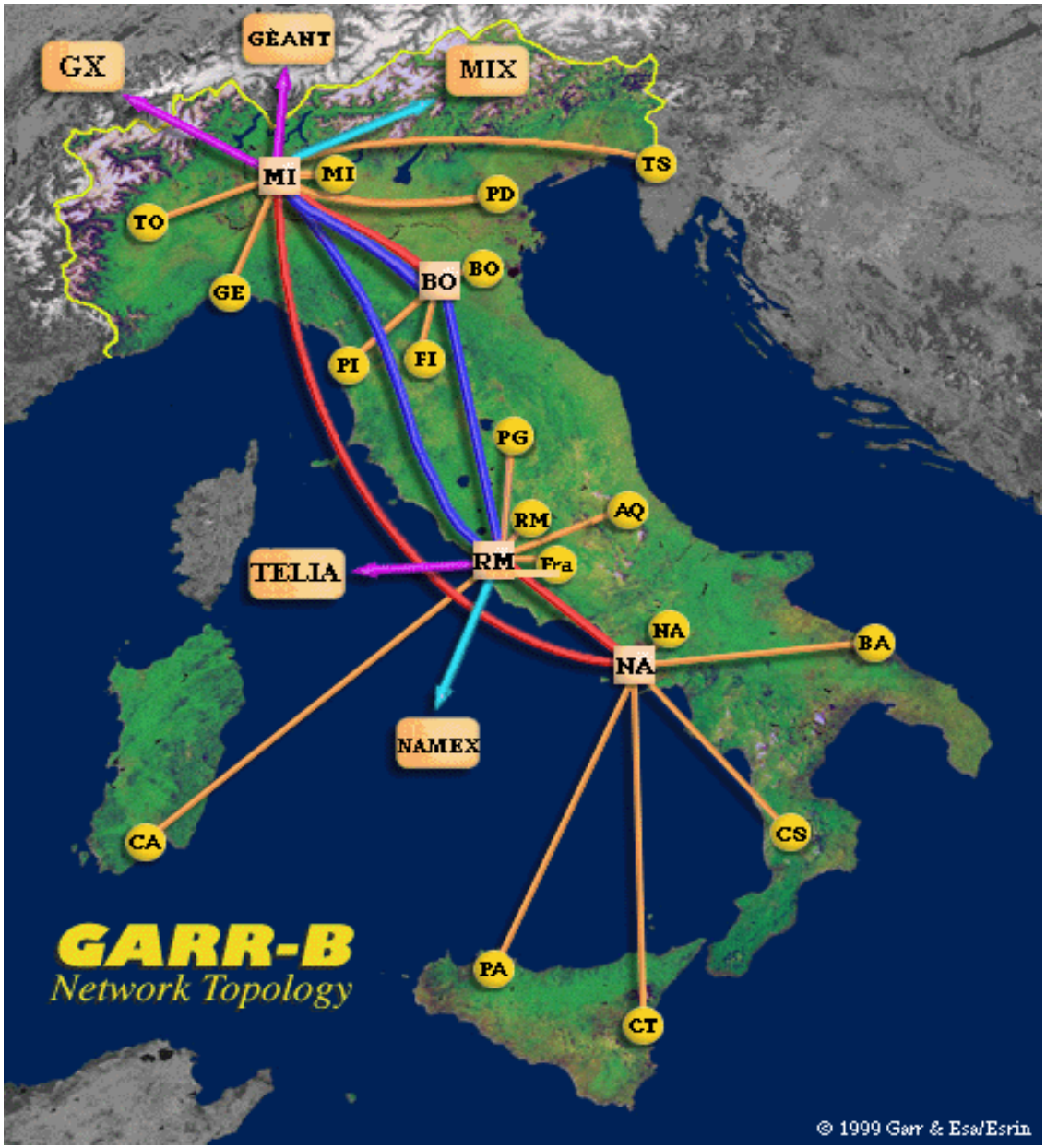
- We are involved in the Geant Ipv6 TaskForce, following the Geant roadmap
- Our Pilot plan is in 3 stages:
  - 1st stage: the Network
  - 2nd stage: the Routing
  - 3rd stage: the Users

# 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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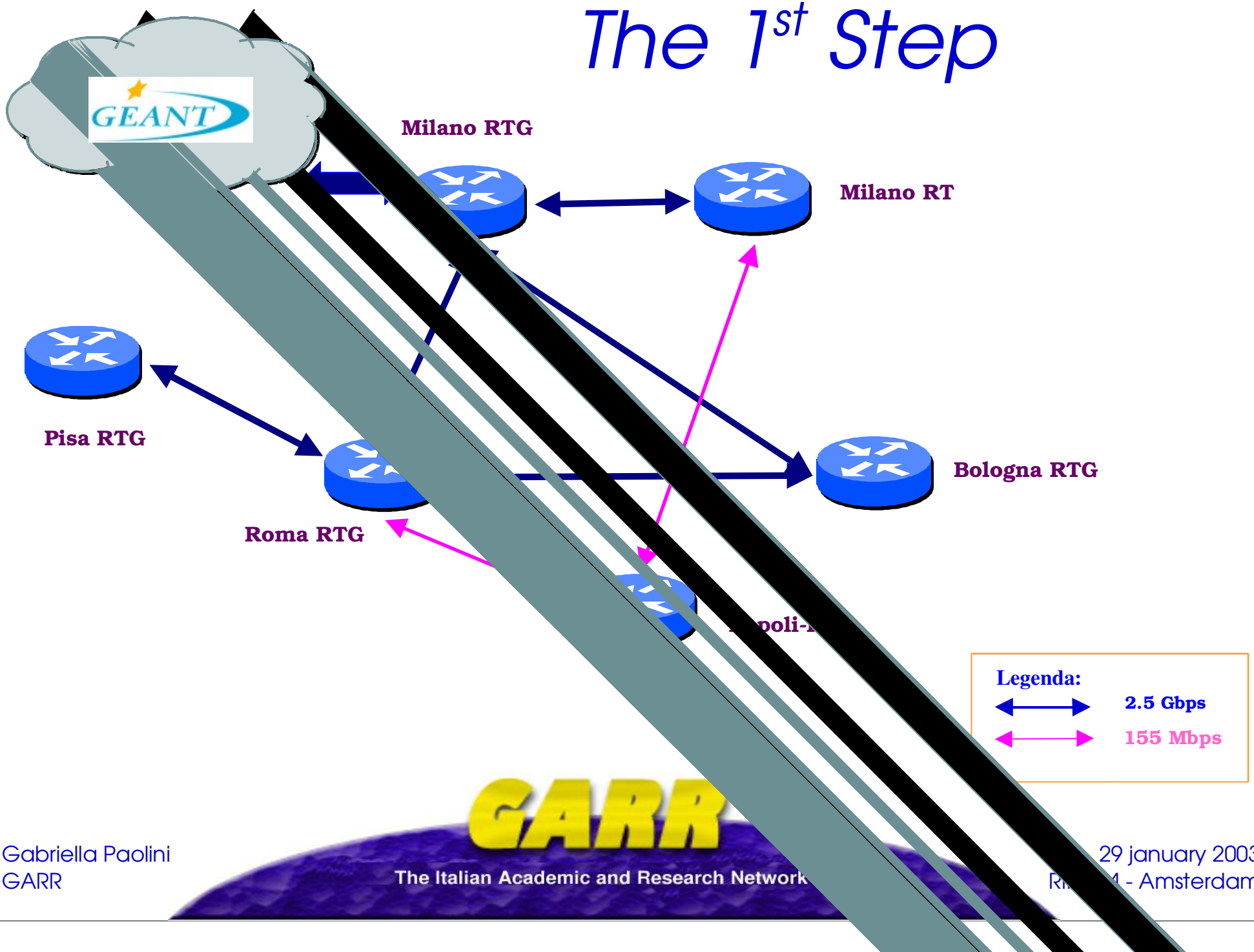
RIPE 44 - Amsterdam

# The 1st Step

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# 1st Stage: Step by step

## 2nd Step (feb 2003)

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

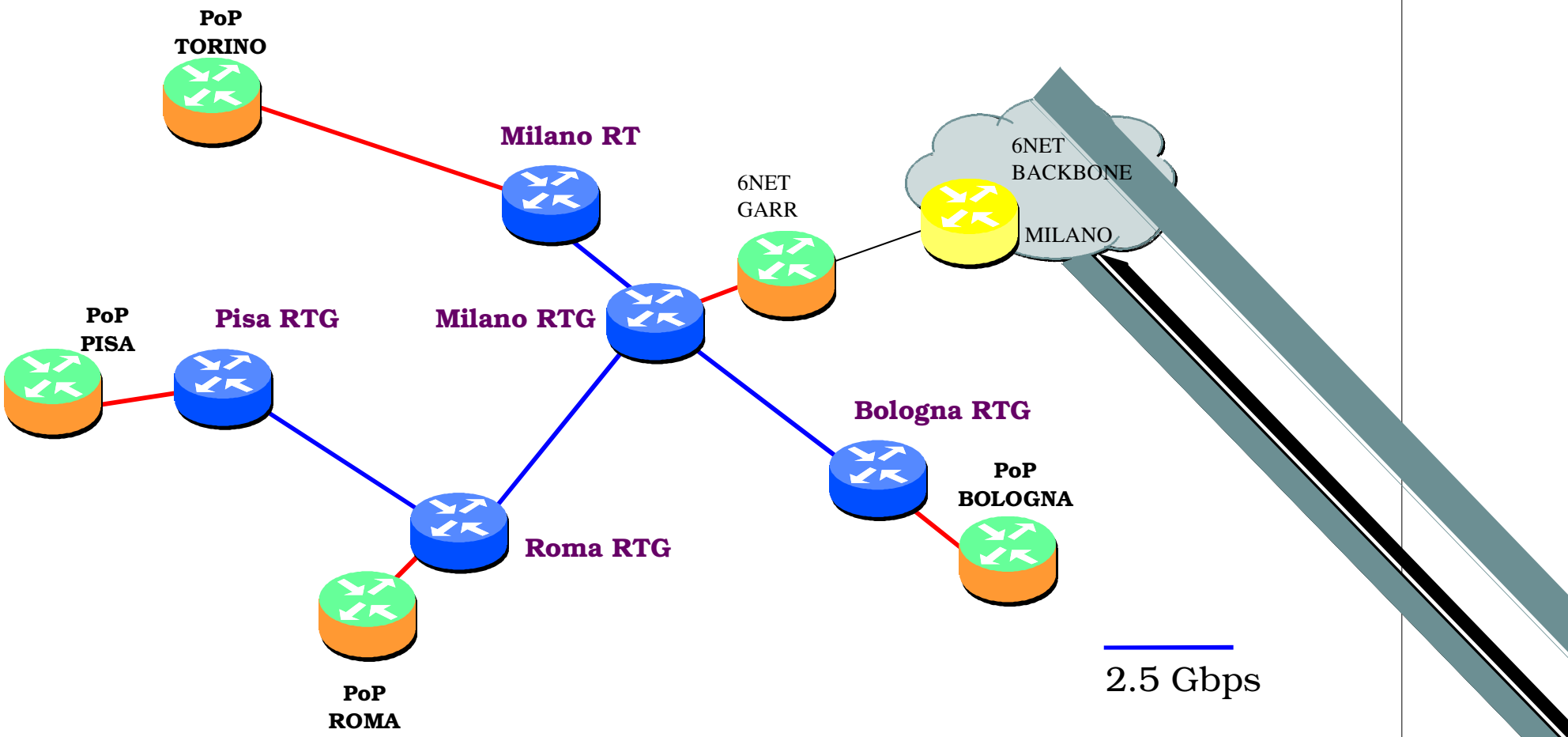
## 3rd Step (Starting from the 2 quarter 2003)

- 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

# 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*

# *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.


*At any time...*

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