The SABA2 Project

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SABA2: Institutions

- SABA participants:
  - Universidad Carlos III de Madrid
  - Universidad Politécnica de Madrid
    - Universidad de Oviedo, Universidad de Sevilla
  - Universidad Politécnica de Barcelona
    - Universidad de Girona
  - TELEFONICA I+D
- Sponsors: TELEFONICA, CISCO Iberica, SATEC, RedIris
- Collaborating Institutions
  - Univ. de Murcia, Univ. Pol. de Valencia, etc.

SABA2: Institutions

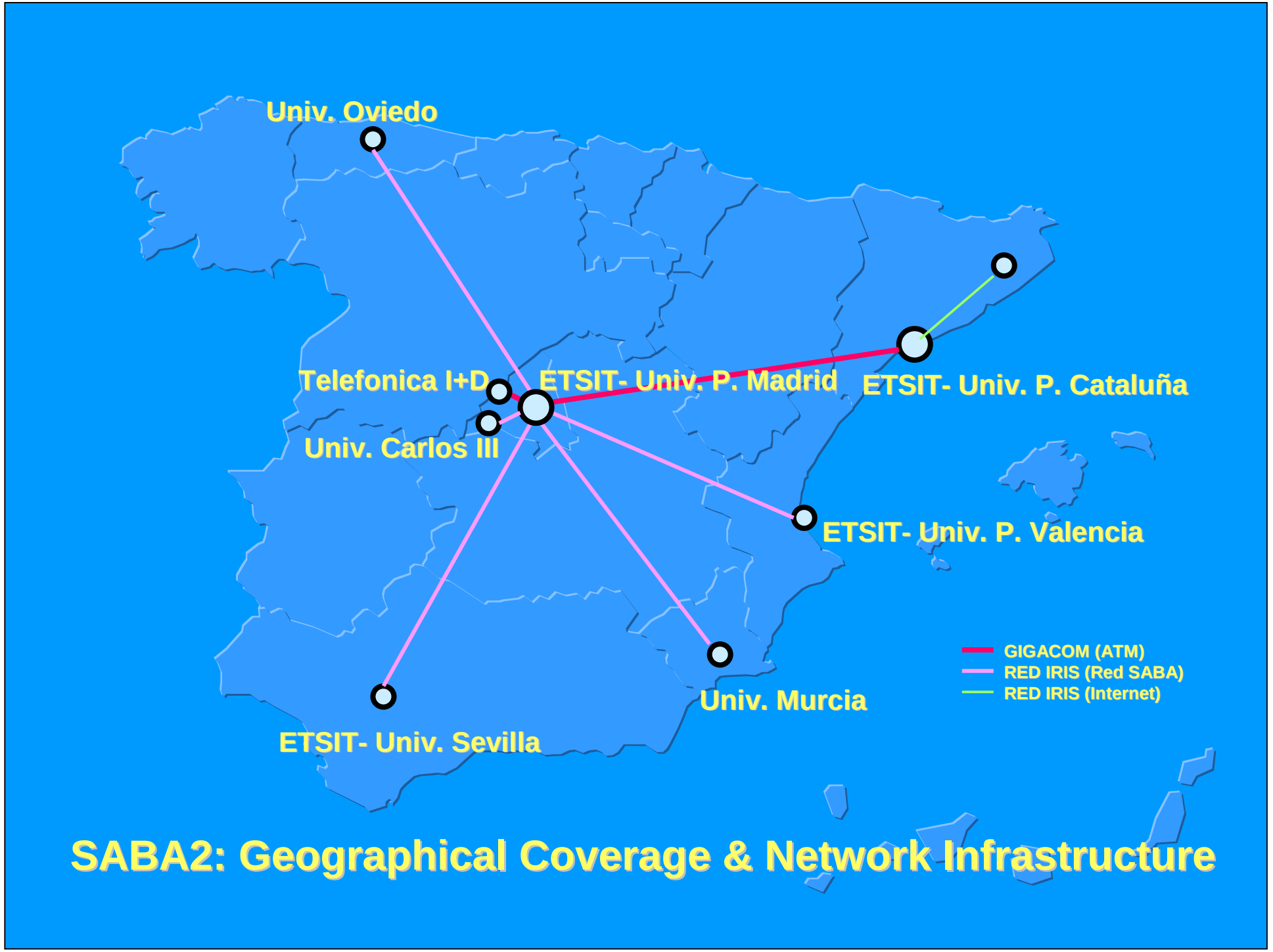
- SABA participants:
  - Universidad Carlos III de Madrid
    - Arturo Azcorra, David Larrabeiti, Alberto García
  - Universidad Politécnica de Barcelona
    - Jordi Domingo-Pascual, Josep Sole, Josep Mangues, Albert Cabellos, René Serral
  - Universidad Politécnica de Madrid
    - Juan Quemada, Tomas de Miguel, Joaquin Salvachua, Eva Castro, Alberto López Toledo, Santiago Pavón
  - TELEFONICA I+D
    - Pedro Lizcano, Carlos Ralli, Ruth Vazquez, Sheila Escribano

SABA2: General Approach

- Project driven by real service experiments
  - Distributed congresses, workshops
    - Gloabl IPv6 Summit is distributed with ISABEL by SABA2
  - Distributed courses among universities
  - Telework & tele-meeting
- Service experiments performed over the SABA2 broadband internet testbed
  - Testbed used to evaluate & incorporate next generation Internet features
  - Real service experiments must validate the maturity

SABA2: Networks & Applications

- Network: Evaluate new protocols and services
  - IPv6, IntServ, DiffServ, Multicast, RTP, RTCP, ...
    - Emphasis on transition scenarios from IPv4 to IPv6
    - QoS and CoS provision of prime importance
      - Most critical feature for real service experiments
- Application: Test/adapt applications
  - ISABEL CSCW application
    - Advanced service generation environment - RACE/ACTS
      - http://isabel.dit.upm.es
  - MBONE tools
  - Videoconferencing over LAN (H.323)

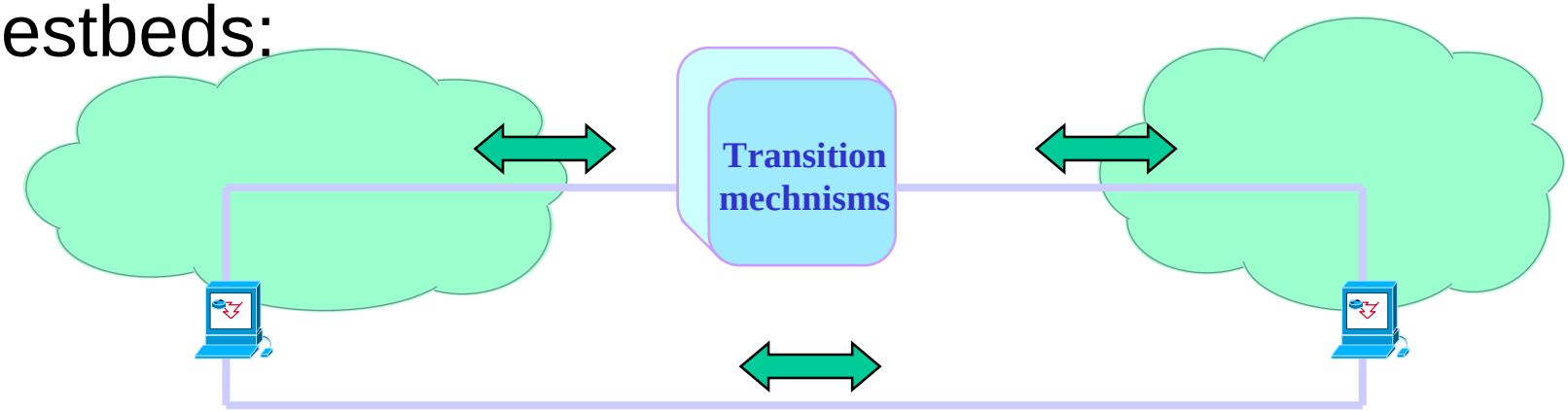

Univ. Oviedo
Telefonica I+D
ETSIT- Univ. P. Madrid
ETSIT- Univ. P. Cataluña
Univ. Carlos III
ETSIT- Univ. P. Valencia
Univ. Murcia
ETSIT- Univ. Sevilla
GIGACOM (ATM)
RED IRIS (Red SABA)
RED IRIS (Internet)
SABA2: Geographical Coverage & Network Infrastructure

SABA2: Network experiments

- Experiments: IPv4 to IPv6 transition mechanisms
  - Solutions considered
    - tunnels and tunnel brokers
    - 6to4 tunnels
    - NAT-PT
    - Socksv5
    - BIS (Bumo in the Stack)
    - DSTM (DualStack Transition Method)
    - 6over4 tunnels

General Methodology: Performance Tests

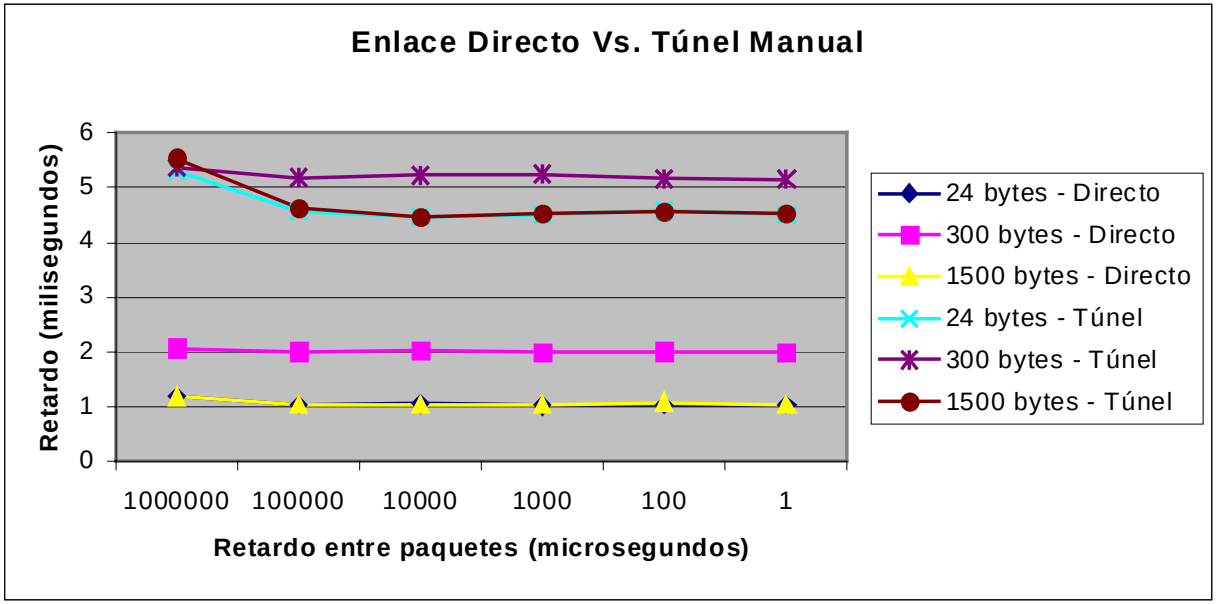
- Testbeds:

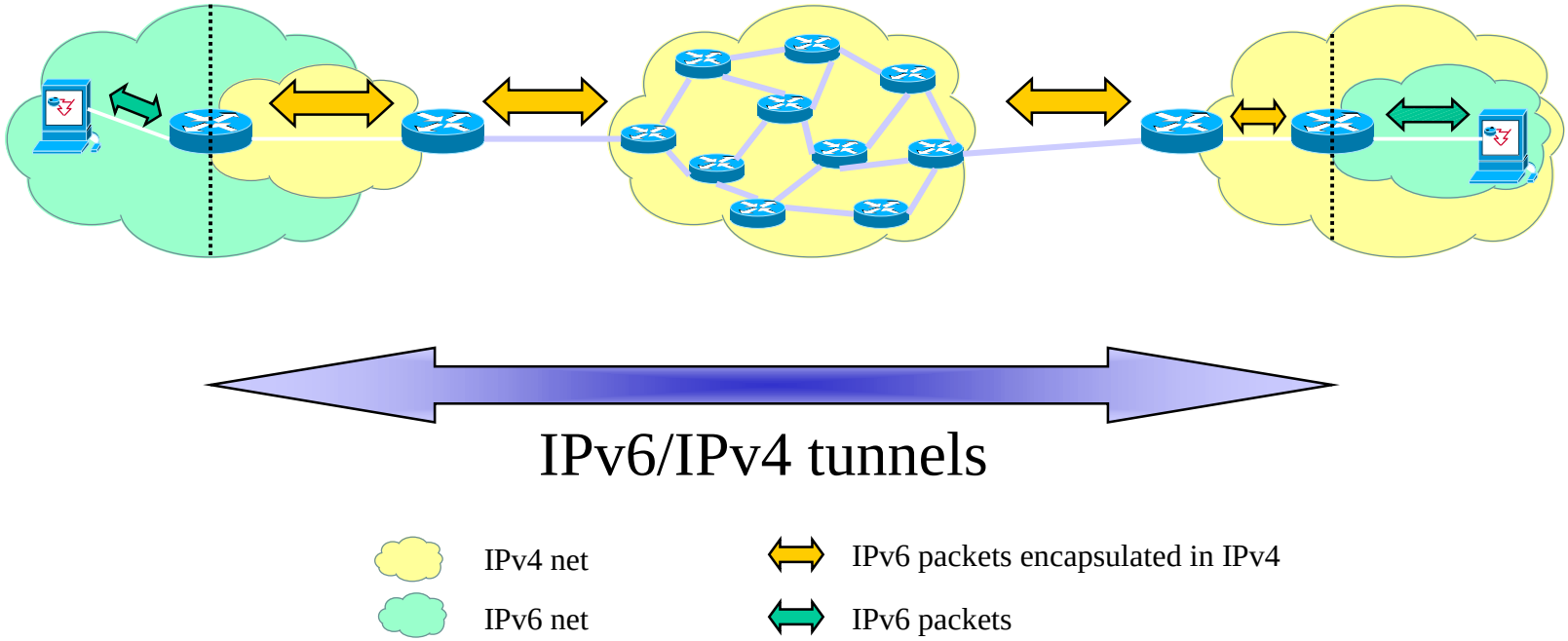


- Measures:
  - Delay.
  - Delay Jitter.
  - Throughput.

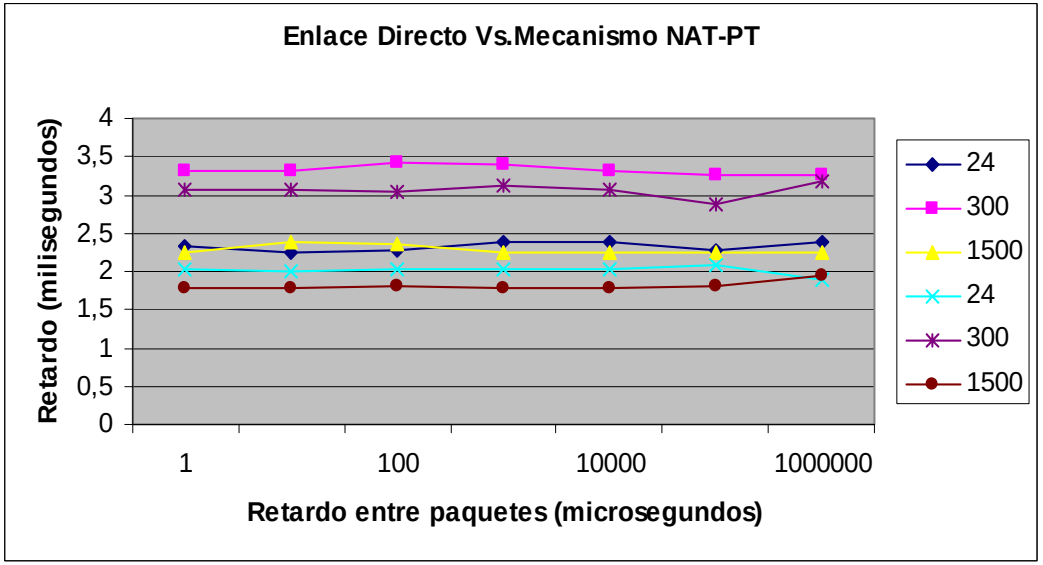
Tunnels

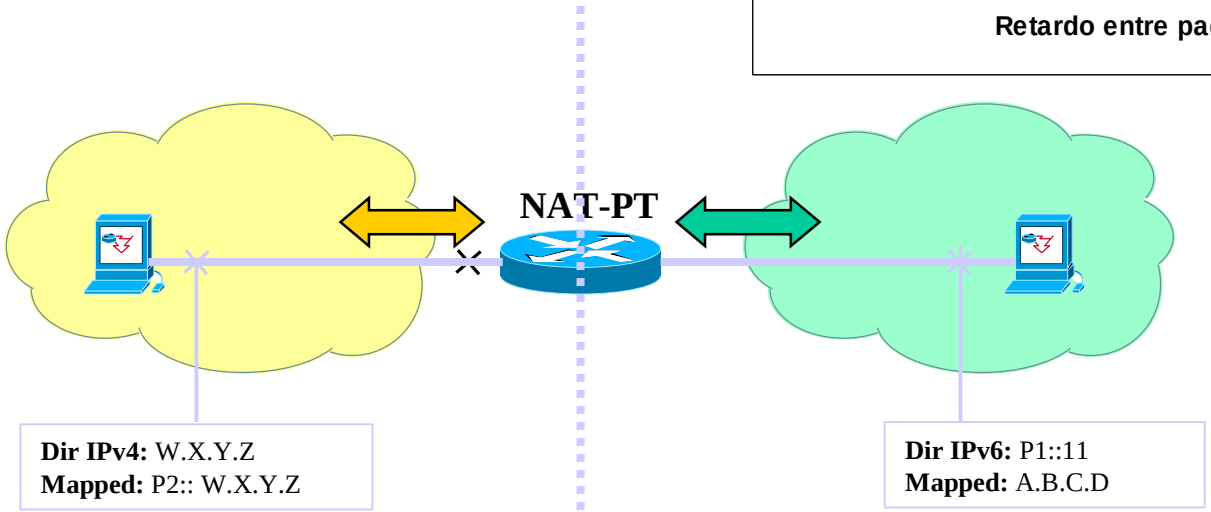
- Manual tunnels
- 6to4 tunnels





NAT-PT





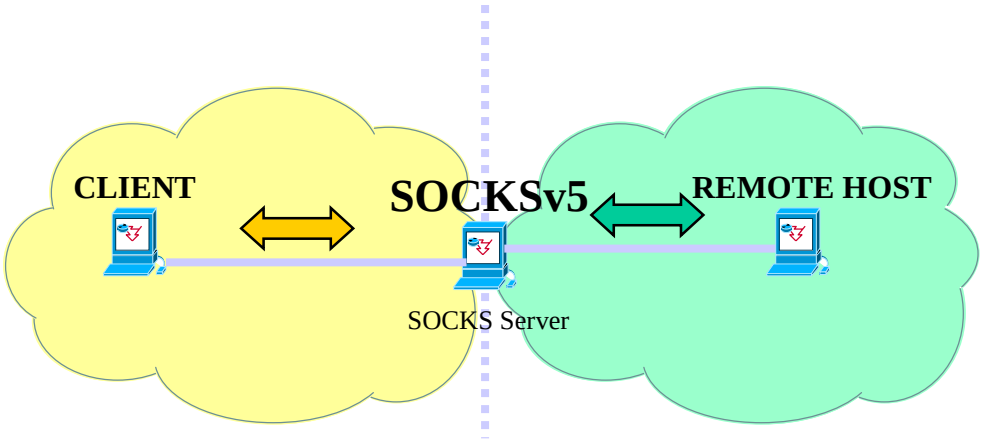
P1= PREF_1_RED_IPv6: /64
P2= PREF_2_RED_IPv6: /64

IPv4 net

IPv6 net

IPv4 packets

IPv6 packets



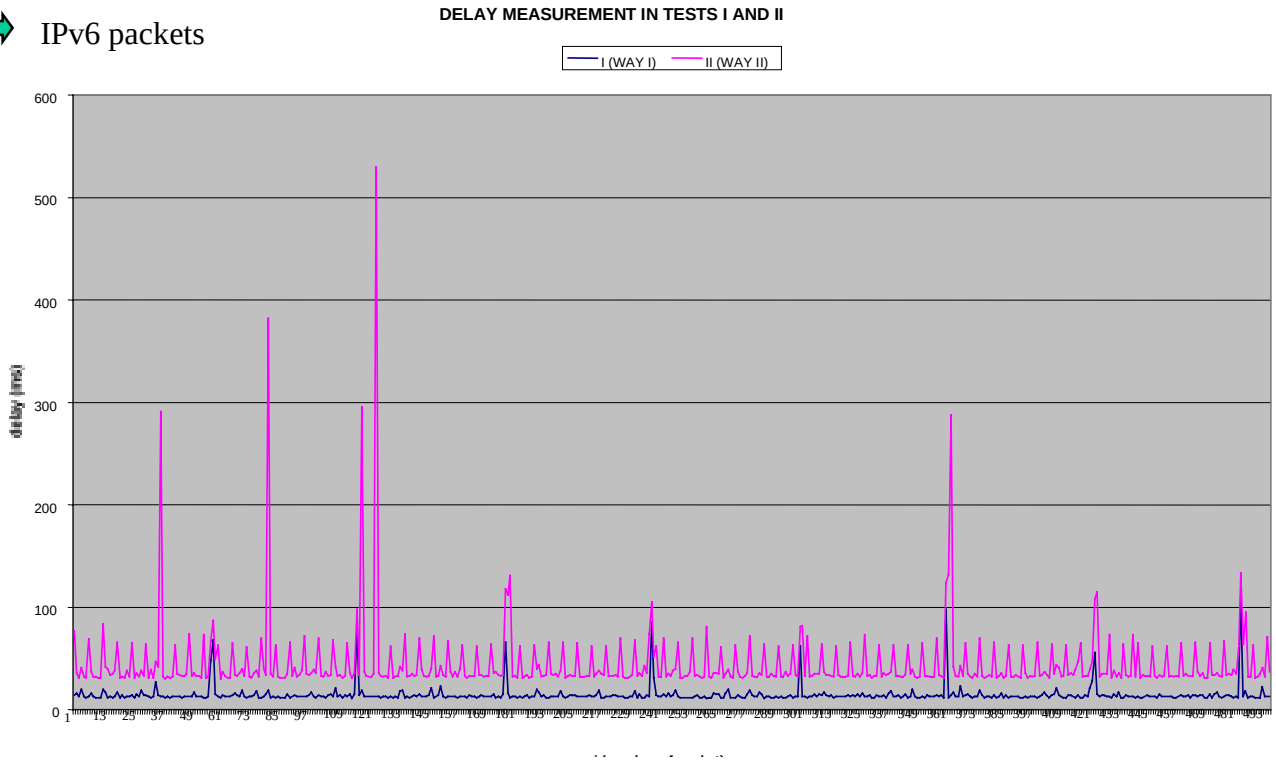
SOCKSv5

IPv4 net

IPv6 net

IPv4 packets

IPv6 packets



SABA2: service experiments

- Regular realisation of experiments
  - with internal and external users
- Service experiments
  - Distributed congresses
    - Telecom I+D, Project workshops, other congresses
      - For example: Gloabl IPv6 Summit at El Escorial
  - Tele-meeting:
    - Project meetings, third party meetings
  - Distance learning:
    - Regular courses involving several universities
      - IBA course

The IBA Distributed Course

The IBA Distributed Classroom

- The distributed classroom:
  - set of interconnected physical classrooms
    - Each in a different university or location
    - where lecturers and students can interact from any of the linked physical classrooms
- The distributed course
  - Course given in a virtual classroom
    - where content is provided by various universities
    - where attendees can attend in any university
    - where students are obliged to collaborate over the distance
- Aim: Place education in a global context

Lecturers in a Global Context

- A distributed course places the lecturer in a new framework
  - Lecturing and pedagogical approaches are made highly visible
    - to other colleagues
    - to other universities
  - The new framework is competitive/collaborative
    - course providers collaborate to produce a course
      - will be implicitly reviewed by their peers
    - should increase educational quality

Students in a Global Context

- A distributed course places the students in a richer environment
  - with different focus and points of view
  - in different cultures
  - with different academic and pedagogical approaches
- Students must collaborate over the network
  - preparation, planning and defence of graduation works
- The distributed evaluation is a difficult issue
  - How can it be made compatible with local regulations

Optimisation of resources

- A distributed course can optimise academic resources
  - Content production & delivery can be shared
    - by several lecturers
      - only local supervision is needed by content receiving sites
    - from different universities and with different points of view
- Higher educational quality with less effort
  - more effort can be devoted to
    - actualisation of content
    - academic innovation

IBA course

- Distributed course: “IBA - Broadband Internet”
  - Offered by Telecom Eng. Schools (ETSITs) in Spain
    - As a result of an agreement among directors of ETSITs
- Course offered as a regular course in all ETSITs
  - Each ETSIT decides the type of offer made:
    - free course, obligatory within a speciality, ...
  - Credits are accounted as in any other graduate course
- Each site (ETSIT)
  - Has professors responsible for the delivery
    - Responsible professors share the delivery of the content
  - Hosts 30 students

IBA Deliveries

- Delivery 1999:
  - 3 sites
    - Madrid: ETSIT - UPM
    - Barcelona: ETSIT - UPC
    - Valencia: ETSIT - UPV
  - 4,5 credits (2nd semester, Tuesday. & Wed. 15h-17h)
  - Participants: 90 students (30 in each ETSIT)
- Delivery 2000:
  - 4 sites
    - Madrid: ETSIT - UPM and ETSIT - UC3M
    - Barcelona: ETSIT - UPC
    - Valencia: ETSIT - UPV
  - 6 credits (2nd semester, Wednesday & Thur. 15h-17h)
  - Participants: 120 students (30 in each ETSIT)

IBA Content

- Negotiated each year by responsible lecturers
- Courseware:
  - Slides
  - Web server with support info & bibliography
  - Definition of graduation works
- Graduation work
  - Produced by teams of students: one of each institution
    - Work done collaborating over the internet
    - Work presented by authors over the platform
- Evaluation different in each ETSIT
  - ETSIT-UPM evaluation: attendance & work evaluation
  - ETSIT-UPC evaluation: final examination

IBA platform

- Delivery performed over an ISABEL platform
  - running the tele-meeting service
    - Interaction controlled by the professors
- Site set up:
  - videoconferencing room
    - ISABEL terminal projected on a large screen
      - Isabel Terminal: PC running Isabel & Linux
    - Good quality audio set up
      - lecturers use a HIFI wireless body-pack microphone
      - Audience uses wireless handheld microphone
    - Video set up: simultaneous view of lecturers & students
- Network set up
  - Virtual private IP network
    - IP over ATM (RedIris & Gigacom)

Conclusions

- Next generation Internet is quickly maturing
  - Needs further developments & tunning
- Transition to IPv6 is a “must”
  - issues
    - performance of products is improving
      - but still unstable
    - support
    - fine tunning of all the elements
- Most important feature for service spreading
  - QoS or CoS