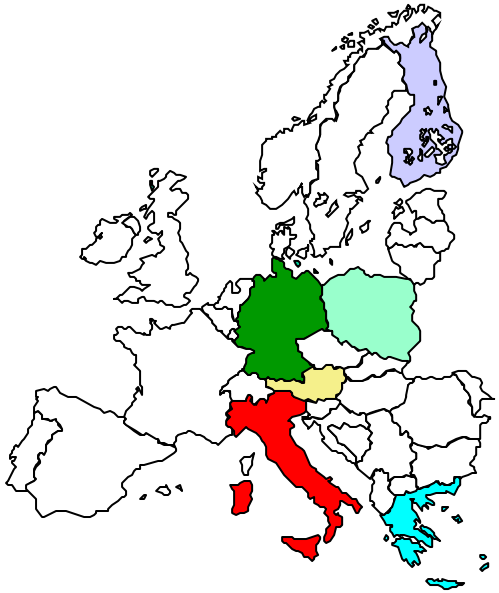
AQUILA (IST-1999-10077)

Adaptive Resource Control for QoS Using an IP-based Layered Architecture



GÉANT meets the Users
Brussels, May 22nd, 2002

Bert F. Koch SIEMENS

http://www.ist-aquila.org/

Outline

- AQUILA Architecture
- Network Services
- Inter-domain QoS
- AQUILA and GÉANT
- Schedule for 2002
- Outlook and Wishes

Consortium

Siemens, Germany

Bertelsmann, Germany

Dresden Univ. of Technology, Germany

Salzburg Research, Austria

T-Systems Nova, Germany

Polish Telecom, Poland

NTUA, Greece

Elisa Communications, Finland

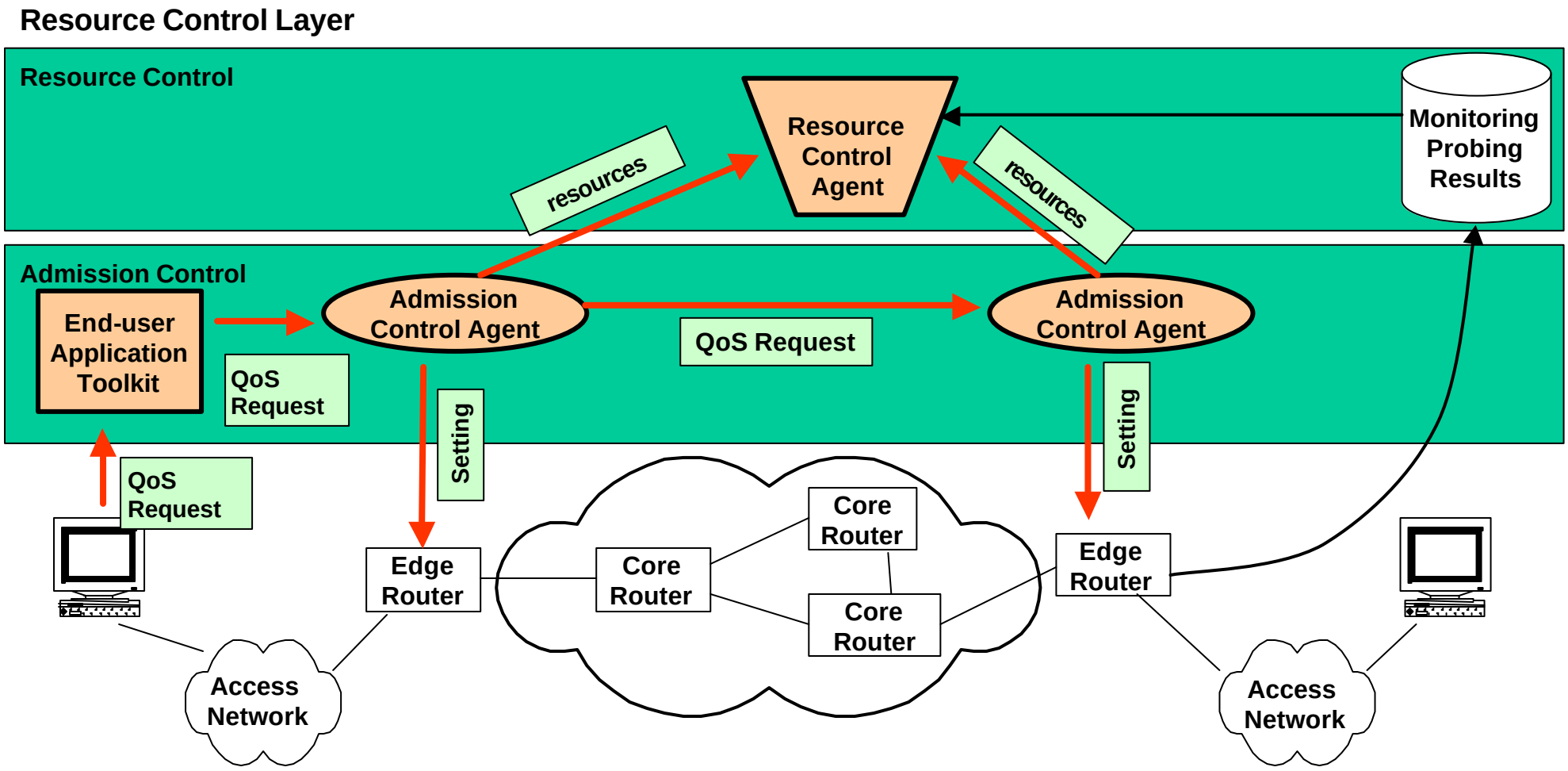
CoRiTeL, Italy

Q-Systems, Greece

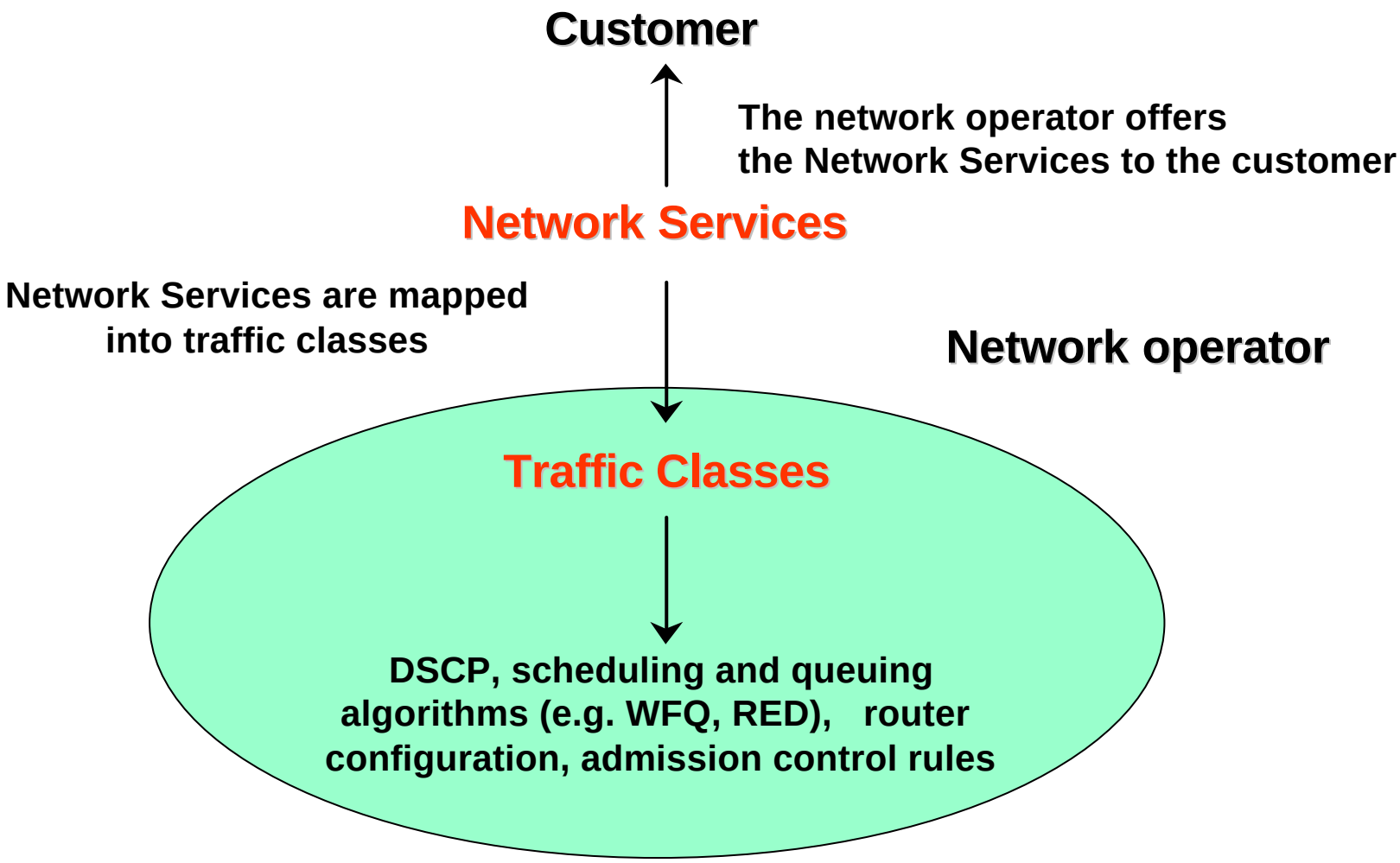
Telekom Austria, Austria

Warsaw Univ. of Technology, Poland

Architecture



Traffic Classes

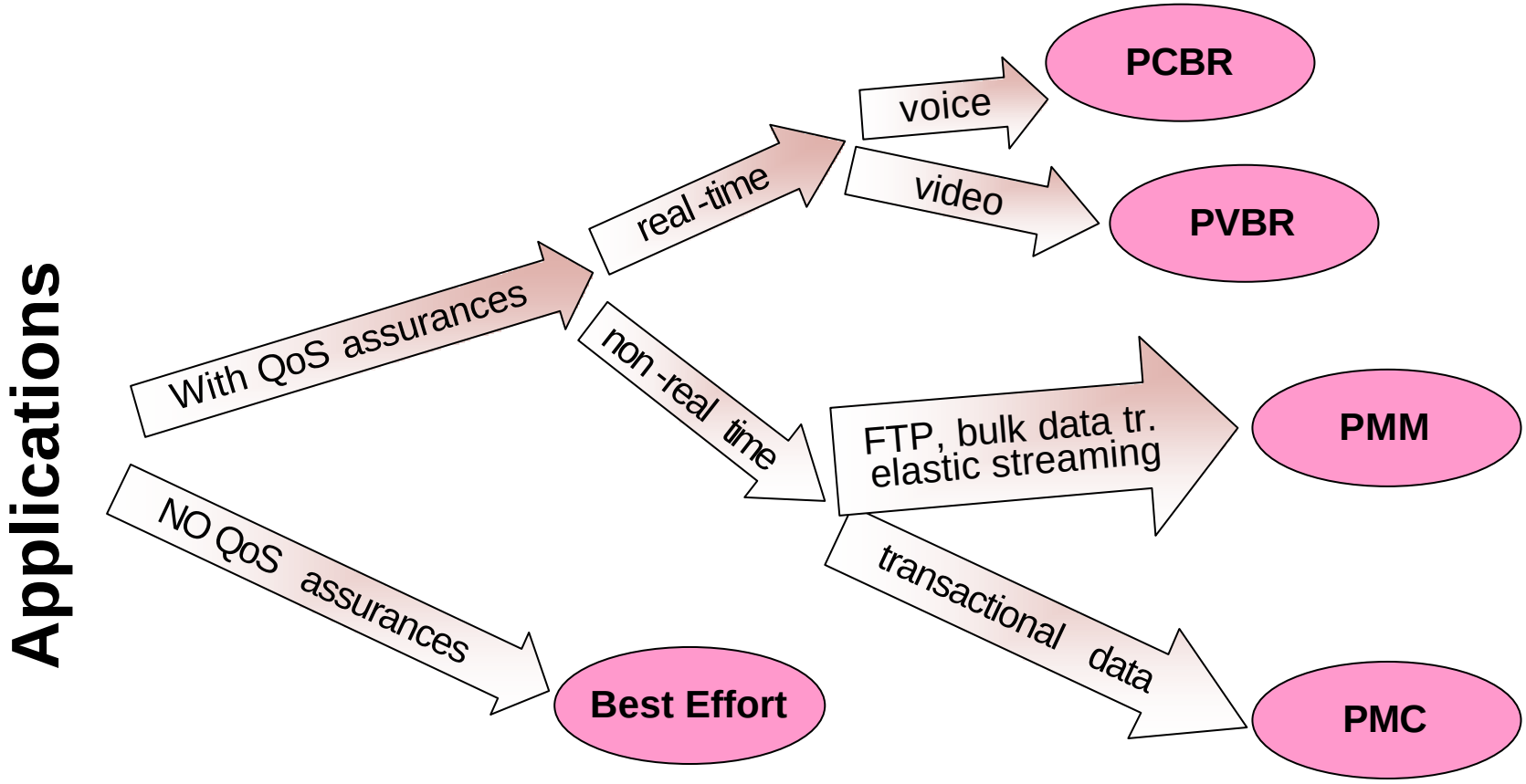


AQUILA set of pre-defined network services

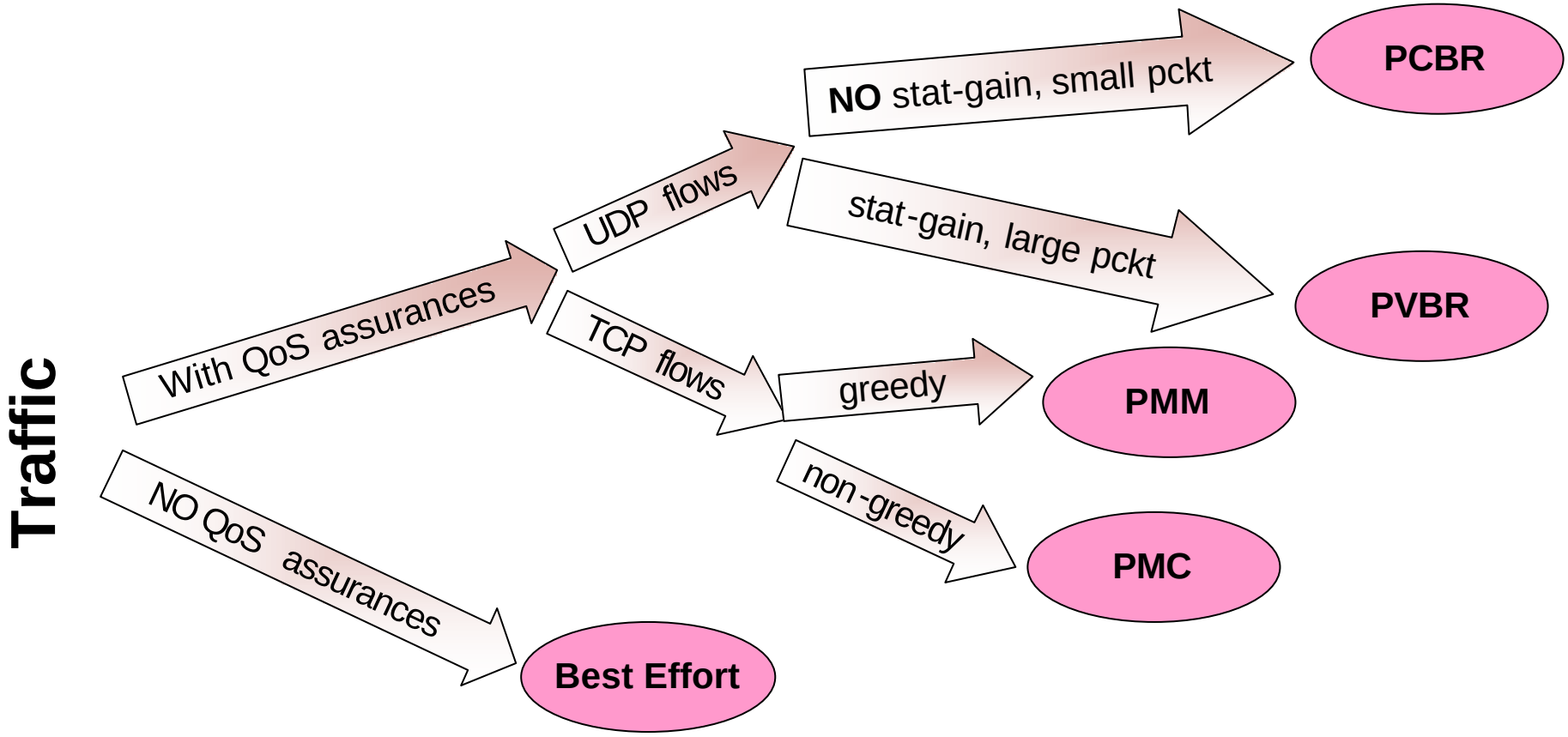
Network service	Traffic type	Characteristic examples	Application example
• Premium CBR	constant	small packets low loss	SIP VoIP
• Premium VBR	variable	large packets low loss	SIP Video
• Premium MM	adaptive	moderate delay	Streaming Video
• Premium MC	bursty	very low delay & loss	online Game
• Standard	best effort	classical	the rest

Goal: only a *few* network services to allow clear service differentiation

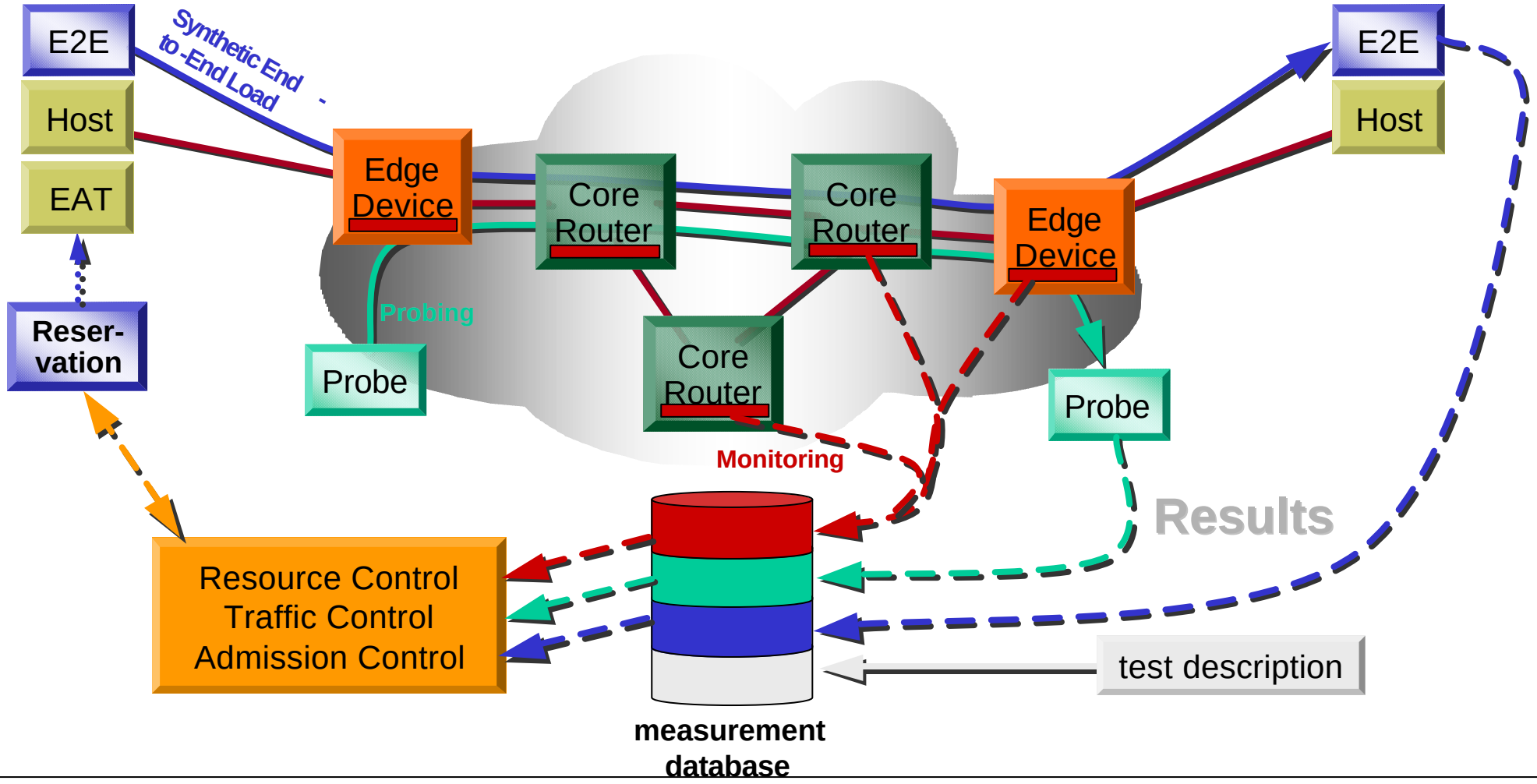
Why different Network Services ?
An application-oriented perspective…



Why different Network Services ?
A traffic-oriented perspective…

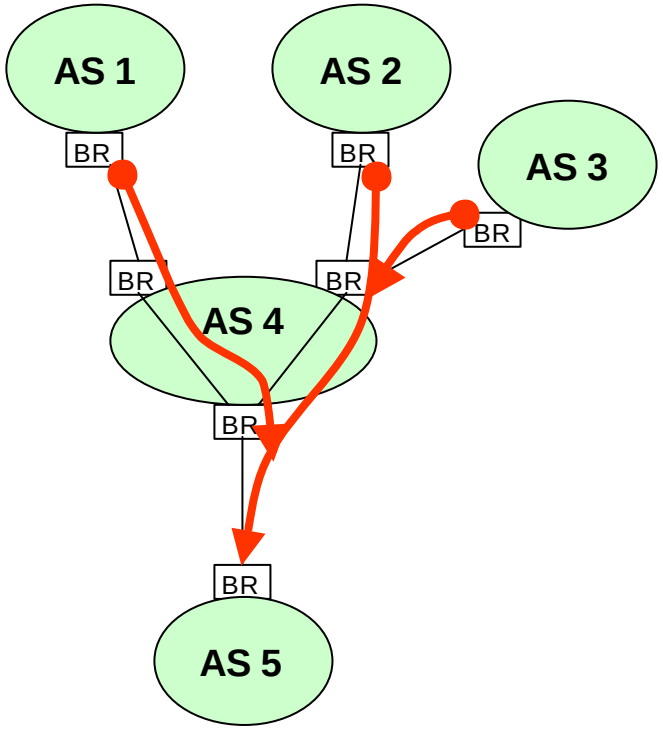


Measurements

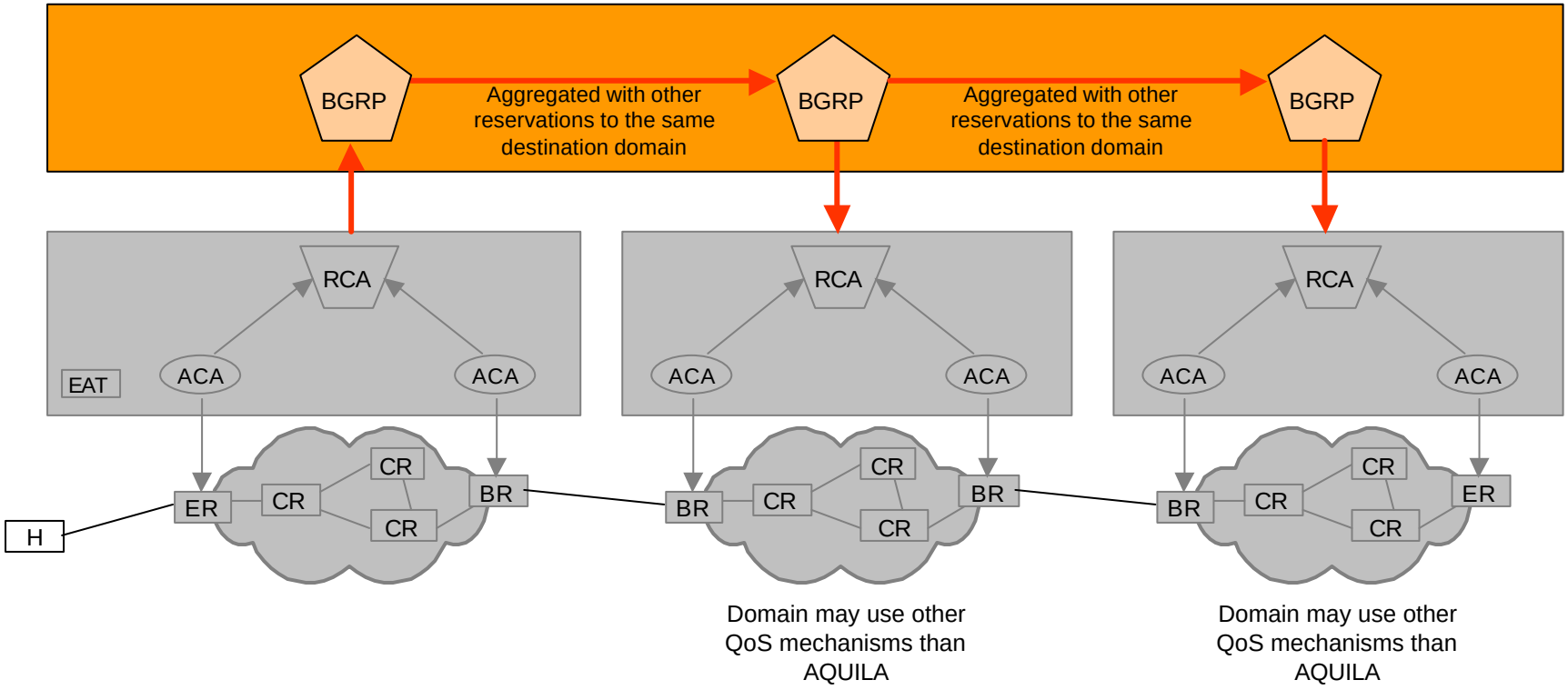


Current Work

- **Resource control in the 2nd trial (closed loop)**
  - Measurement Based Admission Control (MBAC)
  - Provisioning Control Loops (PCL)
- **Inter-domain resource allocation**
  - BGRP aggregates reservations along BGP sink trees
  - BGRP limits the number of active reservations at each node



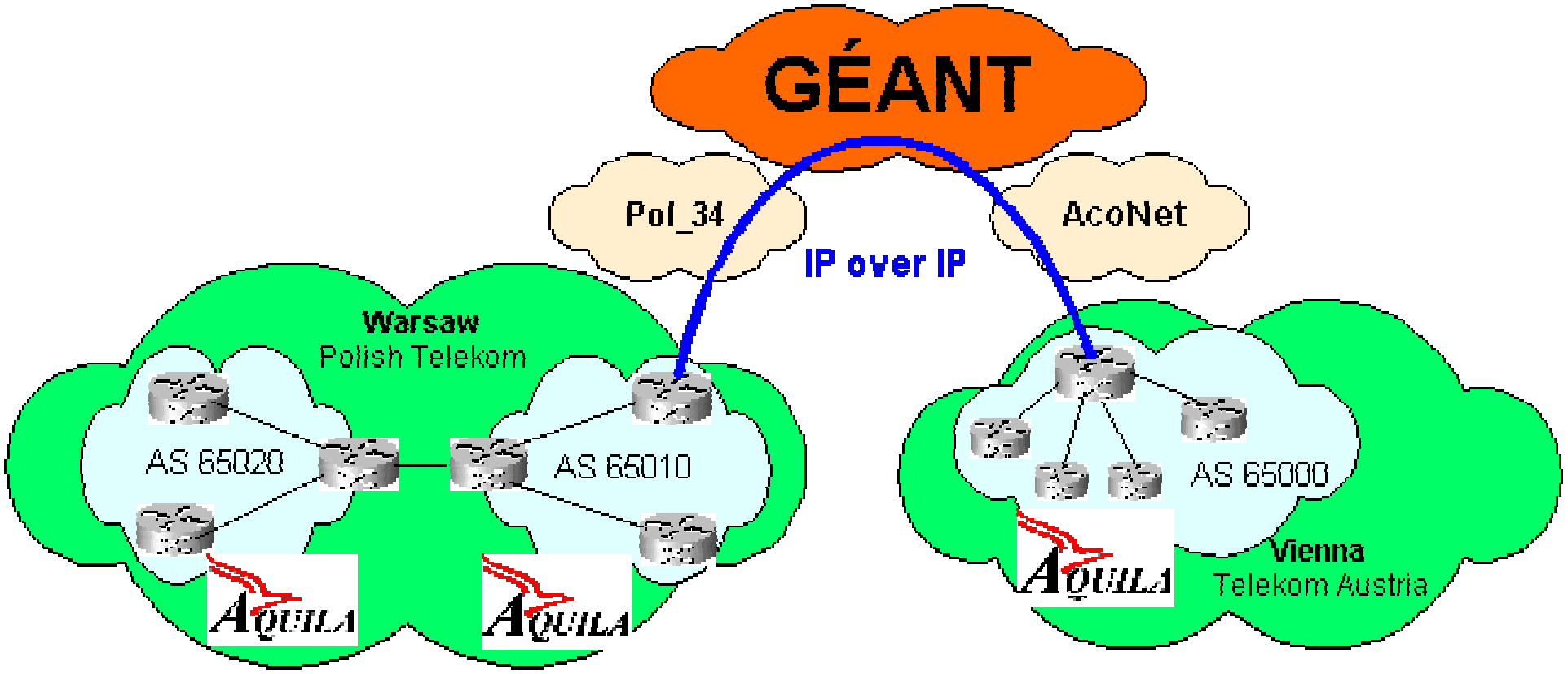
Inter-domain QoS



QoS applications used in the 2nd trial

- **NetMeeting**
- **SIGMA (Sip-based IntelliGent Multimedia Application)**
- **Mediazine**
  - IP based Internet / TV application
  - Different multimedia broadband services:
    - video / audio on demand
    - games
    - news
    - email
    - chat
    - e-commerce

Overall topology for 2nd trial



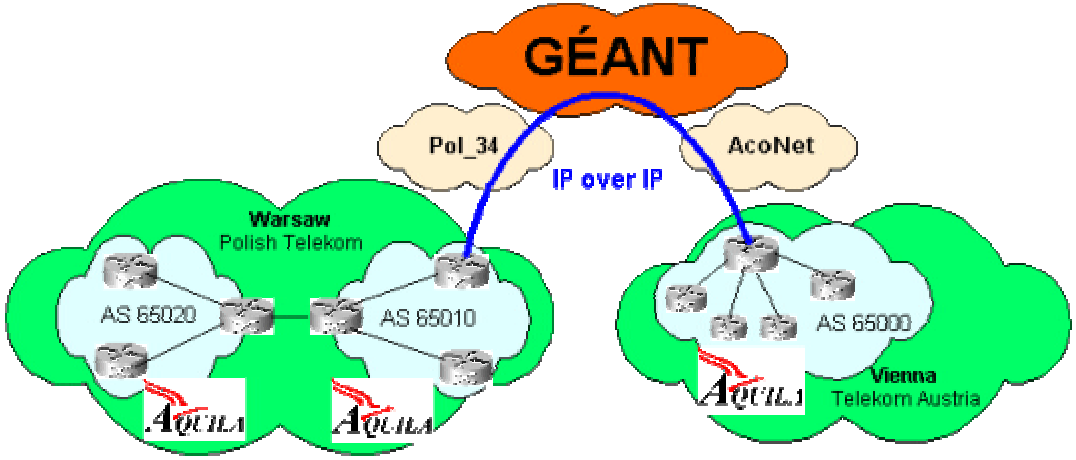
AQUILA connects with SEQUIN / GÉANT

- **Why do we use a tunnel (IP over IP)?**

	AQUILA	SEQUIN
Network services	5	2
Traffic classes	5	2
DSCP	Different	Different
AS	Private numbers	Official numbers

AQUILA connects with SEQUIN / GÉANT

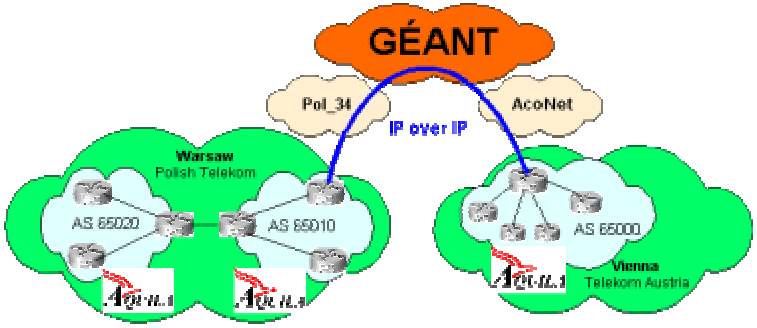
- Four AQUILA traffic classes would be mapped into Premium IP
- DiffServ Code Points (DSCP) would be changed
- AQUILA traffic between Warsaw and Vienna must not be interfered during this trial
- In the future, Globally Well-Known Services (GWKS) may help



Schedule for 2002

- **April - June**
  - Global integration
  - Integration-meeting (last week of April 2002)
  - Remote configuration of the other trial sites
- **June - October**
  - 2nd trial
- **End of December**
  - Final Trial Report, Final Project Report

Interconnection activities



- **Mailing list**
  - pip-aquila@fokus.gmd.de
- **Establishing connectivity in two steps**
  - Step 1: Testbed connection to the NRENs
    - ATM 2.5 Mbit/s “TAA-testbed → AcoNet”
    - ATM 2.5 Mbit/s “TPS-testbed → POL-34”
  - Step 2: Tunnel configuration using GÉANT
    - Tunnel-termination at AQUILA testbeds
    - DSCP marking for Premium IP at ingress points of GÉANT

Experiences with GÉANT

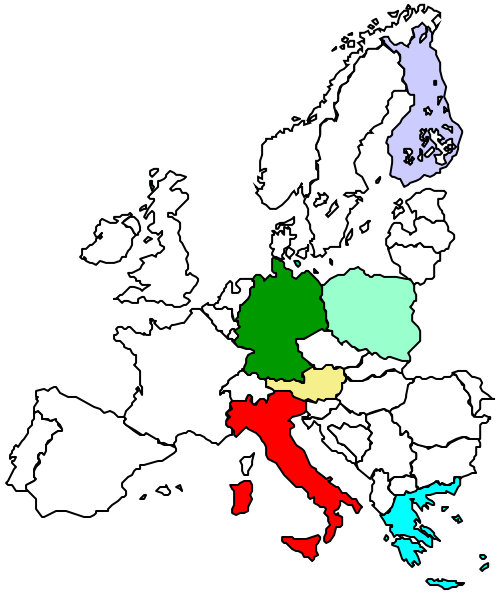
- **Establishment within one week from initial request (April 2002)**
- **SEQUIN / GÉANT network engineers very helpful**
- **Network fulfills the AQUILA requirements**
  - Positively prooven using application like ftp, telnet, AQUILA QMTool, …
- **AQUILA will now start it's 2nd trial using the NREN/GÉANT infrastructure**
  - Test scenarios for inter-domain QoS provisioning
  - Evaluation of MBAC
  - Real user involvement in Warsaw, Vienna and Salzburg

Outlook and Wishlist

- **Enhancement of Standardization Activities**
  - Inter-domain QoS signalling: the BGRP+ architecture
    - draft-salsano-bgrpp-arch-00.txt (May 14, 2002)
      - » requirements and scalability of inter-domain resource reservation
  - Standardized GWKS
  - Standardization of DiffServ usage (like port numbers e.g.)
- **Further availabilty of pan-European (and international) Research Network infrastructure**
- **Ease of administration overhead for researchers**
  - One contact point in order to avoid a series of negotiations with different network operators in the connectivity path

AQUILA (IST-1999-10077)

Adaptive Resource Control for QoS
Using an IP-based Layered Architecture



Thank you for your attention !

http://www.ist-aquila.org/