

# ArchiteCTure for enhanced Overlay netwoRks (ACTOR)

Call5: Future Internet

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# Content:

- Experiences, running and submitted projects (before final evaluation)
- Motivations and requirements for new project (call5): ACTOR
  - Proposed ACTOR architecture
  - Research areas in ACTOR
- Summary



## TNT: Telecommunication Network Technologies Group

Prof. W. Burakowski

tnt.tele.pw.edu.pl

Stuff: W. Burakowski (professor), H. Tarasiuk, A. Bęben, J. Śliwinski (assistant professors), 3 Ph.D. Students, about 20 M.Sc. students

Areas of expertise:

- ATM/IP/WLANs/Ethernet/xDSL networks
- transport, routing, network protocols, QoS mechanisms
- test-beds, monitoring and measurement systems

Important previous projects: - COST 224, COST 257, COST 279

- 5FR – AQUILA
- 6FR – MoMe (Monitoring and Measurements)
- 6FR - EuQoS (NGN network)

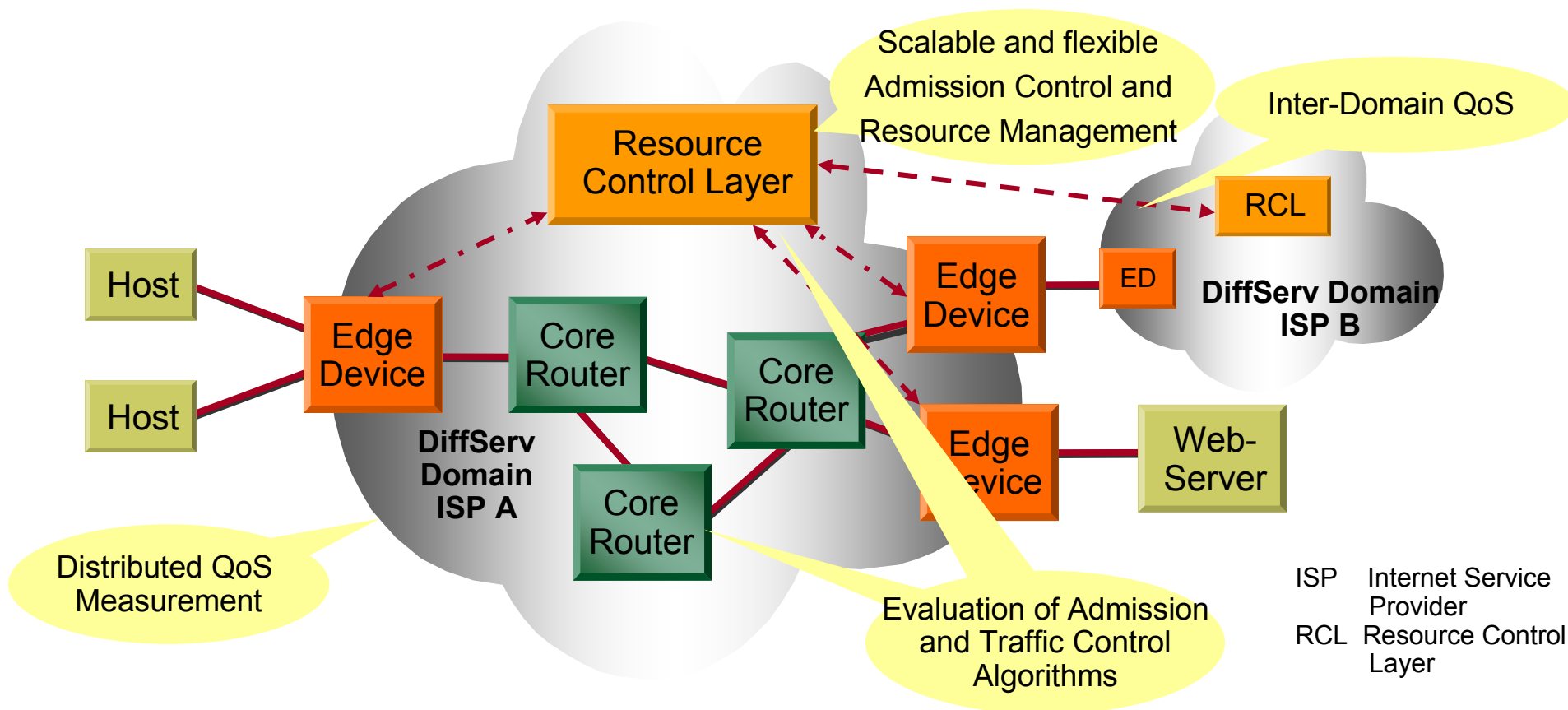
Organised Workshops: Art.-QoS 2003, MoMeSim 2005, To-QoS 2006, SOCNE 2006, QoSIM 2008



# Division of Computer Networks and Switching



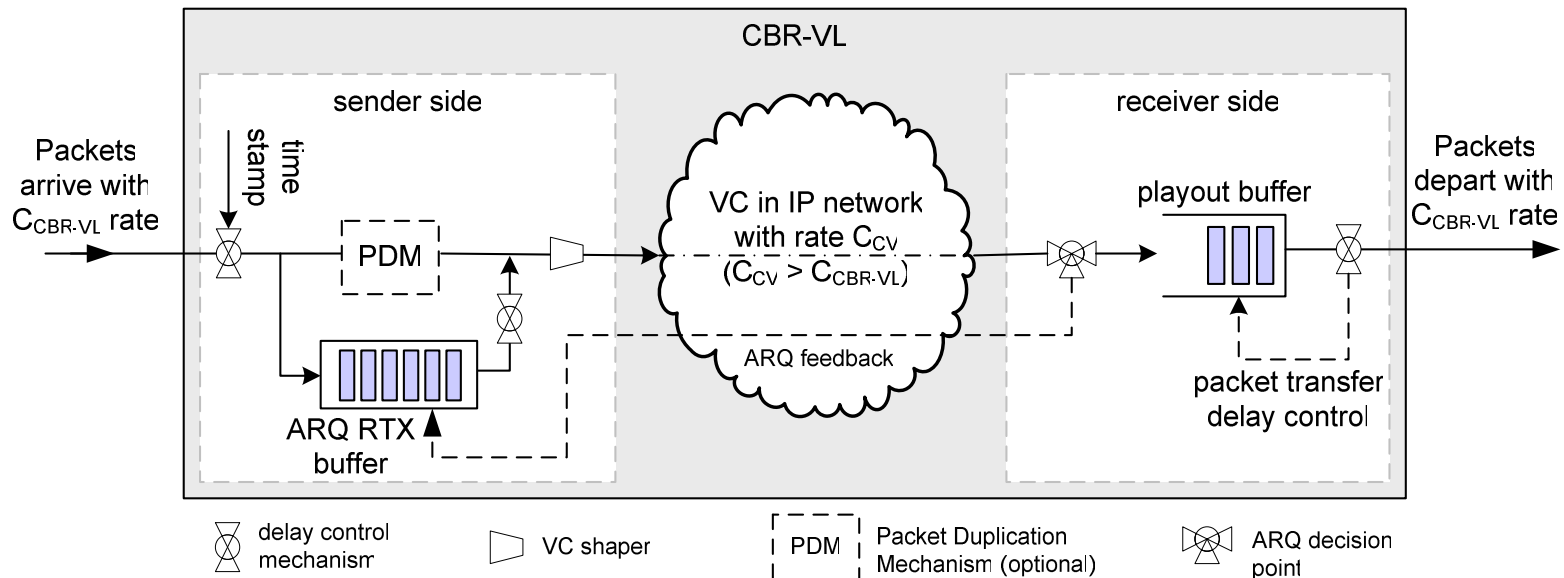
Important running projects (national): Implementation of IP DiffServ network



⇒ **Quality of Service in single domain**



## Important running projects (national): Constant Bit Rate Virtual Link



Objective: to provide Constant Virtual Link over IP Virtual connection

Solution: to investigate both ARQ schemes and playback buffer mechanism



## Important running projects (international): COST IC0703 Data Traffic Monitoring and Analysis (TMA)



### Objectives:

- Increase the quality and the impact of European research in the field of Traffic Monitoring and Analysis (TMA).
- Build a strong European network in the field which can give rise to future EU funded projects.
- Promote sharing of operational know-how, ideas, and lessons-learned between industry and researchers.
- Re-align curiosity-driven research with concrete problems of interest for real-world application.
- Promote the usage of common tools, data formats and analysis modules by the researchers. Solicit experimental validation works.
- Boost testing and experimental adoption by the industry of tools developed by research groups.



### Participants:

about 60 organizations from 20 countries: AT, BE, BG, CH, DE, DK, ES, FI, FR, GR, HU, IE, IL, IT, NL, NO, PL, PT, SE, UK



## Important submitted projects (national)

### Engineering of Future Internet

17 teams from 9 organisations, 140 researchers

**The objective: to design, research, implement and test the concept of Future Internet based on resource virtualization**

#### Main activities:

1. IPv6 – implementation issues
2. Architecture, mechanisms and algorithms for Future Internet
3. Applications for Future Internet
4. Testbed, pilot networks



## Important submitted projects (FP7), call 4

Small or medium-scale focused research project (STREP) proposal

ICT Call 4

FP7-ICT-2009-

### COntent Mediator architecture for content-aware nETworks COMET

Small or medium scale focused research project (STREP)

**Date of preparation:** 1st April 2009

**Work programme topic addressed**

Challenge 1: Pervasive and Trusted Network and Service Infrastructures

Objective ICT 2009.1.5: Networked Media & 3D Internet

**Participant no. Participant organisation name**

1 (Coordinator) Telefónica Investigación y Desarrollo S.A.U.TID Spain

2 University College London UCL United Kingdom

3 University of Surrey UniS United Kingdom

4 PrimeTel PLC PrimeTel Cyprus

5 Warsaw University of Technology WUT Poland

6 INTRACOM TELECOM ICOM Greece





## Important submitted projects (FP7), call 4

Small or medium-scale focused research project (STREP) proposal  
FP7-ICT- Call 4

### Personalized Heart Failure Monitoring and Support System

Type of funding scheme : STREP  
FP7-ICT – Challenge 5 – 4th Call Towards sustainable and personalised healthcare  
Objective ICT-2009.5.1 Personal Health Systems  
Target outcomes a. Minimally invasive systems and ICT-enabled artificial organs  
Application domain:  
a1) Cardiovascular diseases

Participant no. \*Participant organisation namePart. short nameCountry  
1 (Coordinator) FIMI Philips (FIMI S.R.L.) FIMIItaly  
2 Cardio Centro Lugano CARDIOSwitzerland  
3CNR , National Research Council CNRIItaly  
4 ETH, Eidgenossische Technische Hochschule Zurich ETHSwitzerland  
5Institute of Cardiology - WarsawIKARDPoland  
6 SUPSI, Scuola Universitaria Professionale della Svizzera Italiana SUPSISwitzerland  
7 TELCORDIA TELCORDIAPoland  
8UNIVERSITY OF PASSAU UPGermany  
9 Politechnika Warszawska (Warsaw University of Technology) WUTPoland  
10Istituto Nazionale di Geofisica e VulcanologiaINGVItaly

# **ArchiteCTure for enhanced Overlay netwoRks (ACTOR)**

Call5:

Challenge 1: Pervasive and Trustworthy Networks and  
Service Infrastructures

Objective ICT-2009.1.1: The network of the Future

# Why we need ACTOR?

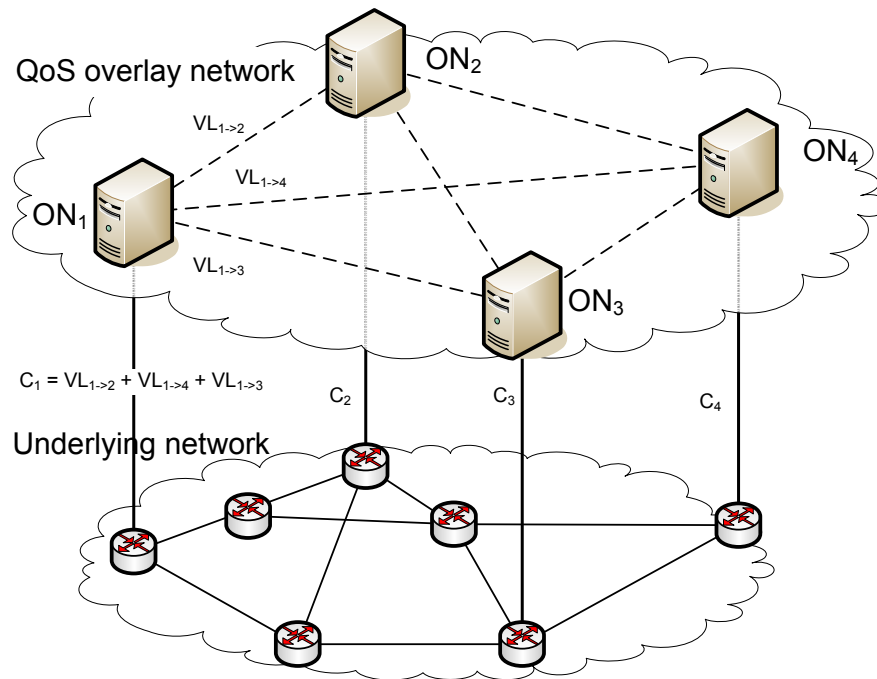
## Motivation

- The networks (best effort IP, xDSL, LAN/Ethernet, WLANs...) do not meet the requirements for enhanced services (QoS, reliability, security, ...)
- To improve packet forwarding capabilities of underlying technologies by providing a homogenous overlay infrastructure

## Project objectives

- To build service architecture in overlay networks (as ACTOR network)
- To use existing underlying networks only for packet forwarding
- To research, design, prototype and test ACTOR network

# The ACTOR concept



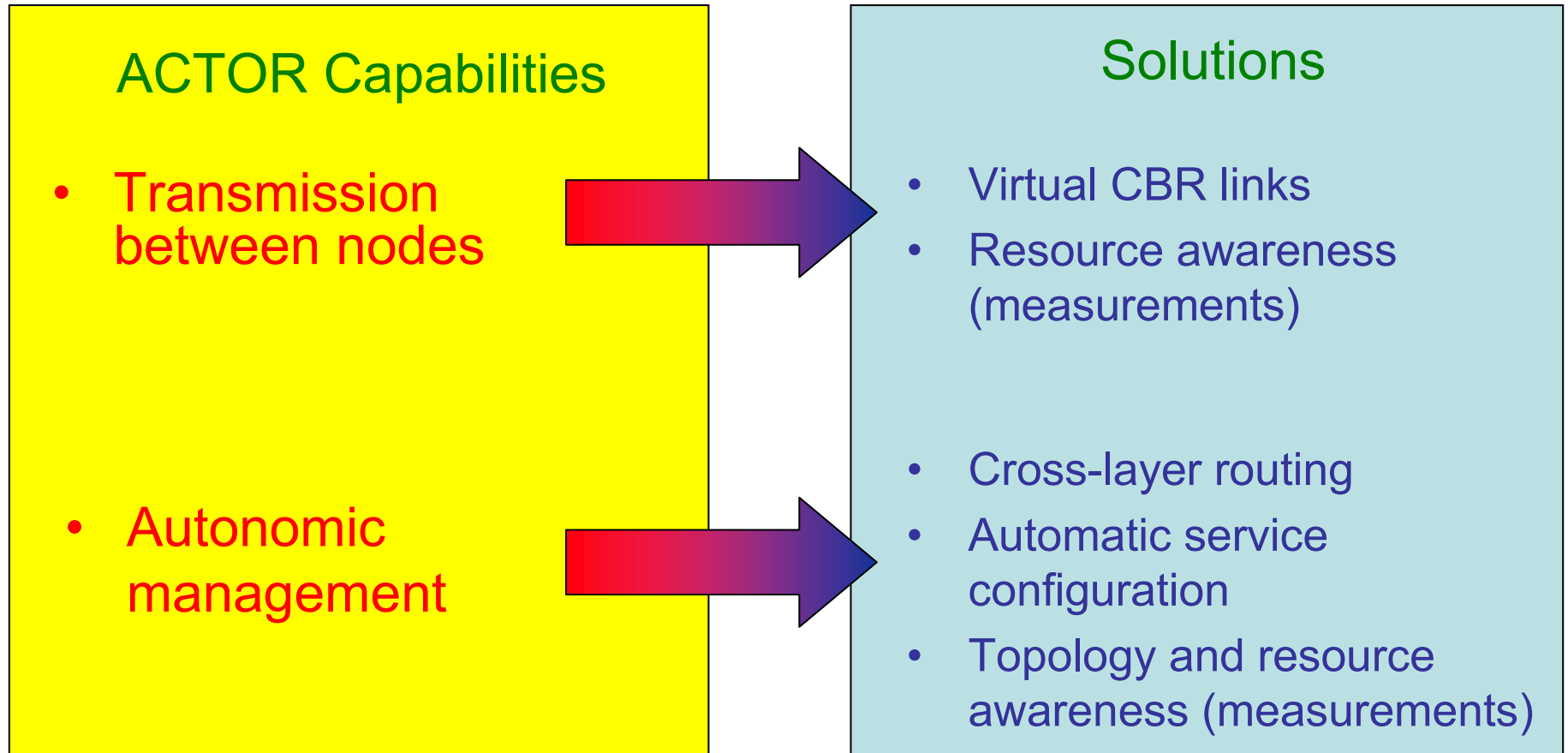
Overlay nodes

Virtual CBR links  
between the overlay  
nodes

Underlying network

ON – overlay node  
C<sub>i</sub> – capacity of access link  
VL<sub>x->y</sub> – capacity of virtual link between overlay nodes x and y

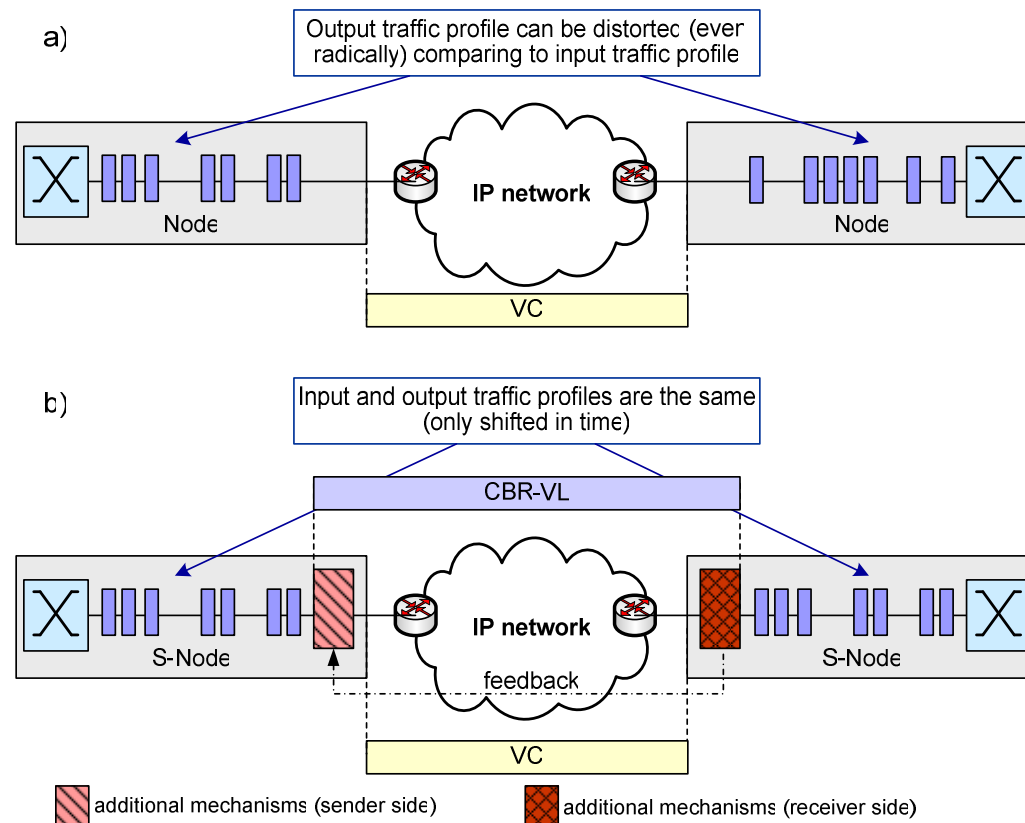
# New mechanisms and algorithms in ACTOR



# Research areas

## Transmission between nodes

- To build virtual CBR links between overlay nodes



# Research areas

## Autonomic management

- Routing with multiple constraints
  - Multiple objectives, routing per service, ...
- Service creation
  - Provisioning of links
    - Where? Target parameters?
  - Provisioning of paths
    - Where? Target parameters?
- Measurements
  - Capacity, delay, losses, virtualized resources, ...

# Design and implementation

- ACTOR design should
  - define the service
  - guarantee the service
  - be scalable
  - be transparent (open?) and flexible
- ACTOR implementation
  - A platform for testing new mechanisms and algorithms for future programmable IP routers



# Deployment and testing

- Test beds connected to GEANT network
  - Possibility for multihoming
- Tests proving the correct operation of the service
  - By means of exemplary applications

# Summary

- Currently, polish teams have marginal impact of designing Future Internet (only few teams are involved in the EU running projects)
- We want to fill this gap by establishing national project
- We take the challenge to submit a proposal for EU projects (as co-ordinator or partner)
- Call 5 is one of our goals