Interim Master Thesis Talk

"Extension of a DiffServ enabled IP core network for delivering QoS to the xDSL access"

By : Sandeep Misra

Guide : Prof. Hußmann

AQUILA (IST-1999-10077)

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

TECHNISCHE UNIVERSITÄT DRESDEN

SIEMENS

http://www-st.inf.tu-dresden.de/aquila/

Outline

- **Motivation & AQUILA**
- **Resource Reservation Protocols**
- **Implementation Scenarios**
- **xDSL**
- **Network Address Translation**
- **Current Status**
- **Summary**
- **Discussion**

- Motivation
- Protocols
- Scenarios
- xDSL
- NAT
- Status
- Summary
- Discussion

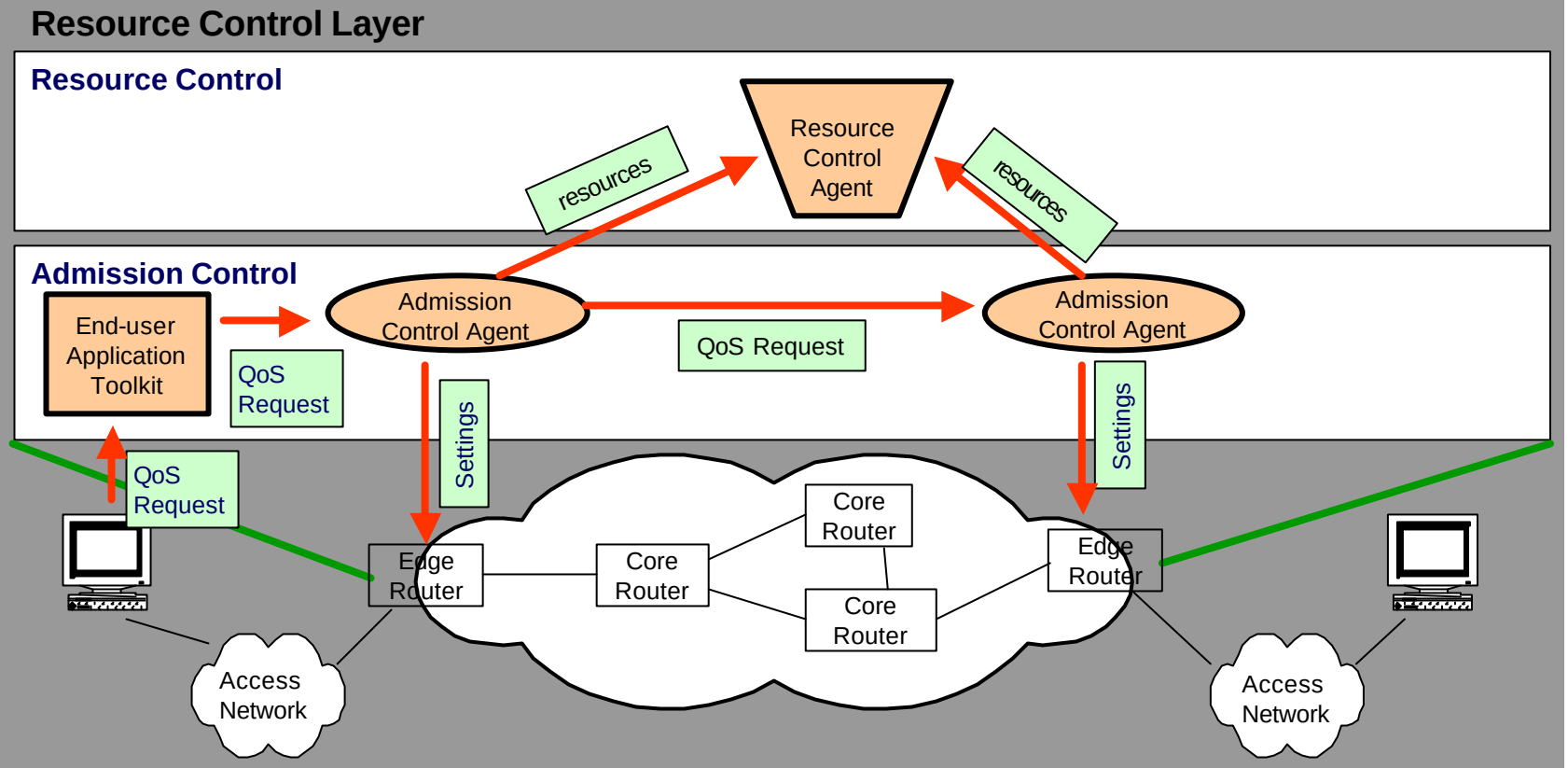
Quality of Service

- Current traffic flow : Best effort
- Requirements :
  1. Traffic Classification
  2. Real Time Traffic
  3. IP Convergence
- User is paying for the service
- Need for QoS

AQUILA : Introduction

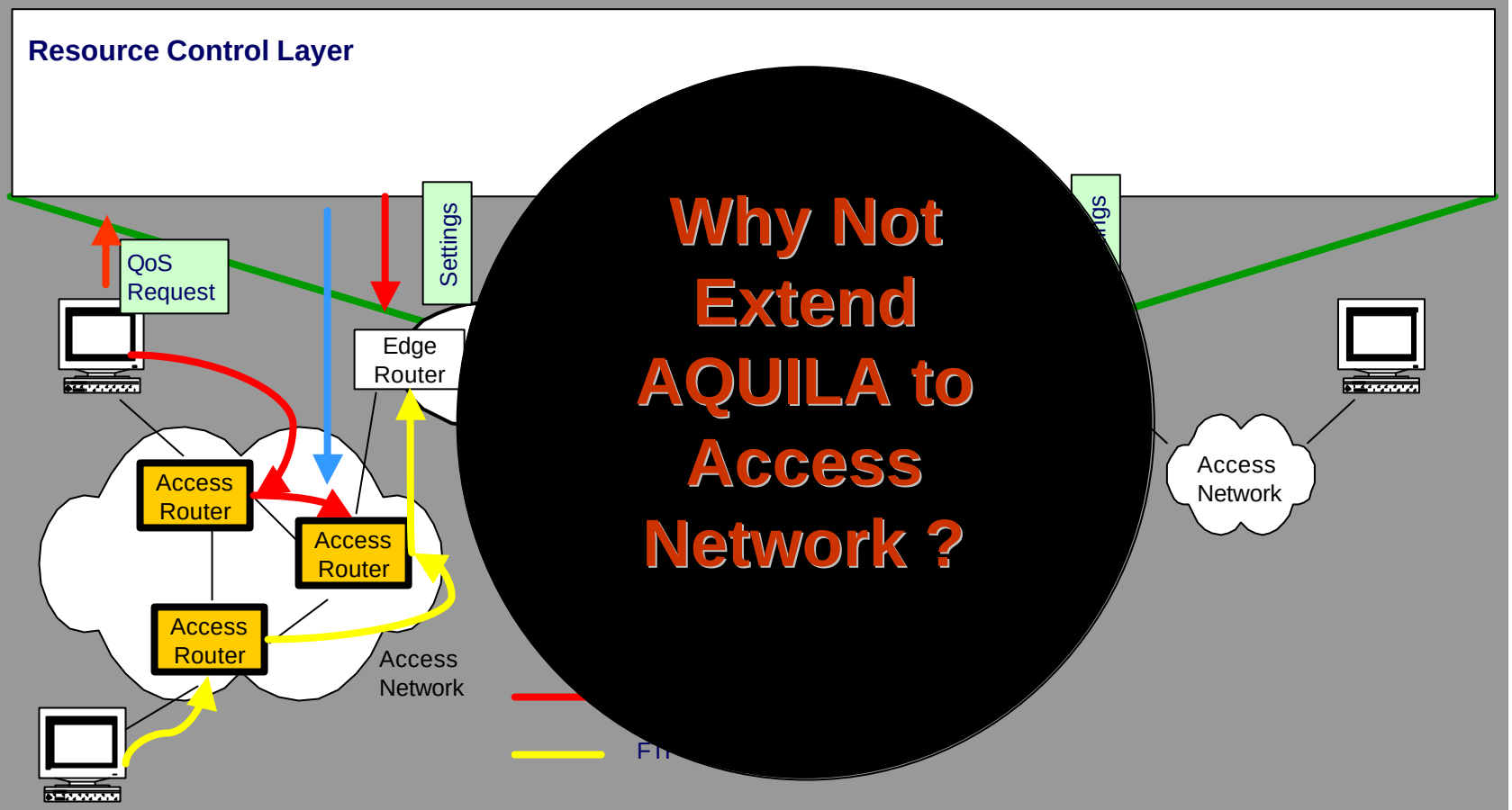
- Based on the DiffServ network concept
- Introduces Traffic Classes
- Introduces Admission Control
- Introduces Resource Control
- Only for Core Network
- Is Scalable

AQUILA Architecture



- **Motivation**
- Protocols
- Scenarios
- xDSL
- NAT
- Status
- Summary
- Discussion

AQUILA on Access n/w ?



- **Motivation**
- Protocols
- Scenarios
- xDSL
- NAT
- Status
- Summary
- Discussion

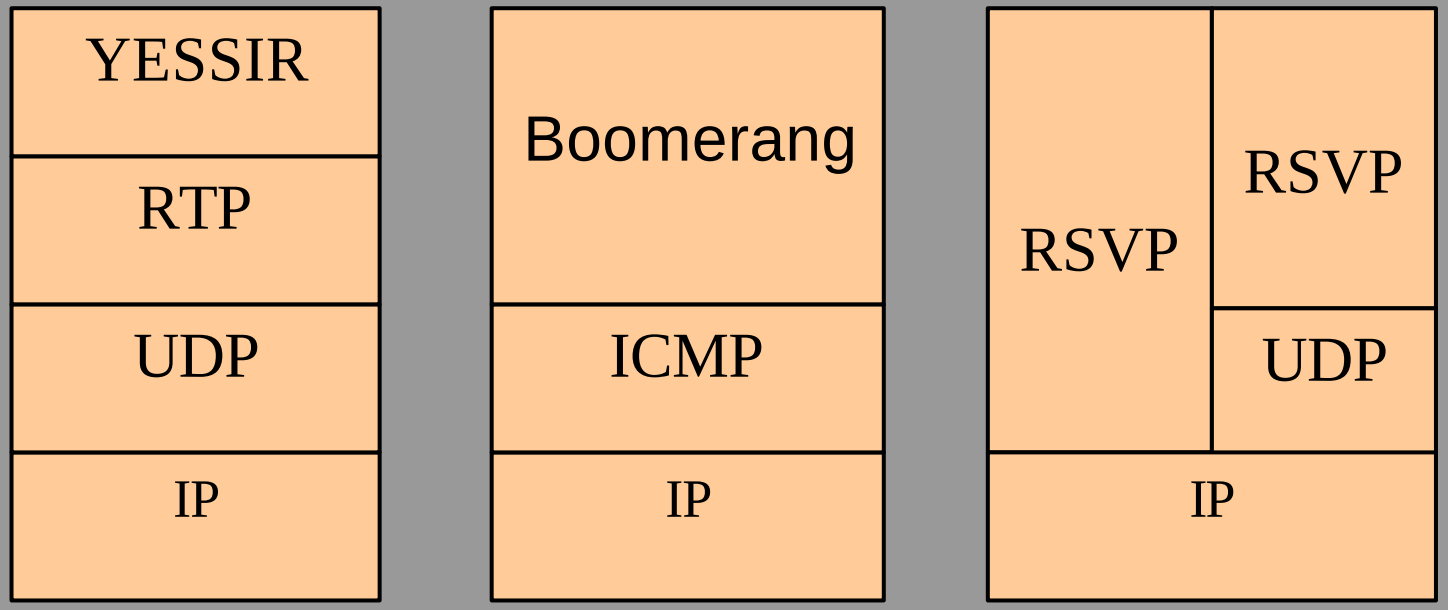
Protocol Requirements

- Guarantees QOS
- Implementation should exist
- Should be widely supported
- Scalability, not a problem
- Suitable for Access networks
- Low Bandwidth
- Fast Signaling

Reservation Protocols

- RSVP – Resource Reservation Protocol
- SRP – Scalable Resource Reservation Protocol
- FIRST – Flow Initiation and Reservation Tree
- DRP – Dynamic Sender Initiated Reservation Protocol
- Boomerang – A simple protocol for Resource Reservation
- YESSIR – Yet another Sender Session Internet Reservation

Comparison : Headers



YESSIR Header

Boomerang Header

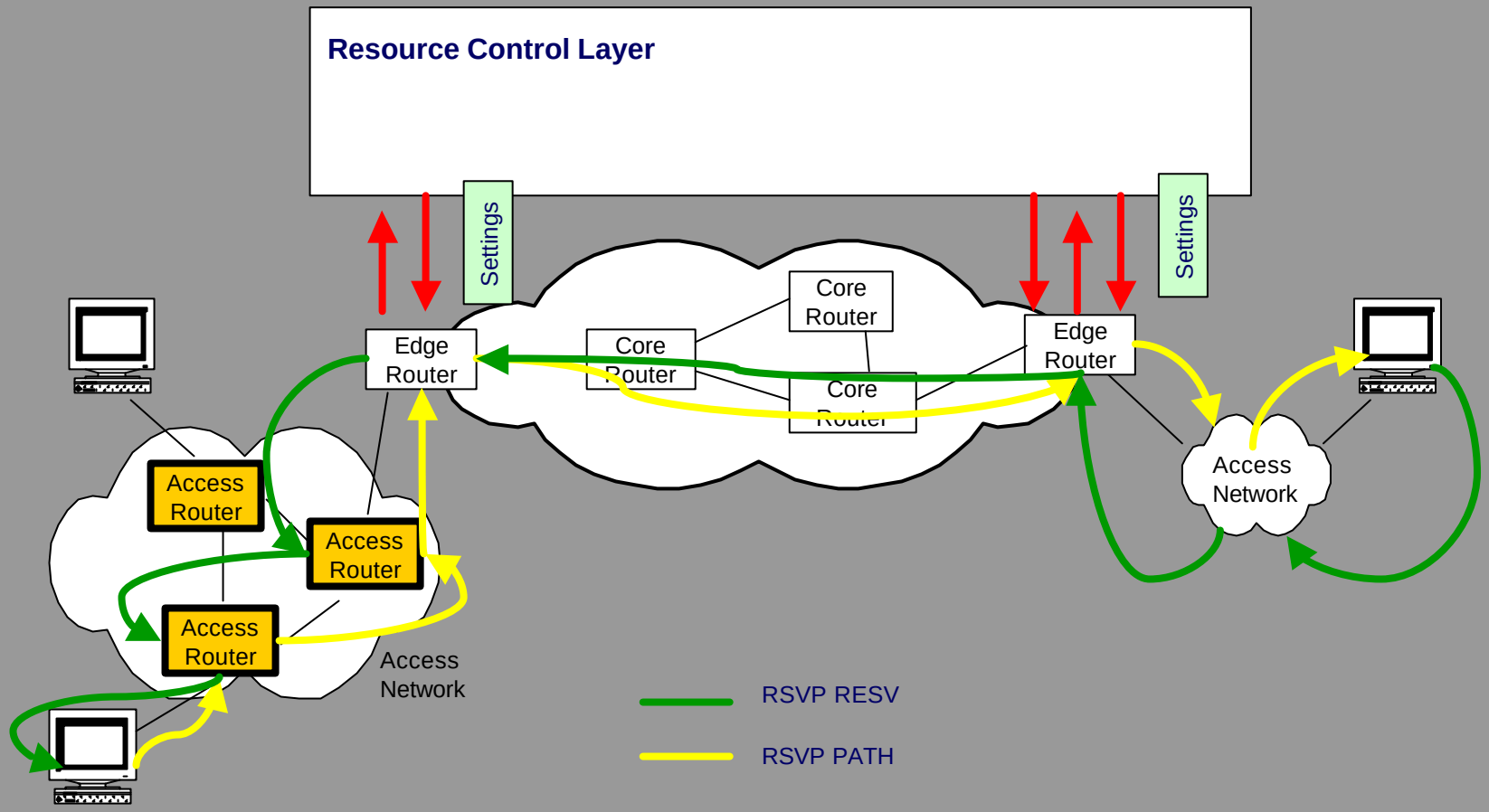
RSVP Header

- Motivation
- **Protocols**
- Scenarios
- xDSL
- NAT
- Status
- Summary
- Discussion

Comparison : Properties

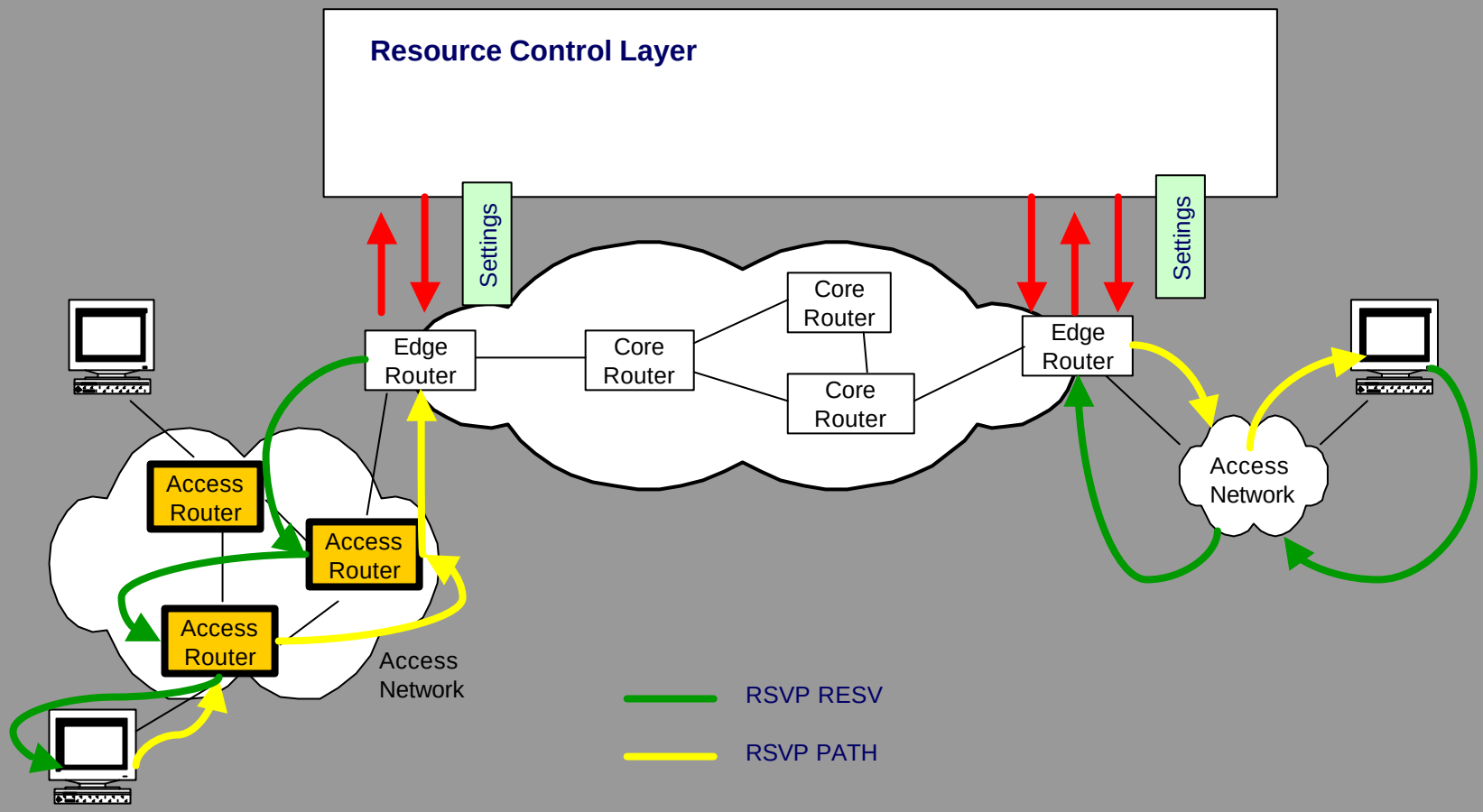
	RSVP	YESSIR	Boomerang
Initiator	Receiver	Sender	Sender
Flow Setup	Two Messages	One Message	One Message
Setup at router	Fast	Faster	Faster
Refresh	Fast	Faster	Faster
Bandwidth	Low	Lower	Lower
Implementation	Yes	Yes	Yes
Scalable	No	Yes	Yes
Support	Wide	No	No

Implementation Scenario : RSVP Encapsulation



- Motivation
- Protocols
- **Scenarios**
- xDSL
- NAT
- Status
- Summary
- Discussion

Implementation Scenario : RSVP Termination



- Motivation
- Protocols
- **Scenarios**
- xDSL
- NAT
- Status
- Summary
- Discussion

xDSL : Overview

- **HDSL : High-bit rate Digital Subscriber Line**

  Symmetric

  Up to 2 Mbps

- **SDSL : Symmetric Digital Subscriber Line**

  Symmetric

  Up to 3 Mbps

- **ADSL : Asymmetric Digital Subscriber Line**

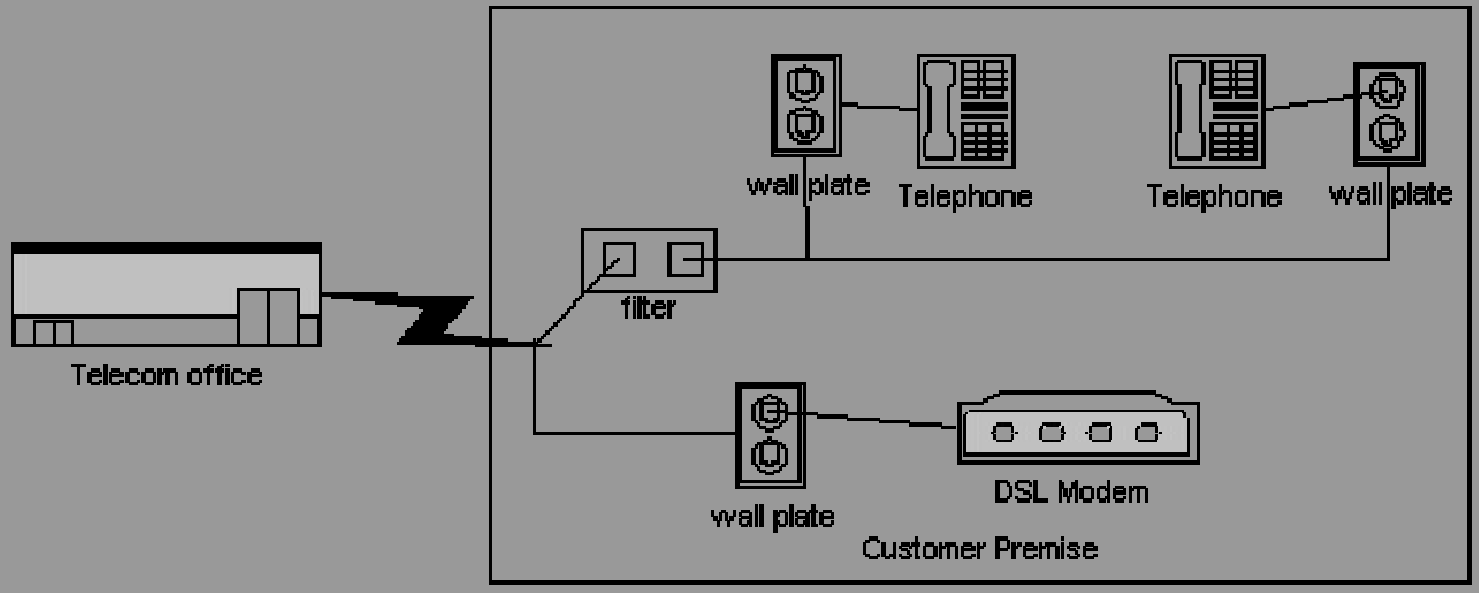
  Asymmetric

  Downstream : up to 9 Mbps

  Upstream : 128 kbps upstream

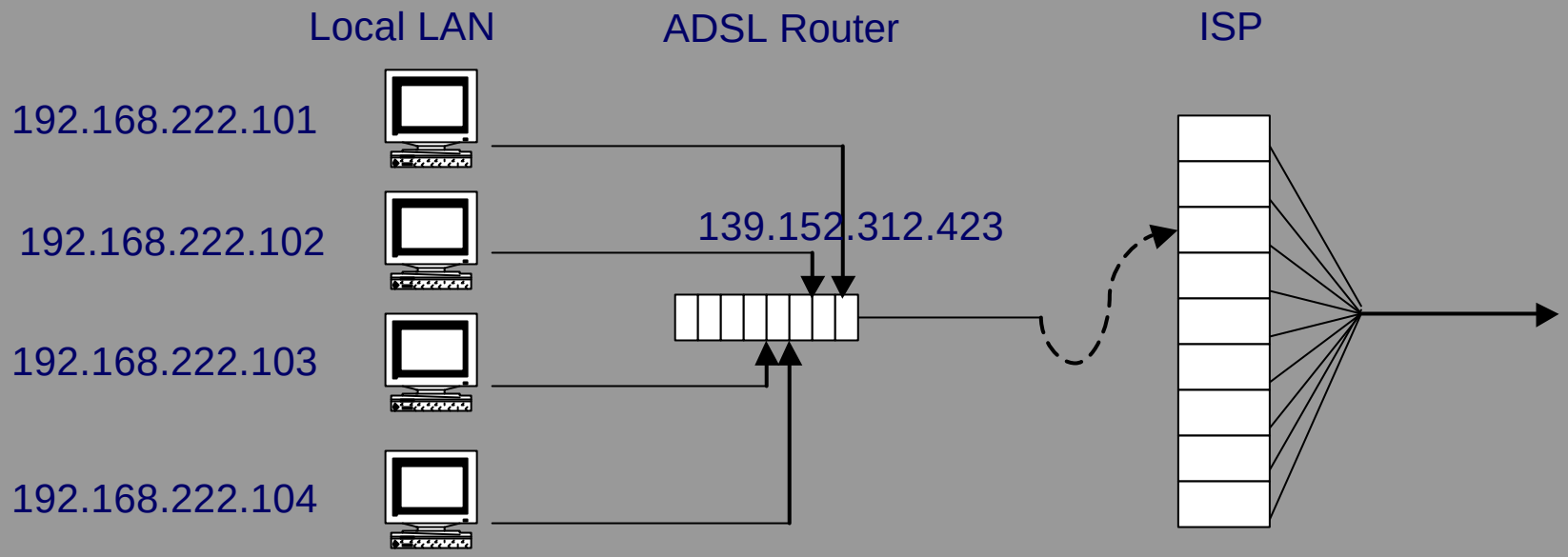
ADSL : Technology

- Simultaneous voice and data use of a single copper connection
- Voice call, Fax etc use the normal 0-4kHZ
- Higher frequencies to pass the data traffic



NAT : Network Address Translator

- NAT translates local IP header address to unique IP
- Does not look for IP address in payload
- Plug in, in NAT for RSVP

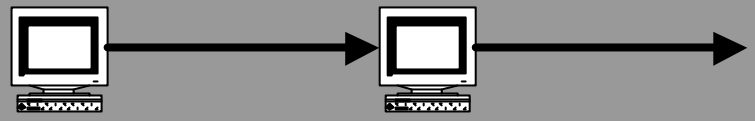


Implementation Scenarios

- **Router & RSVP on different systems**

Host + RSVP xDSL Router AEA

- **Router & RSVP on same system**



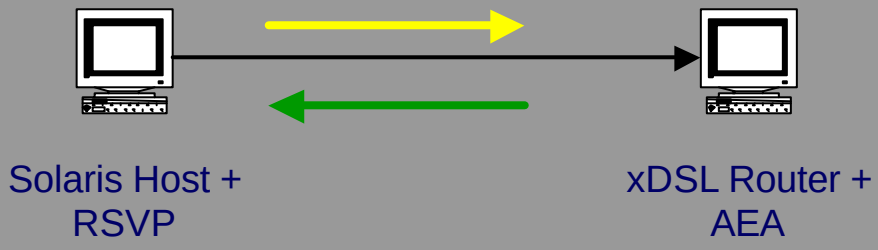
Host + RSVP xDSL Router + AEA

AEA : AQUILA Extension for Access n/w

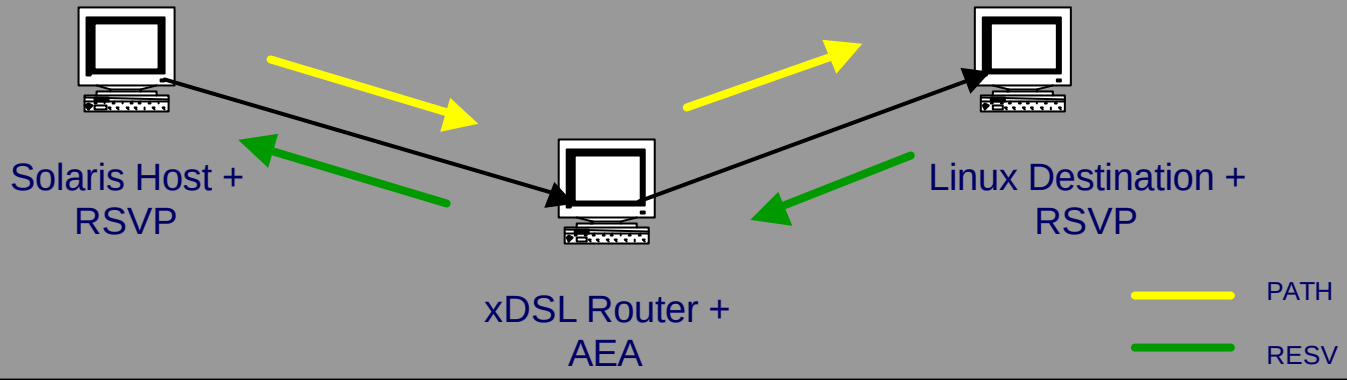
- Motivation
- Protocols
- Scenarios
- xDSL
- NAT
- **Status**
- Summary
- Discussion

Current Status

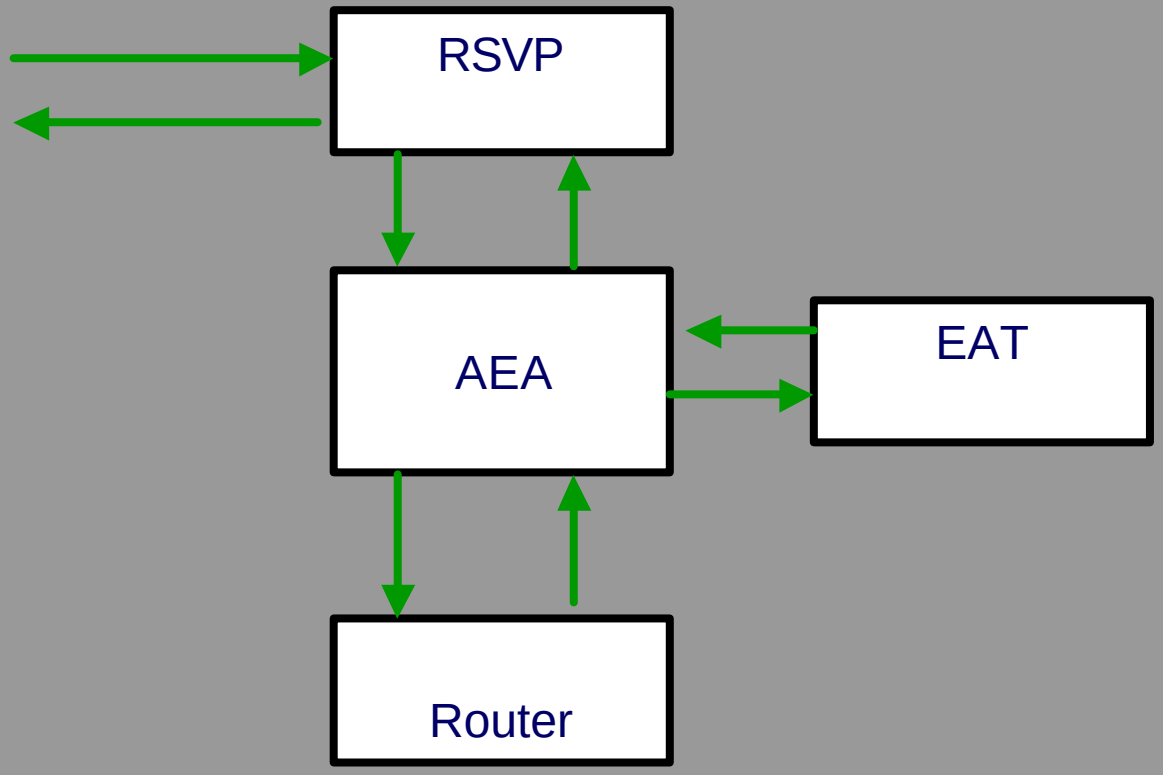
- **Between Two Systems**



- **Between More than Two Systems**



AEA Implementation



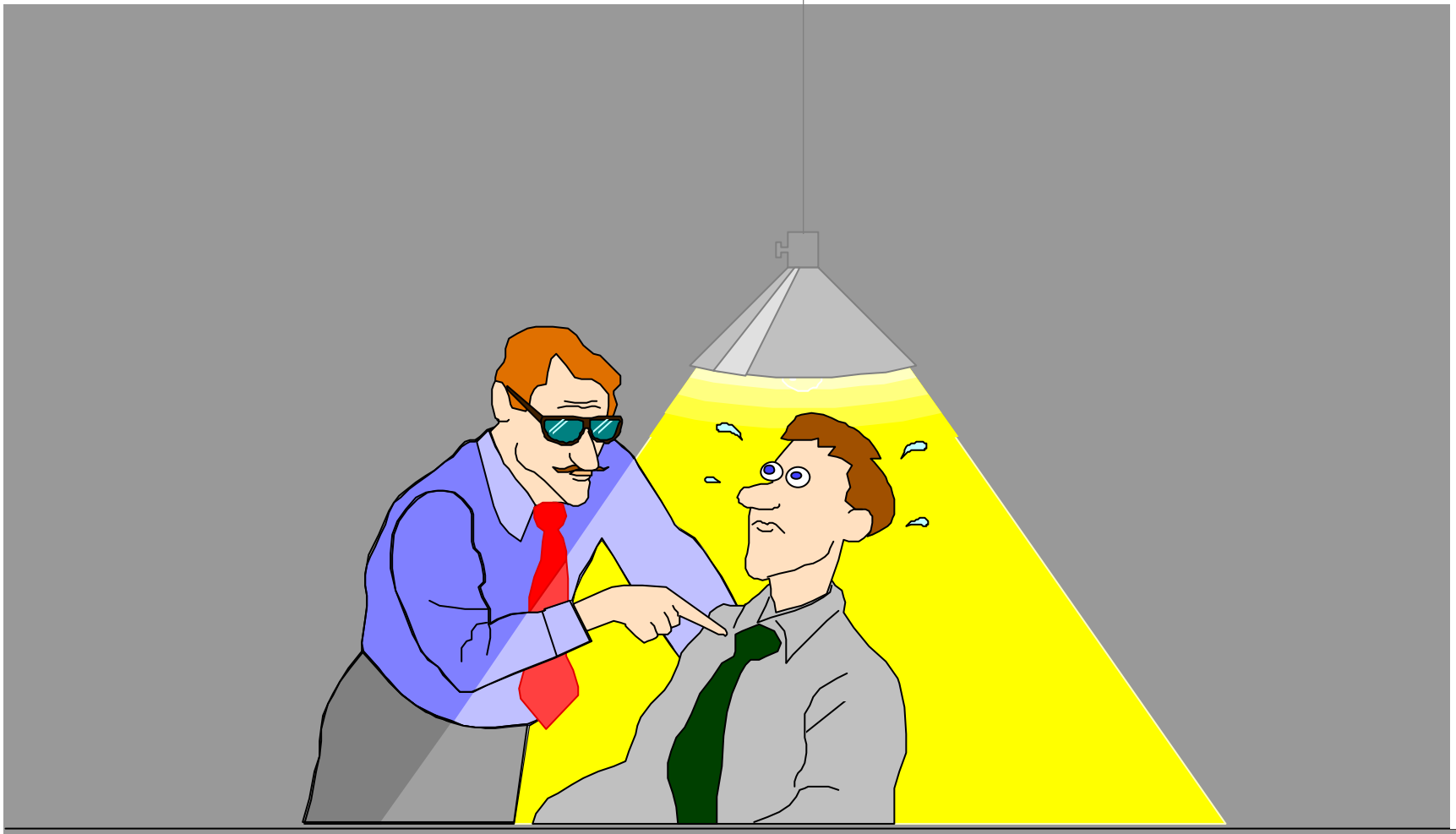
AEA installed as on edge router

- Motivation
- Protocols
- Scenarios
- xDSL
- NAT
- **Status**
- Summary
- Discussion

Summary

- **Complete : Theoretical Part**
  - **Research**
  - **Planning**
  - **Installation of xDSL router and RSVP**
- **To Be Done : Implementation**
  - **Development of AEA**
  - **Tests**

Questions & Discussion



- Motivation
- Protocols
- Scenarios
- xDSL
- NAT
- Status
- Summary
- **Discussion**

AQUILA

AQUILA (IST-1999-10077)

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

Thank you for your attention !

http://www-st.inf.tu-dresden.de/aquila/