

# An Adaptive Live Media Streaming Architecture



Lambros Lambrinos

*Ellie Demetriou*

Dept. of Communication and Internet Studies

Cyprus University of Technology

[lambros.lambrinos@cut.ac.cy](mailto:lambros.lambrinos@cut.ac.cy)

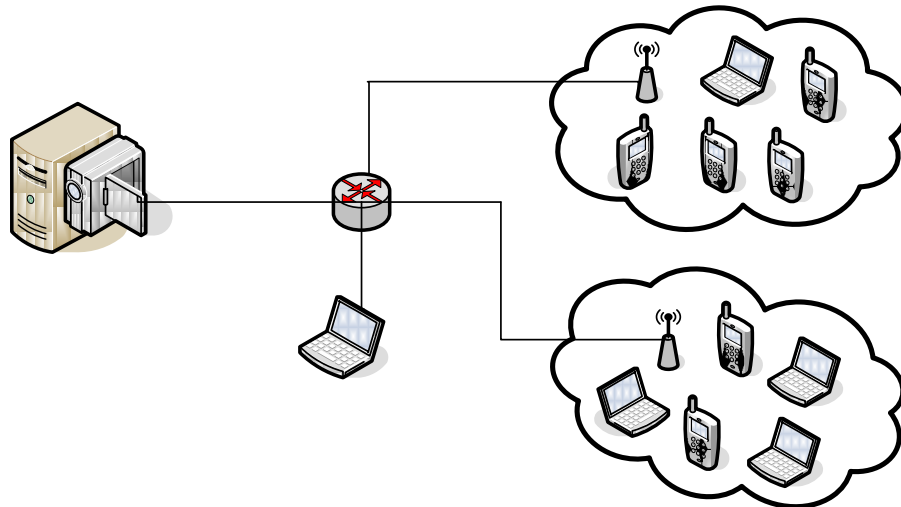
[ellie.demetriou@cut.ac.cy](mailto:ellie.demetriou@cut.ac.cy)

# Presentation Outline

- **Introduction**
  - **Background**
  - **Streaming**
- **Live Media Streaming Modules**
- **Live Media Streaming Architecture**
- **Conclusions & Future Work**

# Introduction

- Increase in Internet connectivity speeds
- Enable streaming of quality multimedia data
- Unpredictable network conditions
- Propose an architecture that dynamically change to provide QoS at minimal cost



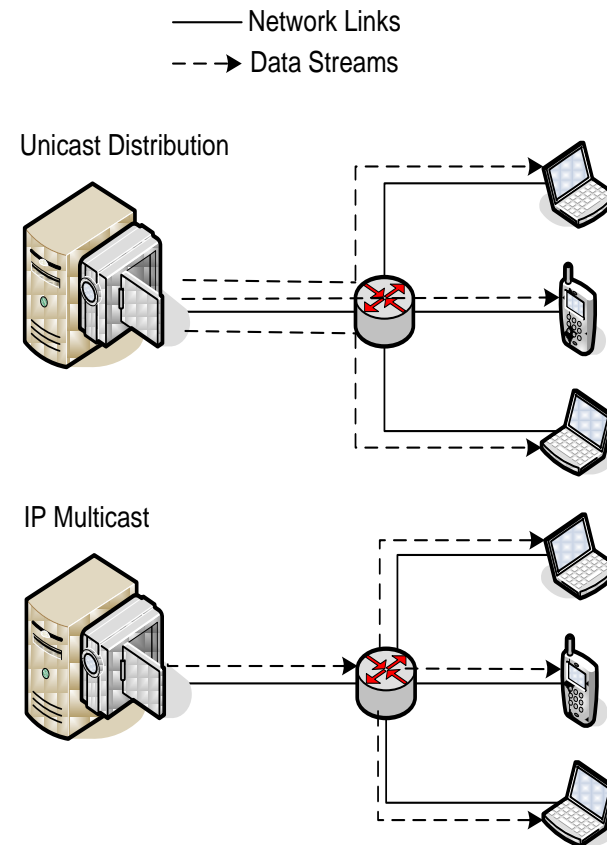
# Background <sub>1</sub>

- Unicast Distribution

- ☞ One-to-One Connection
- ☞ Increase Server Workload
- ☞ Increase Network Traffic

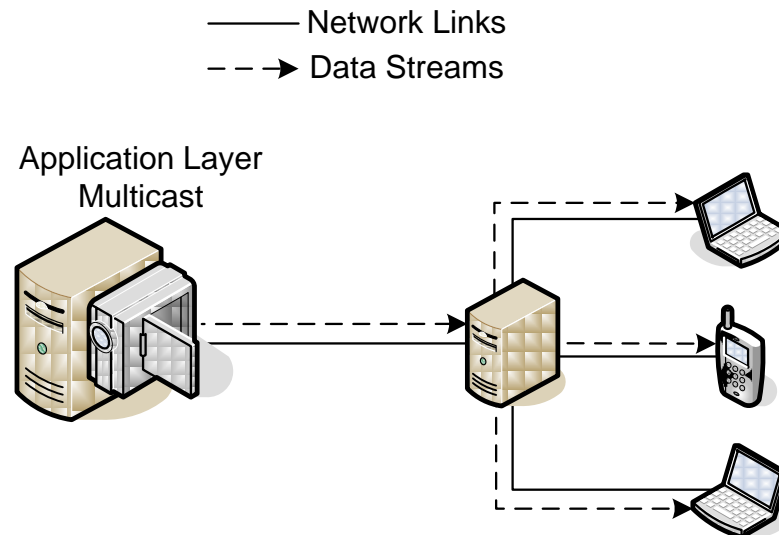
- IP Multicast

- ☞ Better Network Resources Utilization
- ☞ Routers Modification
- ☞ Lacks on Access Control and Security



# Background <sub>2</sub>

- Hybrid Solutions
  - Combine Unicast and Multicast Techniques
- Application Layer Multicast
  - Reflector/Relay



# Streaming

- Aim
  - Stream live events to multiple clients
- Requirements
  - Scalability
  - High QoS
  - Simple client model
- Idea
  - Middleware infrastructure
  - Continuous monitoring of client feedback
  - Dynamic Architecture Modification

# Live Media Streaming Modules 1

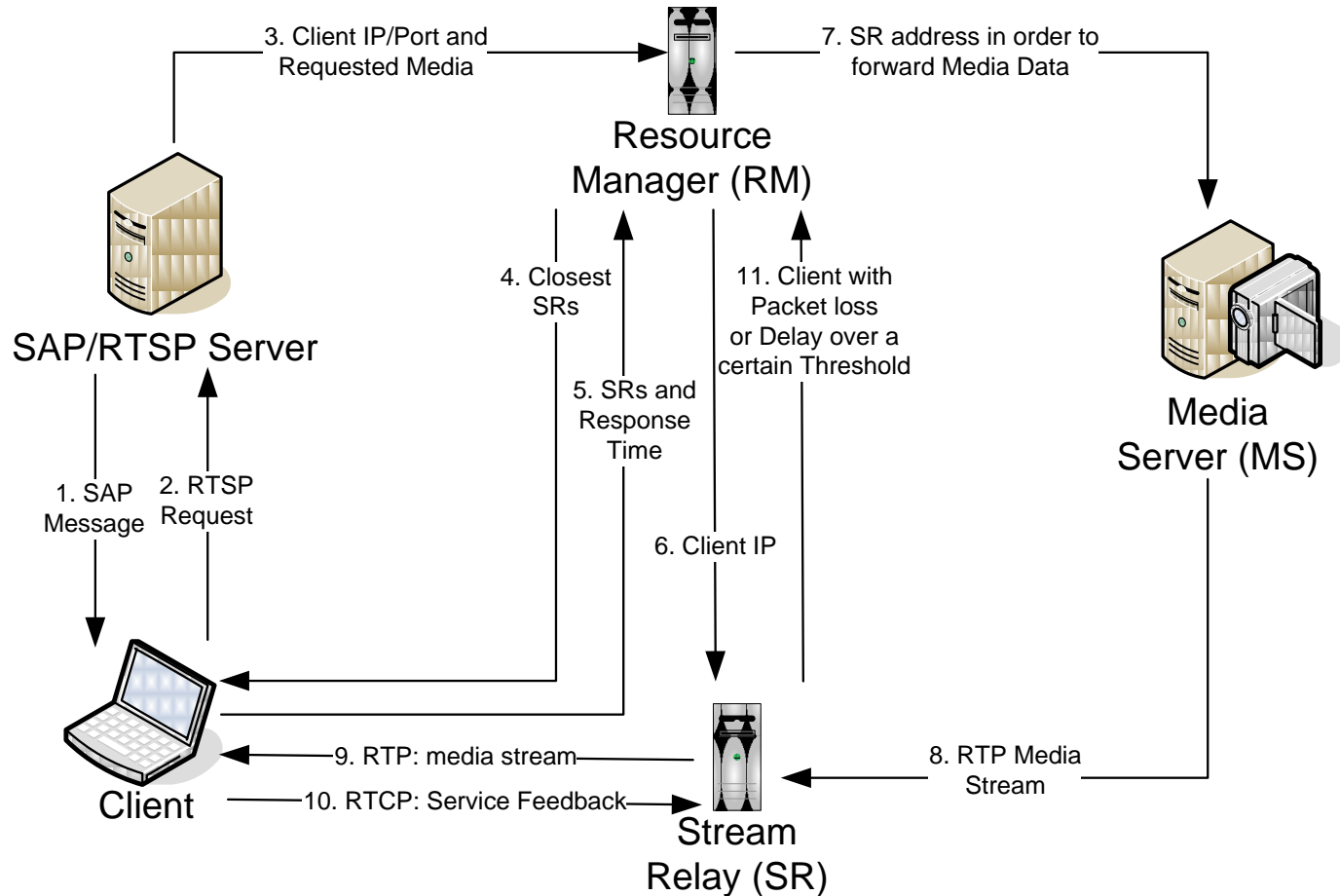
- **SAP/RTSP Server**
  - Announce the availability of new media streams
  - Handle (at an initial stage) client join requests
- **Media Server (MS)**
  - Receive the media stream from the original source
  - Forward it to the Stream Relays
- **Stream Relay (SR)**
  - Forward the media stream from the media server to a given list of clients
  - Process client's feedback

# Live Media Streaming Modules 2

- Resource Manager (RM)
  - Generate and maintenance the network topology
  - Decide to which SR a new client should be allocated
  - Decide to which SR an existing client should be moved
  - Update MS client list
- Client
  - Interoperate with other components of the system via open standards
  - Request and Receive media data
  - Send feedback about the stream quality



# Live Media Streaming Architecture



# Conclusions & Future Work

- Remove Network Traffic from Core to Edge
- Improve Client Experience
- Implement Proposed Architecture - utilising existing standards and software
  - Define Protocols
  - Design new optimized Algorithms
- Deployment of the architecture implementation over the Grid infrastructure

**Thank You**