An Adaptive Live Media Streaming Architecture

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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

- **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

- 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

- **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

- **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

1. SAP Message
2. RTSP Request
3. Client IP/Port and Requested Media
4. Closest SRs
5. SRs and Response Time
6. Client IP
7. SR address in order to forward Media Data
8. RTP Media Stream
9. RTP: media stream
10. RTCP: Service Feedback
11. Client with Packet loss or Delay over a certain Threshold
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