

Objective: To design a reputation-based p2p live streaming system to solve mainly two real life problems; first is scalability issue of client-server system and second is free riding problem of P2P system itself.

Currently, in live streaming architecture, people are using a client-server model. But the demand for the load on the server is increasing every day. So, scalability is the major issue. In the P2P live streaming system, there will be no centralized server; each peer will be acting as a client as well as a server. Selfish peers try to gain from the system without contributing to the system. That's why, we need an incentive mechanism to motivate peers to contribute to the system. This motivates us to build a **Reputation-based Peer-to-Peer (P2P) live streaming system**.

We have divided the streaming of media into two parts – Single-Layer Streaming and Layered Streaming. In layered streaming, we have different quality of media layer.

Actual motivation of using layered video is to give more incentive to peers who are contributing. If peers contribute more, they will have more no. of layers which in turn will have better quality of video.

For calculating the contribution of peers, we have analysed the formula for reputation aggregation.

Reputation calculations

• Reputation for peers in single layer streaming

$$R(t) = R(t-\tau)e^{-\alpha\tau} + R_x$$
$$R(t) = \frac{R(t-\tau)e^{-\alpha\tau} + R_x}{1 + R_x}$$

$R(t) \in [0, 1]$

R_x = Reputation of peer sending the reputation.

* Peers earn higher reputation by sending video to higher reputation requesters.

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• Reputation of peers in layered streaming -

$$R(t) = \frac{R(t-z)e^{-\alpha z} + (R_s L)}{1 + (R_s L)}$$

$L \rightarrow$ no. of layers

* The more no. of layers peers send, the more the reputation, which in turn makes him to get the more no. of layers.

We have also built the formula for how client peers will give trust value to server peers. Here, trust value means how much the client peer is satisfied by the server peer. It is equivalent to a rating. This trust value will then play a role in reputation aggregation.

We have used game theory to find the equilibrium of the system. Server peers will decide the strategy by looking into reputation value of client peer. This strategy will give higher payoff and ultimately an equilibrium in the system. So, in our system, equilibrium means that a peer will be at a loss if he deviates from that equilibrium.

I am aiming to simulate our system with the proposed algorithm. I Need to create simulation environment where I can proof our theoretical analysis and compare with other algorithms proposed in the literature. For that I am writing pseudo code and learning few software (right now NS3).