

Weekly Report:

Paper Study:

Stochastic Differential Equation Approach to Model BitTorrent-like P2P Systems

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This paper derives three stochastic differential equations to represent the dynamics and evolution of a BitTorrent-like P2P system. Compared with the paper "Modeling and performance analysis of bittorrent-like peer-to-peer networks", it contains three state spaces of peers. Type 1 peer is a leecher that holds a few chunks, Type 2 peer is a leecher that holds most but not all chunks. Type 3 is a seeder. "Modeling and performance" only considers two types of peers, leechers and seeders.

With more peer states, then it could be possible to calculate the transfer rate (downloading and uploading) with more details.

To study the steady-state performance, it let the $dX_1 = dX_2 = dY = 0$. But we could see from the simulation results that numbers of leechers or seeders' change over time are Oscillation. So maybe we could consider the forms of function $X_1 + X_2$ and Y are $\cos(t)$ or $\sin(t)$.

To represent the dynamics and evolution of P2P networks, it is important to calculate the conversion from one state to another. Bin's paper considers three states which distinguish two types of leechers. This could make it have more details about the downloading and uploading between peers. So the results are better which could be seen from the simulation results.