Distributing Digital Products in Peer-to-Peer Networks

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ABSTRACT

As Peer-to-Peer (P2P) quickly gains popularity for its nearly unlimited scalability, the amount of copyright infringing incidents surges even more rapidly. While record industry pleads for prohibiting P2P by lawmakers, academicians and practitioners turn to look for more constructive ways: using P2P as a profitable and legitimate distribution channel. By offering rebate to those who share content with others, incentive can be provided for hosting copyrighted material as well as motivating product diffusion process. As several business models are already in practice, rigorous studies of this novel distribution mechanism are still largely absent. This dissertation represents one of the first analytical studies of P2P content distribution. Conceptually, it can be divided into three essays. The diffusion models developed in essay 1 builds up the analytical foundations for further optimization. Comprehensive analysis is conducted to reveal the impact of different parameters on the diffusion process, including the rebate, network topology, and searching mechanism. Based on them, essay 2 studies the optimal distribution process under different scenarios. Both static and dynamic rebating strategies are explored to find the optimal rebate amount such that the content distributor’s total profit/utility is maximized. Finally, essay 3 studies the economics of P2P distribution. Compared with traditional centralized content distribution schemes, gains and losses of P2P distribution are evaluated in terms of different metrics. The conditions under which P2P distribution is preferred are derived and discussed.