**Project Title: Unreeling Netflix: Understanding and Improving Multi-CDN Movie Delivery**

**Author Name:** Vijay Kumar Adhikari

**Abstract:** Netflix is one of the leading internet subscription service companies. Understanding the Netflix architecture and its performance can shed light on how to best optimize its design as well as on the design of similar on-demand streaming services. In this paper, they performed a measurement study of Netflix to uncover its architecture and service strategy. Netflix employs a blend of data centers and Content Delivery Networks (CDNs) for content distribution. A periodic computation of the three CDN’s employed by Netflix is done, in order to measure the delivery bandwidth. Finally, as improvements to Netflix’s current CDN assignment strategy, they proposed a measurement-based adaptive CDN selection strategy and video delivery strategy, and demonstrated their potentials in significantly increasing user’s average bandwidth.

**Project Title: Optimal Content Placement for a Large-Scale VoD System**

**Author Name:** David Applegate, Aaron Archer

**Abstract:** PTV service providers offering Video-on-Demand (VoD) typically have many servers at each metropolitan office to store all the videos in the library. It will soon become infeasible to replicate the entire library at each office as the video on demand library size is increasing. Hence they have presented an approach for intelligent content placement that scales to large VoD library sizes. The problem is formulated as a mixed integer program (MIP) that takes into account constraints such as disk space, link bandwidth, and the skew in content popularity. To overcome the challenges of scale, it is observed that a Lagrangian relaxation-based decomposition technique can find a near-optimal solution (e.g., within 1-2%) with orders of magnitude speedup. Simple strategies are adopted to address practical issues such as popularity estimation, content updates, short-term popularity fluctuation, and frequency of placement updates. Using traces from an operational system, it is seen that this approach significantly outperforms simpler placement strategies. For instance, the MIP-based solution can serve all requests using only half the link bandwidth used by LRU cache replacement policy. The tradeoff between disk space and network bandwidth is also investigated.

**Project Title: A Collaborative Framework for In-network Video**

**Caching in Mobile Networks**

**Author Name: Jun He, Honghai Zhang**

The need to place frequently accessed information close to the requestor is becoming progressively important. However, this is a difficult problem due to the large number of online videos and video requests, limited capacity of caching nodes, and limited bandwidth of in-network links. . In this paper, they propose a dynamic collaborative video caching framework to be deployed in mobile networks. The caching problem is decomposed into a content placement subproblem and a source-selection subproblem. SRS (System capacity Reservation Strategy) is then developed to solve the content placement subproblem, and LinkShare, an adaptive traffic-aware algorithm to solve the source selection subproblem. Our framework supports congestion avoidance and allows merging multiple requests for the same video into one request. We carry extensive simulations to validate the proposed schemes. Simulation results show that the SRS algorithm achieves performance within 1 − 3% of the optimal values and LinkShare significantly outperforms existing solutions

**Project Title: Coordinating In-Network Caching in Content-Centric Networks: Model and Analysis**

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**Abstract:** In-network content storage has become an inherent capability of routers in the content-centric networking architecture. This raises new challenges in utilizing and provisioning the in-network caching capability, for instance, how to optimally provision individual routers’ storage to cache contents, so as to balance the trade-offs between the network performance and the provisioning cost. To address this problem, they proposed a holistic model to characterize the network performance of routing contents to clients and the network cost incurred by globally coordinating the in-network storage capability. An optimal strategy is derived for provisioning the storage capability that optimizes the overall network performance and cost, and analyze the performance gains via numerical evaluations on real network topologies and is also demonstrated which has achieved a significant gain on both the load reduction at origin servers and the improvement on the routing performance.